

Study on the Correlation Between Mental Health and Socio-Demographics of Patients in Five Designated Treatment Hospitals in China During the Covid-19 Outbreak: A Cross-Sectional Survey

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Abstract

The global epidemic of 2019 Novel Coronavirus Diseases (COVID-19) has caused many psychological problems. During the peak period of COVID-19 outbreak in China, COVID-19 patients from 5 designated hospitals with new coronary pneumonia were selected by convenient sampling method. Symptom Checklist 90 (SCL-90) were investigated by either a convenient online questionnaire at: WJX.cn as a data collecting platform or an equivalent paper questionnaire. It showed that the positive detection rate of SCL-90 in the COVID-19 patients was 29.83%. The most common mental health problem was anxiety (28.3%), and the top three prominent mental health problems are depression (9.4%), interpersonal sensitivity (9.4%), paranoia ideation (7.7%). Compared with the Chinese adult norm, there were significant differences in the SCL-90 total score and somatization, depression, anxiety, and phobic anxiety dimension ($P < 0.05$). The main influencing factors of mental health of COVID-19 patients are the number of confirmed cases nationwide, sex, marital status and psychological intervention. The mental state of some groups is relatively low, which leads to depression and anxiety more easily. In particular, the most vulnerable group was found to be unmarried women who have a high occurrence rate of mental health problems. We need to pay particular attention to high risk groups, and support patients with increased susceptibility, which will require timely assessment by mental health care professionals.

Keywords: COVID-19, Symptom Check-List 90 (SCL90), Psychological, Patient

Abbreviation

COVID-19 Corona Virus Disease 2019
SCL-90 Symptom Checklist 90
ANOVA One-Way Analysis of Variance
IBM SPSS 25.0 Statistical Package for the Social Sciences
SD Standard Deviation
SOM Somatization
OC Obsessive-Compulsive
IS Interpersonal Sensitivity
DEP Depression
ANX Anxiety
HOS Hostility
PHOB Phobic Anxiety
PAR Paranoid Ideation
PSY Psychoticism
ADD Additional items

Introduction

In late December 2019, a series of unexplained pneumonia cases occurred in Wuhan, China [1]. In January 7, 2020, the pathogenic pathogen was identified as a new type of corona virus (Corona Virus Disease-19, COVID-19) [2]. At present, the new type of corona virus pneumonia has spread widely and rapidly in China and many other countries, causing an outbreak of acute infectious pneumonia. It was subsequently declared as an international public health emergency by the World Health Organization (WHO) [3]. The new COVID-19 is highly infectious, and the population is generally susceptible to it, showing a cluster of disease. The clinical manifestations are complex and diverse [4-6], dyspnea and/or hypoxemia may occur, and severe cases rapidly progress to acute respiratory distress syndrome, septic shock, difficult to correct metabolic acidosis and blood coagulation dysfunction, etc., will eventually become multiple organ failure death.

According to the psychological stress theory, when an individual

encounters a huge crisis, the individual will produce a series of emotional, behavioural and physiological stress responses based on their own cognition and evaluation [7]. With the increase in confirmed cases and the increase in the number of provinces and countries affected by the epidemic, the public is worried about possible infection. Studies have shown that since the outbreak of the new COVID-19 epidemic, more and more patients and suspected cases, as well as more and more provinces and countries affected by the epidemic, have aroused public concern about infection [8]. According to a survey on February 18-20 and 21-22, there is widespread concern among the public, and a high percentage of people have fear, anger, sadness, and panic [9].

Excessive negative emotions cannot be adjusted in time, and the individual stays in a state for a long time, which will damage the individual's physical and mental health and lead to psychological problems [10]. A large multicenter cohort study conducted by HAMER found that people with higher psychological stress would increase viral infections (OR=1.23, 95% CI: 1.14 to 1.33) and pneumonia (OR=1.20, 95% CI: 1.13 ~ 1.28) mortality rate. Epidemiological and zoological studies have also shown that psychological stress is considered as a potential auxiliary factor in the pathogenesis of infectious diseases, which may change the sensitivity of animals and humans to the source of infection, thereby affecting the onset, process and pathology of certain infectious diseases results [11-12].

In the early stage of COVID-19 outbreak, a large number of infected patients appeared in a short time. At the same time, the society knows little about the disease, and China has adopted unprecedented national isolation measures, which has deeply increased the psychological burden of the patients diagnosed. Therefore, as the most affected patients with COVID-19 pneumonia, it is particularly important to understand their psychological status.

This article uses the psychological symptom checklist-90 (SCL-90) to conduct a cross-sectional study design to evaluate the mental health of patients with mild and common COVID-19 pneumonia in Guangdong and Hubei provinces, and to help clinical nursing staff Develop effective and targeted care plans to solve the actual problems of patients, and provide reference and basis for clinically effective psychological intervention measures for patients [13].

Method Design

A cross-sectional exploratory design was used.

Respondents and Procedure

The convenience sampling method was used to select Jiangmen Central Hospital, Jiangmen Wuyi Traditional Chinese Medicine Hospital, Hubei Provincial Public Security County Hospital of Traditional Chinese Medicine, Hubei Public Security County People's Hospital, and The First Affiliated Hospital of Guangzhou Medical University from February 17, 2020 to March 5, 2020, Patients with mild and common new COVID-19 pneumonia treated by the five hospitals were the subjects of investigation.

Inclusion criteria: 1)the mild and common confirmed COVID-19 patients diagnosed in the "Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia (Trial Version 7)" issued by the National Health Commission of the People's Republic of China;2)age \geq 16 year; 3) clear awareness and no history of diagnosis, treatment or psychiatric medication for a mental illness;4) patients whose voluntarily participated in the study and with an informed consent. Exclusion criteria: 1) patients whose condition changes to severe and critically ill;2)had severe cognitive dysfunction or mental disorder or cannot cooperate; 3) recent major psychological trauma; 4) unable to complete the questionnaire independently [14].

This study has been approved by the Ethics Committee of XXX (ref. [2020]115/A). The main person in charge of the project has conducted unified training for investigators in each hospital through the Tencent Meeting APP. The investigators informed the patients the purpose, procedures and precautions of the study. With informed consent, the investigators would show the patients a paper version or the questionnaires were uploaded onto Wenjuanxing, which is an online survey platform used to collect survey data. So that the patients could fill the questionnaire by scanning the QR code using a public mobile phone provided by the isolation ward or his own one. The patients who could not use smart phone could fill a paper version, all the contents and results recorded on paper files are transmitted as camera images. The questionnaire was required to be completed within one week of hospitalization. If the research subject has questions during the filling process, the investigator would patiently explain. 145 electronic questionnaires and 36 paper version were effectively retrieved. The study included a total of 181 patients who participated.

Health technical personnel at all levels have been approved by the health administrative department and obtained corresponding qualifications and practicing certificates. In this study, "implementer of psychological intervention" refer to the medical staff who can carry out psychological intervention to COVID-19 patients face to face, which are specifically divided into two categories: One is the doctor who has been certified by the administrative department of health and family planning as having psychiatric qualifications; The other one is the nurse in charge of the isolation ward. All psychological intervention implementers in the five designated hospitals of COVID-19 received unified training of Guiding Principles of Emergency Psychological Crisis Intervention for Pneumonia in novel coronavirus issued by the National Health Commission on January 26, 2020, and passed the examination. At the same time, all the implementers of psychological intervention have studied SPIKES and related psychological training in America [15].

We invite psychologists to work together to develop psychological intervention programs. Psychological intervention takes about 30 minutes. The process includes: 1) Seeking needs and expressing concern; 2) Encourage patients to express their feelings; 3)To provide knowledge and information about COVID-19; 4) In order to provide effective self-psychological intervention methods, we recommend cognitive behavior therapy, mindfulness therapy, physical exercise in the ward and listening to mu-

sic; 5) Evaluate the psychological state of patients and further deal with serious psychological problems [16].

Measurements

Psychological Component Summary
Symptom Check-List 90 (SCL90)

The Symptom Check List 90 (SCL-90) was compiled by L.R [13]. Derogatis and translated and revised by Wang Zhengyu, which is widely used to measure the mental health of adults over 16 years old [17-18]. The scale has a total of 90 items, involving 10 factors: Somatization (SOM), Obsessive-Compulsive (OC), Interpersonal Sensitivity (IS), Depression (DEP), Anxiety (ANX), Hostility (HOS), Phobic Anxiety (PHOB), Paranoid Ideation (PAR), and Psychoticism (PSY) and seven other items (ADD) that do not belong to these nine dimensions. The items on the scale adopt the Likert 5-level scoring method (0=never, 1=mild, 2=moderate, 3=severe, 4=severe), the sum of 90 items is the total score of SCL-90, the items of each factor The total score divided by the number of items in each factor is the score of each factor. When the total score is ≥ 160 points or any factor score is ≥ 2 points, it can be judged as positive. Factors are divided into severity: 2-2.9 is mild, 3-3.8 is moderate, and 3.9 and above are severe[19]. The reliability coefficient of the SCL-90 total scale Cronbach's α is 0.98. The reliability coefficient Cronbach's α of the 10 factors of the SCL-90 scale is 0.823~0.957.

Demographic Variables

Gender, age, education, marital status, annual income, hospital treatment, number of confirmed cases nationwide, psychological intervention implementer and number of psychological interventions.

Analysis

Use IBM SPSS 25.0 to enter and count data. The measurement data conforming to the normal distribution are expressed as mean \pm standard deviation; single factor analysis is performed using t test or F test; multiple regression analysis is used to further statistical analysis of factors with statistical differences in single factor analysis. The test level is $\alpha=0.05$, and the difference is statistically significant with $P<0.05$.

Results

Characteristics of Participants

General data of 181 COVID-19 patients, mainly from 156 cases (86.2%) in Hubei Province. There are slightly more women in the study, mainly aged 16-59(79.0%). The education level is mainly high school or below, accounting for 68.5%. The maximum number of married persons is 147 (81.2%). The annual income of 122 cases (67.4%) was less than 80,000. Among the subjects, mental health care intervention was provided once in 38 cases (21.0%). See Table 1 for details.

Table 1: Basic Information Table of Patients in The Survey (n = 181)

Variables	Overall	
	N	%
Gender		
Male	87	48.1
Female	94	51.9
Age(years)		
16-35	57	31.5
36-59	86	47.5
≥ 60	38	21.0
Educational attainment		
Below junior high school	67	37.0
High school / secondary school	57	31.5
College	31	17.1
University and above	26	14.4
Marital status		
Unmarried	28	15.5
Married	147	81.2
Divorce	4	2.2
Widowed	2	1.1
Annual income		
Less than 80,000	122	67.4
80,000-300,000	56	30.9
More than 300,000	3	1.7

Variables	Overall	
	N	%
Hospital		
Hospital A	16	8.8
Hospital B	87	48.1
Hospital C	4	2.2
Hospital D	65	35.9
Hospital E	9	5.0
The number of confirmed cases nationwide		
17th February - 23nd February : 45000-60000	80	44.2
24th February - 29th February : 35000- 45000	34	18.8
1st March - 5th March: 20000 - 35000	67	37.0
Psychological intervention implementer		
Psychologist	23	12.7
The responsible nurse in the isolation ward	39	21.6
No implementer	119	65.7
Number of psychological interventions		
0	119	65.7
1	38	21.0
2	13	7.2
≥3	11	6.1
Note: Hospital A=Jiangmen Center hospital, Hospital B=Gong'an Hospital of Traditional Chinese Medicine, Hospital C=Gong'an County People's Hospital, Hospital D=The First Affiliated Hospital of Guangzhou Medical University, Hospital B=, Hospital E=Wuyi Traditional Chinese Medicine Hospital of Jiangmen City		

Mental Health Status of Covid-19 Patients

According to the SCL-90 psychological abnormality scoring standard, the questionnaire results showed that 50 COVID-19 patients had a total score of more than 160 points, accounting for the ratio is 27.60%; 54 COVID-19 patients had positive symptoms, with a positive rate of 29.83%.

In Fig.1, it showed that ADD (26.5%) had the highest level of mild abnormalities, followed by ANX (21.1%), OC (18.2%), IS (17.1%), PHOB (17.1%). Mental health problems that have reached a moderate or higher severity are mainly: DEP (9.4%), IS (9.4%), PAR (7.7%). Among these ten dimensions, indicating that the COVID-19 patients felt ANX, IS, DEP, and a poor appetite with sleeplessness.

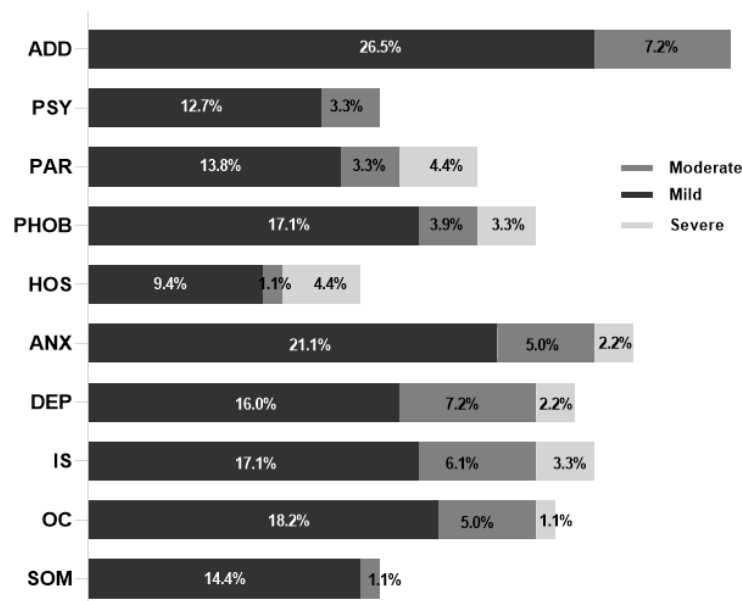


Figure 1: SCL-90 Scale Score Severity Distribution in This Study Sample.

Comparison with the Chinese norms of SCL-90The t-test results show that the total score of SCL-90 and SOM ,DEP,ANX ,PHOB were more significant than those of the Chinese norms of SCL-90 (P<0.05).See Table 2 for details [20].

Table 2: Comparison of SCL-90 scores between the COVID-19 period and the Chinese norms (mean ± SD).

Group	Total score	SOM	OC	IS	DEP	ANX	HOS	PHOB	PAR	PSY
Chinese norm	129.96±38.96	1.37±0.17	1.62±0.58	1.65±0.51	1.50±0.59	1.39±0.43	1.48±0.56	1.23±0.41	1.43±0.57	1.29±0.42
COVID-19 patients	139.61±60.31	1.46±0.51	1.59±0.74	1.59±0.90	1.63±0.77	1.62±0.81	1.47±0.86	1.52±0.84	1.50±0.89	1.35±0.52
t	2.152	3.227	-0.476	-0.843	2.324	3.879	-0.178	4.674	1.098	1.652
P	0.03	0.001	0.653	0.400	0.021	<0.001	0.859	<0.001	0.273	0.100

ANOVA of Different Groups

As shown in Table 3, SOM is affected by gender, the number of confirmed cases nationwide, number of psychological interventions, and ppsychological intervention implementer. DEP and ANX are affected by gender, age, marital status, number of con-

firmed cases nationwide, number of psychological interventions, and psychological intervention implementer. PHOB are affected by gender, age, marital status, annual income, number of confirmed cases nationwide, number of psychological interventions, and psychological intervention implementer.

Table 3: One-way ANOVA for SOM , DEP , ANX , PHOB, Total score.

variable	SOM	DEP	ANX	PHOB	Total score
Gender					
Male	1.32±0.38	1.44±0.65	1.42±0.72	1.33±0.72	122.91±51.56
Female	1.58±0.57	1.82±0.83	1.81±0.83	1.70±0.90	155.06±63.86
t	-3.720**	-3.419**	-3.447**	-3.124**	-3.740**
Age(years)					
16-35	1.56±0.55	1.93±0.99	2.02±1.00	1.88±1.11	166.91±76.10
variable	SOM	DEP	ANX	PHOB	Total score
Age(years)					
36-59	1.45±0.53	1.55±0.65	1.52±0.68	1.40±0.67	131.01±50.91
≥60	1.32±0.35	1.38±0.47	1.26±0.42	1.26±0.46	118.61±34.31
F	2.675	7.347**	13.061**	8.571**	10.050**
Marital status					
unmarried	1.48±0.36	2.35±1.17	2.52±1.16	2.50±1.35	199.00±90.47
married	1.46±0.54	1.50±0.59	1.46±0.60	1.35±0.55	129.12±45.96
Divorce	1.33±0.26	1.69±0.79	1.56±0.64	1.32±0.55	130.25±46.41
Widowed	1.13±0.06	1.12±0.05	1.25±0.21	1.00±0.00	98.00±2.83
F	0.375	11.557**	17.689**	20.038**	13.076**
Annual income					
Less than 80,000	1.48±0.55	1.57±0.65	1.59±0.77	1.40±0.63	135.53±53.18
80,000-300,000	1.42±0.40	1.80±0.99	1.71±0.90	1.82±1.14	150.36±73.8
More than 300,000	1.06±0.10	1.08±0.00	1.20±0.00	1.00±0.00	104.67±4.04
F	1.273	2.470	0.855	0.004**	1.684
The number of confirmed cases nationwide					
17th February - 23rd February : 45000-60000	1.58±0.54	1.82±0.90	1.90±0.87	1.78±1.02	157.69±68.38
24nd February - 29th February : 35000- 45000	1.47±0.44	1.70±0.74	1.59±0.78	1.51±0.75	141.97±56.45
1st March - 5th March: 20000 - 35000	1.30±0.46	1.38±0.52	1.31±0.61	1.22±0.45	116.82±42.43
F	5.679**	6.484**	10.618**	5.752**	9.167**

Psychological intervention implementer					
Psychologist	1.90±0.77	2.55±1.07	2.39±0.93	2.63±1.12	209.04±81.53
The responsible nurse in the isolation ward	1.49±0.48	1.47±0.44	1.51±0.69	1.18±0.25	125.33±36.82
No implementer	1.36±0.40	1.51±0.67	1.51±0.74	1.42±0.73	130.87±52.80
<i>F</i>	12.734**	22.973**	13.727**	32.742**	21.618**
Number of psychological interventions					
0	1.36±0.40	1.51±0.67	1.51±0.74	1.42±0.73	130.87±52.80
1	1.63±0.57	1.88±0.86	1.92±0.88	1.75±0.97	158.53±66.58
variable	SOM	DEP	ANX	PHOB	Total score
Number of psychological interventions					
2	1.94±0.87	2.26±1.19	2.18±1.01	2.13±1.26	189.31±89.54
≥3	1.35±0.29	1.37±0.19	1.14±0.16	1.12±0.23	110.09±10.25
<i>F</i>	7.887**	5.987**	6.378**	4.993**	6.436**
Note:* P <0.05; ** P <0.01					

Multiple Linear Regression Analysis

As shown in Table 3, Total score of SCL-90 is affected by gender, age, marital status, the number of confirmed cases nationwide, number of psychological interventions, and psychological intervention implementer ($P < 0.05$). Then, multiple linear regression analysis was performed to establish the best regression

model and find the independent risk factors of the total score of SCL-90. The results showed that independent risk factors of the psychological health of patients were the number of confirmed cases during survey, female, unmarried, psychologist and the responsible nurse in the isolation ward. See Table 4 for details.

Table 4: Multiple linear regression analysis for Total score.

	B	SE	β	t	p
Constant	213.02	20.59	-	10.35	<0.001
The number of confirmed cases during survey	-8.46	4.43	-0.13	-1.91	0.050
Female	22.81	7.86	0.19	2.90	0.004
Unmarried	-46.87	11.93	-0.30	-3.90	<0.001
Psychologist	-56.47	13.92	-0.39	-4.06	<0.001
The responsible nurse in the isolation ward	-50.07	12.25	-0.40	-4.09	<0.001

Discussion

The Basic Situation of The Mental Health of Covid-19 Patients In this study, 50 survey subjects had a total score of more than 160 points, accounting for 27.60%, which was higher than Qin Xuemei survey results on the mental health of 112 COVID-19 patients admitted to Changsha area (the results of the survey showed that the positive rate was 21.4%) [21].

All the COVID-19 patients had varying degrees of psychological symptoms. Besides ADD, ANX is the highest among those with mild abnormalities, accounting for 21.1% of the total. A brief review article emphasized that anxiety is the main emotional reaction during the outbreak of a pandemic [22]. Psychological problems have reached a moderate or more serious degree, mainly DEP and IS, both of which account for 9.4% of the total. Followed by PAR, accounting for 7.7% of the total. Next came ANX, PHOB and ADD, each accounting for 7.2% of the total. A study of COVID-19 patients admitted to Huoshenshan Hospital was similar to the results of this study: mild anxiety accounted for 17.36%, moderate anxiety 12.5%, severe anxiety 4.86%, mild depression 13.89%, moderate 10.42%, severe

4.17%. Another study has shown that anxiety symptoms may be mild at first, but they may suddenly worsen in a few days due to the long hospitalization time [23-24].

Compared with Chinese adult norms, there are significant differences in SCL-90 total scores and depression factor scores ($P < 0.05$), and somatization, anxiety, and fear factor scores are all significantly different ($P < 0.01$). The results of this study are consistent with the results of Qin Xuemei's investigation on the mental health of 112 COVID-19 patients admitted to Changsha [21].

The results of the study suggest that the mental health of COVID-19 patients is lower than normal. The author believes that the mental health situation of patients with COVID-19 is not optimistic for the following reasons:

The outbreak of the new corona virus pneumonia coincides with the Chinese New Year period. In a short period of time, the number of infection cases has increased exponentially. The number of hospital emergency and fever clinics has increased significantly, and medical human resources and medical supplies can-

not be guaranteed in a short time. Patients experience physical discomfort caused by infections, such as severe fever, dyspnea, and cough, as well as discomfort caused by the side effects of treatment. The patient's physical discomfort is not treated in time and aggravates the somatization symptoms. There is a close correlation between physical and mental illness [24].

The age group of the subjects in this study is mainly concentrated in 19-59 years old, accounting for 77.7%. People in this age group are also the main users of apps such as Wecom and Tik Tok. Anytime the information age comes, people can actively browse the epidemic information through various apps. According to the report of the Social Psychology Research Center of the Institute of Sociology, Chinese Academy of Social Sciences on February 18, Wecom had been the main channel for the public to understand the new corona virus pneumonia epidemic since the outbreak began [25]. With prolonged exposure to excessive media information, the anxiety situation might continue to increase, and depression symptoms might appear.

A previous article of Kamara's emphasized that during a pandemic outbreak, most of the confirmed patients will be mildly troubled, such as depression, anxiety, shame, and sadness [26]. The unpredictability and uncertainty of disease conditions in different aspects of epidemiology, as well as effective treatments, expose people to stressful situations. However, the study found that psychologists accounted for only 12.7% of psychological interventions and 65.7% of the subjects did not carry out psychological intervention. It shows that most patients do not get enough professional psychological intervention.

Isolation as the main means of treatment, the daily activities and social activities of COVID-19 patients are limited, and the access to social support is blocked. Some studies believe that isolation conditions for various reasons, such as travel restrictions, increased social distance, lack of information, depression and stigma, will adversely affect mental health [28].

In addition, the sensitive factors of interpersonal relationships need attention. The scores of the sensitive factors of interpersonal relationships have no difference compared with Chinese adult norms. However, the sensitivity of interpersonal relationships ranks first in the severity of moderate or above. The treatment of COVID-19 is mainly based on strict isolation treatment, and family cluster infections have occurred. Patients with infected family members need to bear more psychological pressure and are more likely to suffer from depression. These patients will feel guilt and stigma because of the infection to their family members [29]. Those COVID-19 patients need to be treated in designated isolation hospitals. As a result, they feel lonely and socially isolated, and may even cause depression [30].

The mental health status of COVID-19 patients needs to be paid enough attention to. The author suggests that we should pay more attention to the emotional changes of patients in clinical work and guide patients to accept negative emotions such as anxiety and depression, guide patients to vent their bad emotions correctly. At the same time, we can provide more authoritative information to patients, including government policies, overall

prevention and control of epidemic situation, number of confirmed cases, cure rate and mortality rate and so on. We can also provide more medical information to patients, including their physical condition, laboratory test results and treatment strategy. Information support can reduce perceived threats and improve coping strategies, which are protective factors for mental health [31]. The author believes that patients to use modern communication means to communicate with their relatives, friends, colleagues and organizations, including telephone, SMS, email, online chat, video voice, et al. They were encouraged to express their feelings, the support and encouragement from others are beneficial for their mental health.

Factors Affecting of Covid-19 Patients Mental Health

The results of Logistic regression analysis showed that the main influencing factors of the total SCL-90 score of COVID-19 patients were gender, marital status, the number of confirmed cases in the country, and the perpetrators of psychological intervention.

The Impact of Gender on Mental Health:

Female patients with confirmed diagnosis are more likely to have sub-symptoms than men. This is consistent with previous findings that compared to men, women are more likely to develop stress-related mental illnesses [32]. A study analyzing the prevalence of gender-related PTSS subsymptoms after a pandemic catastrophe showed that women had a higher incidence of post-traumatic emergency disorder symptoms [33]. Another study had been shown that acute mental disorders characterized by invasive memory were more common in women than men in pandemic disasters throughout the country [34]. Some evidence show that fluctuations of ovarian hormone levels is the reason for the change of sensitivity to emotional stimulation in certain stages of the menstrual cycle, which may be the reason why women are particularly prone to mental illness [35].

The Influence of Marital Status on Mental Health:

According to this study, SCL-90 total score was mainly affected by unmarried factors. Some studies have shown that stable marital relationships play a protective role in anxiety [36]. The family is the most solid harbor for individuals. Good family relationships help patients get spiritual and financial support, and can provide patients with emotional, information, and experience support. These are the belief support and the source of motivation for patients to overcome the disease, and help patients through the most difficult stage of diagnosis and treatment. This study shows the difference in marital status in the total score of SCL-90, the scores from high to low are: unmarried > divorced > married > widowed. A survey of 217 Bedouin Arab women from Negev in Israel showed that divorced women showed the strongest sense of loneliness and married women were more willing to talk about their problems with others. Divorced women show more somatization, paranoia, obsessive-compulsive disorder, depression, anxiety disorder, fear anxiety disorder and psychosis than married women [37].

The Effect of The Number of Confirmed Cases Nationwide On Mental Health:

The report showed that people's sense of security under the ep-

idemic has slowly increased with the gradual control of the domestic epidemic [25]. From January 20th to

February 20th, the social emotional response gradually changed: from higher negative emotions and lower positive emotions in the early stages of the epidemic to more positive in the later period, and optimism and calmness rose to a moderately high level, while worry, fear, anger and panic gradually declined. From the current social mentality, after several weeks of epidemic prevention and control, people had a certain degree of psychological immunity to the epidemic. Under long-term negative emotions, certain self-protection and regulation are needed, and people's epidemic concerns have decreased. With the resumption of work, student education, and the end of the Spring Festival, people's attention began to shift. For most people, the danger around them is decreasing, which eases the negative emotions and makes some people relax their vigilance against the epidemic. This study showed that over time, the total score and scores of SCL-90 of patients diagnosed in the middle and late investigations tend to approach the Chinese adult norm. This is consistent with the development trend of social emotional responses.

The Impact of Psychological Intervention Implementers on Mental Health:

This study showed that psychologist and the responsible nurse in the isolation ward as the implementer of psychological intervention had an effect on the total score of SCL-90 in patients with COVID-19. In order to understand the influence of psychological intervention implementers on mental health, we compared the mental health differences between psychologist group, nurse in the isolation ward group and non-psychological intervention group. There was a significant difference in the mental health level of COVID-19 patients between psychologist group and nurse in the isolation ward group ($p < 0.001$), and there was significant difference between COVID-19 patients without psychological intervention group and psychologist group ($p < 0.001$). However, there was no difference in mental health level between the nurse in the isolation ward group and the non-psychological intervention group ($p=0.851$). The total score of SCL-90 in COVID-19 patients with Psychologist as the implementer of psychological intervention was higher than that of COVID-19 patients with the responsible nurse in the isolation ward as the implementer of psychological intervention. The author believes that this result is due to the current national conditions in China, clinically, responsible nurses in isolation wards have more chances to contact patients. In general, responsible nurses first use a simple psychological assessment scale to roughly evaluate the psychological state of patients, and initially carry out a series of psychological intervention measures, and through the evaluation results to further cooperate closely with psychiatrists, psychologists through screening and triage. Professional psychotherapy is given to patients with serious mental health problems. Studies have shown that this approach minimizes the risk faced by patients [38]. A doctor's report found that providing psychological intervention to people with SARS or other similar infectious diseases can have significant clinical implications [39]. Although the results of this study showed that there was no difference in the total score of SCL-90 between Nurse as a psychological intervention implementer and COVID-19 patients

without psychological intervention. However, the author believes that this cannot deny the role of nurse in the implementation of psychological intervention.

RECOMMENDATIONS AND NURSING IMPLICATIONS:

In conclusion, we need to pay enough attention to the mental health status of COVID-19 patients, and we recommend that nursing staff should reinforce intervention in clinic.

1. Pay attention to the emotional changes of patients

Our data showed that the COVID-19 patients usually had poor mental health status, especially unmarried females, the principal syndromes are anxiety and depression. Therefore, we should not only pay attention to the physical state and living condition, including physiological discomfort, diet, sleep, etc, but also their mental state, especially the mental state of unmarried female patients without psychological intervention before. We need to listen to their various emotions, ask their requirements, concerns and worries, guide them to accept negative emotions such as anxiety and depression, and guide them to vent negative emotions in any way that neither hurts themselves nor others, such as crying, pouring out and listening to music.

2. Provide the correct information for patients

As is mentioned above, the mental state of COVID-19 patients is not good, in daily work, we should pay more attention to their mental problems, moreover, providing correct and positive information is important as well. We can provide more authoritative information to patients, including government policies, overall prevention and control of epidemic situation, number of confirmed cases, cure rate and mortality rate and so on. We can also provide more medical information to patients, including their physical condition, laboratory test results and treatment strategy.

3. Encourage patients to make full use of interpersonal resources

Isolation is one of the important treatments for COVID-19 patients. However, isolation is not good for the mental state of patients for the loneliness. The nursing staff should encourage patients to use modern communication means to communicate with their relatives, friends, colleagues and organizations, including telephone, SMS, email, online chat, video voice, et al. They were encouraged to express their feelings, the support and encouragement from others are beneficial for their mental health. Furthermore, nursing staff was encouraged to express and strengthen their care for patients in clinic. In addition, the patients are encouraged to communicate with each other and share their experiences.

Limitations

There are some limitations in this study. First, this study only involves mild and common types of COVID-19 pneumonia, and patients with COVID-19 pneumonia also include severe and critical patients. Second, we cannot tell whether psychological symptoms such as anxiety or depression are caused by COVID-19 or pre-existing. Third, this study has confirmed that with the development of the epidemic situation, the psycholog-

ical status of patients will be affected, but we only measured at one time point, cannot reflect the mental health status of the whole COVID-19 epidemic period.

Conclusion

This study is a cross-sectional design for one of the few researches on the mental health of COVID-19 patients. The mental health of COVID-19 patients is low, mainly manifested by mental symptoms such as depression and anxiety. The main influencing factors of the mental health of COVID-19 patients are the number of confirmed cases nationwide, gender, marital status, and psychological intervention implementers. In clinical work, we should pay attention to the emotional changes of patients, especially unmarried women. We should do psychological interventions, such as: provide correct information in time, and encourage the full use of interpersonal resources. The government should make great efforts to train professional Psychologist, and strengthen the psychological nursing level of nurses at the same time.

Declarations

Ethics Approval and Consent to Participate

The experimental protocol was established, according to the ethical guidelines of the Helsinki Declaration and was approved by the Human Ethics Committee of the Ethics Committee of Jiangmen Center Hospital (ref. [2020]115/A).

Consent for Publication

Written informed consent was obtained from individual or guardian participants.

Availability of Data and Materials

The authors declare that all data supporting the findings of this study are available within the article and its supplementary information files.

Competing Interests

The authors declare that they have no competing interests.

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Authors' contributions

Zhonghuan Liang: Conceptualization, Methodology, Formal analysis, Investigation, Data Curation, Writing-Original Draft;

Jieming Li, Xiuli Ou: Conceptualization, Methodology, Data Curation, Writing - Original Draft;

Gang He, QingDong Xu, Dongping Rao: Conceptualization, Methodology, Supervision, Project administration;

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