Analysis on mental health status and needs of health care workers in designated medical institutions of tuberculosis during the epidemic period of COVID-19

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Research article

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Abstract

Background Coronavirus disease 2019 (COVID-19) has spread rapidly in China and other overseas areas, which has aroused widespread concern. The sharp increase in the number of patients has led to great psychological pressure on health care workers. The purpose of this study is to understand their mental health status and needs, so as to provide a scientific basis for alleviating the psychological pressure of health care workers.

Methods Using a cross-sectional study design, 511 health care workers were randomly selected from two designated tuberculosis medical institutions in Anhui Province. The basic situation, perceived social support, depression level, loneliness and COVID-19 related knowledge were collected and analyzed by questionnaire.

Results There were 139 people in epidemic prevention and control positions (27.20%). Depression level: female was higher than male; nurse was higher than doctor; middle and junior job titles were higher than senior titles; junior college degree or below were higher than bachelor's degree, master's degree and above; isolation ward, fever clinic and pre-check triage were significantly higher than those of non-prevention and control positions ($P < 0.05$). Loneliness scores: doctors were higher than that of medical technicians, and isolation ward, fever clinic and pre-check triage were higher than those of non-prevention and control positions ($P < 0.05$). Social support: doctors were lower than that of medical technicians, and isolation ward, fever clinic and pre-check triage were signicantly lower than those of non-prevention and control positions ($P < 0.05$). The score of social support was negatively correlated with depression and loneliness ($P < 0.001$), while depression was positively correlated with loneliness ($P < 0.001$). Health care workers most want to receive one-to-one psychological counseling (29.75%), and provide crisis management (24.07%). The awareness rate of health care workers on COVID-19’s knowledge was relatively high.

Conclusions The psychological problems of health care workers, especially women, nurses with low educational background, low professional title, and staff in the epidemic prevention and control positions are relatively serious. We should focus on this population, and take targeted intervention measures.

1. Introduction

The Coronavirus Disease 2019 (COVID-19), formerly referred to as 2019 Novel Coronavirus (2019-nCoV) is a new respiratory virus that was first identified in Wuhan of Hubei Province, China in December, 2019. COVID-19 can result in severe and even fatal respiratory diseases such as acute respiratory distress syndrome\[^1\]. It is similar to Severe Acute Respiratory Syndrome coronavirus (SARS-CoV) virus in its pathogenicity, clinical spectrum, and epidemiology\[^2\]. The COVID-19 epidemic spreads very quickly. It took only 30 days to expand from Hubei province to the rest geographical locations of China Mainland. With many people returning from a long holiday, China needs to prepare for the possible rebound of the epidemic\[^3\]. At present, COVID-19 cases have also appeared in many overseas countries and regions, the spread of COVID-19 in the United States, Spain, Russia, Britain and Italy has become the greatest concern.
Worldwide, more than 4 million cases of COVID-19, and close to 30,000 deaths have been reported. COVID-19 is thought to have higher mortality than seasonal influenza, even as wide variation is reported[^4].

Health care workers are at high risk of COVID-19 infection, a study by Wu et al[^5] showed that a total of 72,314 cases have been reported nationwide by February 11, 2020, of which 44,672 cases have been confirmed. Of all the confirmed cases, there were 1,716 health workers (3.8%), of which 14.8% of the confirmed cases were diagnosed as severe or critical cases, and 5 cases died. Another study showed that[^6] frontline health care workers are prone to psychological problems in public health emergencies. COVID-19 is a new type of infectious disease. At present, there is a lack of effective drugs for this disease, as the main force in the fight against the epidemic, health care workers are prone to all kinds of psychological problems in the face of high-intensity and high-risk work. Two recent studies in China both revealed that the incidence of anxiety and stress disorder is high among health care workers who were treating patients with COVID-19 infection during the epidemic period[^7–8]. The National Health Commission issued a public document requiring[^9] that all localities should strengthen the psychological crisis intervention and guidance of health care workers. But at present, there are few studies on the mental health of health care workers in both epidemic prevention and control positions and non-epidemic prevention and control positions. Therefore, in order to know the mental health level of health care workers in time, and take targeted intervention measures, this study investigated the mental health status and needs of health care workers in two provincial tuberculosis designated hospitals (designated medical institutions to combat the epidemic situation of COVID-19) in Anhui Province, which is of great significance to improve the mental health level of health care workers and better carry out the work of fighting against the epidemic situation.

2. Objects And Methods

2.1 Objects

The method of random sampling was applied to select health care workers from different positions from two provincial tuberculosis designated medical institutions in Anhui province, and a questionnaire survey was conducted. A total of 540 questionnaires were distributed and 511 valid questionnaires were collected, with an effective rate of 94.63%.

2.2 Questionnaire investigation

A questionnaire survey was conducted among the selected health care workers, including: (1) Basic demographic characteristics, including gender, age, occupation, job title, education level, marital status and positions during epidemic prevention and control, etc. (2) COVID-19 related knowledge: including the source of infection, the route of transmission, the susceptible population and the main clinical symptoms, etc. (3) Perceived Social support scale (PSSS): The scale was compiled in 1987[^10], revised by Chinese scholars and widely applied in China, Cronbach’s α = 0.88[^11]. It consists of 12 items, each of which is
rated on a scale ranging from 1 to 7, and each item is randomly arranged, which is divided into three dimensions: family support, friend support and other support. The total support is the sum of the three dimensions, the higher the score, the higher the perceived social support\[^{12}\]. (4) Self-rating Depression scale (SDS): the scale includes 4 groups: psycho-emotional symptoms, somatic disorders, psychomotor disorders and psychological disorders of depression. The specific scoring method is as follows: each item is scored according to grades 1, 2, 3 and 4. The higher the score is, the more serious the degree of depression is, and the cumulative score was more than 40 points, which was judged as depression\[^{13}\]. (5) ULCA loneliness scale: The scale was compiled and revised by Russell et al\[^{14}\], including 11 "lonely" positive order items and nine "non-lonely" reverse order items, the items with asterisks should be in reverse order, and then each item should be added. The higher the score, the higher the degree of loneliness\[^{15}\].

### 2.3 Statistic analysis

The quantitative data were expressed as Mean ± Standard Deviation (Mean ± SD), t-test was used to compare the quantitative data between the two groups, one-way ANOVA was used to compare the quantitative data among different groups, Pearson correlation analysis was used when the variables were in accordance with bivariate normal distribution. The test level was $\alpha = 0.05$. The investigation and experimental data were double input by EpiData 3.1 and analyzed by SPSS 23.0.

### 3. Results

#### 3.1 Basic situation of health care workers in designated medical institutions for tuberculosis

A total of 540 questionnaires were distributed and 511 valid questionnaires were retrieved, with an effective rate of 94.63%. The average age of 511 respondents was 31.19 ± 6.62, including 88 males (17.22%), 423 females (82.78%), the proportion of nurses was the highest (57.34%), and the proportion of bachelor degree was the highest (70.65%). Also, there were 139 people in epidemic prevention and control posts, accounting for 27.20%, of which fever clinic and pre-check triage accounted for the highest proportion (9.59%), and 186 health care workers had depression, accounting for 36.40% (Table 1).
| Characteristics                      | n(%)     |
|--------------------------------------|----------|
| Gender                               |          |
| Male                                 | 88(17.22)|
| Female                               | 423(82.78)|
| Occupation                           |          |
| Doctor                               | 145(28.38)|
| Nurse                                | 293(57.34)|
| Medical technology                   | 73(14.28)|
| Job title                            |          |
| Junior                               | 336(65.75)|
| Intermediate                         | 143(27.99)|
| Senior                               | 32(6.26)|
| Education level                      |          |
| Junior college and below             | 86(16.83)|
| Bachelor's degree                    | 361(70.65)|
| Master's degree or above             | 64(12.52)|
| Marital status                       |          |
| Unmarried                            | 167(32.68)|
| Married                              | 333(65.17)|
| Divorced or widowed                  | 11(2.15)|
| Post                                 |          |
| Non-prevention and control post      | 372(72.80)|
| Isolation ward                       | 16(3.13)|
| Fever clinic and pre-check triage    | 49(9.59)|
| Imaging and laboratory diagnosis     | 43(8.41)|
| Medicament                           | 31(6.07)|
| Depressive state                     |          |
| Depression                           | 186(36.40)|
3.2 Comparison of social support, loneliness and depression scores among medical workers of different genders, occupations, job titles and educational levels.

There was no significant difference in the score of social support and loneliness among health care workers of different genders. The depression score of female was higher than that of male ($P<0.05$). One-way ANOVA showed that there were statistically significant differences in social support, loneliness and depression among different occupations. The scores of family support, friend support, other support and total support of doctors were significantly lower than those of medical technicians ($P<0.05$), the score of loneliness was higher than that of medical technicians ($P<0.05$), and the depression score of nurses was higher than that of doctors ($P<0.05$). The difference in the level of depression was statistically significant in terms of professional titles, the depression scores of intermediate and junior health care workers were significantly higher than those of senior titles ($P<0.05$). The depression scores of health care workers in junior college and below were higher than those with bachelor's degree or master's degree or above ($P<0.05$) (Table 2).
Table 2
Comparison of different genders, occupations, job titles and educational levels (Mean ± SD)

| Characteristics       | Family support | Friends support | Other support | Total support | Loneliness | Depression |
|-----------------------|----------------|-----------------|---------------|---------------|------------|------------|
| **Gender**            |                |                 |               |               |            |            |
| Male                  | 23.84 ± 3.59   | 23.20 ± 3.63    | 22.77 ± 3.81  | 69.82 ± 10.23 | 35.23 ± 11.20 | 34.27 ± 10.63 |
| Female                | 23.91 ± 3.50   | 23.01 ± 3.59    | 22.75 ± 3.60  | 69.67 ± 9.83  | 37.28 ± 10.37 | 36.97 ± 9.55  |
| **t**                 | 0.17           | 0.47            | 0.04          | 0.13          | 1.67       | 2.37       |
| **P**                 | 0.862          | 0.639           | 0.97          | 0.901         | 0.096      | 0.018**    |
| **Occupation**        |                |                 |               |               |            |            |
| Doctor                | 23.60 ± 3.50   | 22.83 ± 3.29    | 22.51 ± 3.58  | 68.94 ± 9.39  | 36.87 ± 11.26 | 35.46 ± 10.59 |
| Nurse                 | 23.74 ± 3.61   | 22.81 ± 3.78    | 22.54 ± 3.63  | 69.09 ± 10.19 | 37.73 ± 10.40 | 37.59 ± 9.73  |
| Medical technology    | 25.15 ± 2.82*  | 24.40 ± 3.11*   | 24.11 ± 3.47* | 73.66 ± 8.77* | 33.84 ± 9.07  | 34.26 ± 7.63  |
| **F**                 | 5.58           | 6.20            | 6.05          | 7.00          | 4.04       | 4.60       |
| **P**                 | 0.004****      | 0.002****       | 0.003****     | 0.001****     | 0.018****  | 0.01****   |
| **Job title**         |                |                 |               |               |            |            |
| Junior                | 23.93 ± 3.51   | 23.15 ± 3.64    | 22.93 ± 3.53  | 70.03 ± 10.00 | 36.97 ± 10.64 | 36.74 ± 9.71  |
| Intermediate          | 23.64 ± 3.63   | 22.63 ± 3.60    | 22.33 ± 3.62  | 68.60 ± 9.83  | 37.33 ± 10.21 | 37.13 ± 10.00  |
| Senior                | 24.56 ± 2.93   | 23.72 ± 2.83    | 22.81 ± 4.50  | 71.09 ± 8.83  | 34.72 ± 10.96 | 31.38 ± 8.34  |
| **F**                 | 0.98           | 1.67            | 1.41          | 1.39          | 0.81       | 4.85       |
| **P**                 | 0.375          | 0.189           | 0.246         | 0.249         | 0.446      | 0.008****  |
| **Education level**   |                |                 |               |               |            |            |
| Junior college or     | 23.31 ± 3.65   | 22.73 ± 3.59    | 22.26 ± 3.67  | 68.30 ± 10.04 | 37.92 ± 10.18 | 39.02 ± 9.69  |
| below                 |                |                 |               |               |            |            |

Note. *: Compared with doctors, P< 0.05; **: Compared with senior job titles, P< 0.05; ***: Compared with junior college or below, P< 0.05; ****: The result of t-test or one-way ANOVA, P< 0.05.
| Characteristics                          | Family support | Friends support | Other support | Total support | Loneliness | Depression |
|-----------------------------------------|----------------|----------------|--------------|---------------|------------|------------|
| Bachelor's degree                       | 24.02 ± 3.41   | 23.06 ± 3.61   | 22.78 ± 3.66 | 69.86 ± 9.79  | 36.75 ± 10.70 | 36.24 ± 9.59*** |
| Master's degree or above                | 24.00 ± 3.83   | 23.36 ± 3.54   | 23.30 ± 3.31 | 70.66 ± 10.19 | 36.63 ± 10.19 | 34.67 ± 10.50*** |

\[ F \]

\[ P \]

|          | 1.45 | 0.57 | 1.54 | 1.21 | 0.46 | 4.16 |
|----------|------|------|------|------|------|------|
|          | 0.236 | 0.565 | 0.215 | 0.300 | 0.633 | 0.016**** |

Note. *: Compared with doctors, \( P < 0.05 \); **: Compared with senior job titles, \( P < 0.05 \); ***: Compared with junior college or below, \( P < 0.05 \); ****: The result of t-test or one-way ANOVA, \( P < 0.05 \).

### 3.3 Comparison of social support, loneliness and depression scores among health care workers of different positions.

There was no significant difference in the score of total social support between the health care workers in COVID-19 prevention and control posts and those in non-prevention and control posts, but the scores of loneliness and depression of health care workers in prevention and control posts were significantly higher than those in non-prevention and control posts \( (P < 0.05) \). One-way ANOVA showed that there were statistically significant differences in the scores of social support, loneliness and depression in specific prevention and control posts. Among them, the score of social support of health care workers in isolation ward, fever clinic and pre-check triage were lower than those in non-prevention and control posts \( (P < 0.05) \), while the scores of loneliness and depression were significantly higher than those in non-prevention and control posts \( (P < 0.05) \), and the scores of depression even reached the diagnostic criteria. The social support of health care workers in imaging and laboratory diagnosis positions was higher than that of non-prevention and control posts \( (P < 0.05) \). There was no statistically significant difference between Medicament and non-prevention and control posts in terms of social support, loneliness and depression (Table 3).
Table 3
Comparison among health care workers of different positions (Mean ± SD)

| Characteristics                  | Family support | Friends support | Other support | Total support | Loneliness | Depression |
|----------------------------------|----------------|-----------------|---------------|---------------|------------|------------|
| Post                             |                |                 |               |               |            |            |
| Non-prevention and control post  | 24.00 ± 3.33   | 23.12 ± 3.33    | 22.72 ± 3.52  | 69.84 ± 9.27  | 36.24 ± 10.09 | 35.47 ± 9.25 |
| Prevention and control post      | 23.64 ± 3.95   | 22.83 ± 4.22    | 22.86 ± 3.90  | 69.32 ± 11.40 | 38.78 ± 11.50 | 39.29 ± 10.62 |
| t                                | 0.95           | 0.74            | 0.38          | 0.48          | 2.44       | 3.99       |
| P                                | 0.345          | 0.461           | 0.707         | 0.634         | 0.015**    | 0.001      |
| Specific post                    |                |                 |               |               |            |            |
| Non-prevention and control post  | 24.00 ± 3.41   | 23.12 ± 3.33    | 22.72 ± 3.52  | 69.84 ± 9.27  | 36.24 ± 10.09 | 35.47 ± 9.25 |
| Isolation ward                   | 21.13 ± 5.76*  | 20.56 ± 5.20*   | 20.81 ± 5.12* | 62.50 ± 15.56 | 46.81 ± 11.91 | 45.00 ± 11.06* |
| Fever clinic and pre-check triage| 22.59 ± 3.96*  | 21.27 ± 4.74*   | 21.41 ± 3.87* | 65.27 ± 11.70 | 43.57 ± 10.99* | 44.55 ± 11.17* |
| Imaging and laboratory diagnosis | 24.98 ± 3.41   | 24.44 ± 3.38*   | 24.49 ± 3.55* | 73.91 ± 9.61* | 34.05 ± 10.48 | 35.33 ± 8.62 |
| Medicament                       | 24.74 ± 2.19   | 24.23 ± 2.00    | 23.94 ± 2.13  | 72.90 ± 5.83  | 33.65 ± 7.66 | 33.55 ± 5.89 |
| F                                | 5.96           | 7.82            | 6.39          | 7.75          | 11.17      | 14.63      |
| P                                | 0.001          | 0.001           | 0.001         | 0.001         | 0.001      | 0.001      |

Note. *: Compared with non-prevention and control positions, P < 0.05, **: The result of t-test, P < 0.05.

3.4 Correlation analysis of social support with depression and loneliness.

Family support, friend support, other support and total social support of health care workers were negatively correlated with the scores of depression and loneliness (P < 0.001). Also, there was a significant positive correlation between the score of depression and the score of loneliness (P < 0.001) (Table 4).
Table 4
Correlation analysis of social support with depression and loneliness

| Variables     | Depression | Loneliness |
|---------------|------------|------------|
|               | r          | P          | r          | P          |
| Family support| -0.51      | 0.001      | -0.56      | 0.001      |
| Friends support| -0.49      | 0.001      | -0.58      | 0.001      |
| Other support | -0.47      | 0.001      | -0.57      | 0.001      |
| Total support | -0.53      | 0.001      | -0.62      | 0.001      |
| Depression    | 1          | —          | 0.75       | 0.001      |

3.5 The need for mental health and awareness rate of COVID-19 related knowledge among health care workers.

The top three psychological needs that health care workers were willing to accept were one-to-one psychological counseling (29.75%), psychological lectures (27.20%) and participating in interactive groups (18.59%). The top three psychological services needed were crisis event management (24.07%), emotional management (21.33%) and stress and frustration coping (21.13%). Most health care workers were willing to have psychological counseling during normal working hours (61.84%). The awareness rate of COVID-19 related knowledge was relatively high, the highest was the source of infection (100%), and the lowest was the clinical manifestation (93.54%). It shows that the understanding of COVID-19 related clinical manifestations among health care workers remains to be deepened (Table 5).
Table 5
The need for mental health and awareness rate of COVID-19 [n(%)]

| Characteristics                      | n(%)   | Characteristics                | n(%)   |
|--------------------------------------|--------|--------------------------------|--------|
| Psychological demand                 |        | Counseling time                 |        |
| One-to-one counseling                | 152(29.75) | working period                  | 316(61.84) |
| Psychological lecture                | 139(27.20) | weekend break                   | 76(14.87)  |
| interactive group                    | 95(18.59)   | lunch break                     | 22(4.31)   |
| Network counseling                   | 90(17.61)   | Other time                      | 97(18.98)  |
| Telephone counseling                 | 35(6.85)    | Awareness rate                  |        |
| Service items                        |        | Infectious source               | 511(100.00) |
| Crisis event management              | 123(24.07) | Pathogen                       | 510(99.80) |
| Emotional management                 | 109(21.33) | Transmission route              | 510(99.80) |
| Stress and frustration coping        | 108(21.13) | Susceptible population          | 489(95.69) |
| Self-awareness and acceptance        | 78(15.26)  | Clinical manifestation          | 478(93.54) |
| Interpersonal communication          | 59(11.55)  |                                |        |
| Parent-child relationship            | 34(6.65)   |                                |        |

4. Discussion

COVID-19 has been listed as Class B infectious disease under the Law of Prevention and treatment of Infectious Diseases in China, and it is managed according to Class A infectious diseases. As an emerging infectious disease, much is still unknown about how the COVID-19 spreads, so it is easy to cause panic and psychological problems. A population-based cross-sectional study\(^{[16]}\) explored the psychological reaction of people in China in the early stages of the COVID-19 outbreak, and found that the rates of moderate and severe anxiety among volunteers fighting the epidemic in were 32.7% and 20.4% in Wuhan and Shanghai, respectively, suggesting that during the rising stage of the outbreak, the physical and mental reactions of the masses were significant. In order to win this battle, the health care workers in China have made great efforts. As front-line personnel in the fight against the COVID-19 epidemic, they not only undertake heavy prevention and control tasks, but also bear tremendous psychological pressure.

Studies have shown that there is a significant positive correlation between depression and loneliness, 36.4% of health care workers had depression, which was higher than that reported in a previous study by Qi et al\(^{[17]}\), and the depression scores of health care workers with lower job title and educational background were higher. The score of loneliness of doctors was higher than that of medical technicians, the scores of depression and loneliness of health care workers in isolation ward, fever clinic and pre-
check triage were higher than those of non-prevention and control posts, it shows that the psychological
problems of doctors, especially doctors with low job titles and academic qualifications, as well as those
in epidemic prevention and control positions are relatively serious. Shao et al\(^{[18]}\) found that during the
period of fighting against SARS, the mental health level of health care workers was lower than the
domestic norm, and there were mental health problems such as anxiety, fear, etc. And doctors, especially
health care workers in prevention and control posts such as isolation wards and fever clinics, rushed to
the front line of the epidemic. Due to the high infectivity and unknown nature of the new coronavirus,
problems encountered in clinical work could not be solved in time, and there is no one to talk to in the
face of the pressure of the epidemic, and there is no psychological comfort. In particular, some doctors
are directly engaged in the diagnosis and treatment of COVID-19 in the isolation ward, and they are in a
state of isolation for a long time and cannot be reunited with their families, but also worried about the risk
of family infection, making them feel lonely and helpless, extremely prone to psychological problems.

In addition, this study found that depression had statistically significant differences in gender,
occupation, professional title, education level and different positions. Among them, the depression score
of nurses was higher than that of doctors. Qi et al\(^{[17]}\) found that clinical nurses have psychological
problems in the special period of facing COVID-19, another study by Jiao et al\(^{[19]}\) shows that in the fight
against the epidemic, nurses have a high intensity of tasks, as well as greater physical and mental
pressure. There are several reasons that might cause this situation, first of all, during the fight against the
COVID-19 epidemic, nurses work intensively, have heavy tasks, and are in a state of physical and mental
exhaustion. Secondly, some nurses work at front line in COVID-19 fight, thus they have a high probability
of contact with infected patients, and face the risk of being isolated at any time. Moreover, COVID-19 is
highly contagious and has various clinical manifestations, so there is no specific drug at present, and the
drugs previously used to treat other coronaviruses may be effective, but they need to be verified by further
clinical trials\(^{[20]}\). Therefore, in the face of many uncertainties, clinical nurses are prone to varying degrees
of psychological problems, such as depression, anxiety, etc. At the same time, the lack of in-depth
understanding of COVID-19 aggravates the fear of nurses.

This study suggests that the social support of health care workers was negatively correlated with the
scores of depression and loneliness. Further analysis of the social support of health care workers is
particularly important for a comprehensive understanding of mental health status. Among them, the
scores of social support of health care workers in prevention and control positions were lower. The reason
is that doctors in prevention and control positions, are more likely to come into contact with COVID-19
patients, and there is a risk of infection. Their family and friends may be worried about being infected and
have low support for them. In the absence of social support, health care workers tend to choose negative
coping styles, such as self-attack and retreat, thus affecting their mental health\(^{[21]}\). Therefore, close
attention should be paid to improving the psychological coping ability of health care workers under
stress\(^{[22]}\), in order to enhance their mental health level, and then carry out epidemic prevention and control
work more effectively.
In the face of the psychological problems that need to be solved urgently, this study continues to investigate the psychological needs of health caregivers, in order to provide a better solution for hospital management and improve mental health. The following reference improvement measures are obtained from the study, such as mental health lectures, psychological counseling and psychological guidance for them, because healthy psychological counseling can maintain a positive and stable state of mind to deal with unexpected situations and reduce the risk of mental disorders such as anxiety and depression[^23]. In addition, it is also very important to actively care for the families of health care workers and make them feel at ease with their work. It is suggested that managers should communicate more, understand their difficulties encountered in work and life, give timely help, improve their family conditions and reduce their life stress[^24].

Mental health is not only related to individual health, but also affects social function and professional ability[^25]. During the fight against COVID-19, health care workers, as front-line personnel in the fight against the epidemic, face both physical and mental pressure. The quality of their work is not only related to the life safety of patients, but also related to whether the epidemic can be effectively controlled and social stability. Therefore, we should actively take mental health intervention measures for health care workers according to the psychological needs of them. This study points out that the health care workers who need to pay attention to during the epidemic can provide reference for the prevention and management of public health emergencies.

5. Study Limitations

This study also has some limitations. First of all, despite the widespread spread of COVID-19, this study only investigates the mental health status of health care workers in two designated tuberculosis medical institutions during the epidemic period. The conclusions are limited, so multicenter studies should be considered. Secondly, the mental health status is dynamic, and the results of cross-sectional survey can only reflect the psychological information at a certain point in time. The design method of longitudinal study will make the research results more rigorous. Finally, this study only analyzes the mental health status of health care workers from the aspects of depression, perceived social support and loneliness, which needs to be studied more comprehensively.

6. Conclusion

During the epidemic period of COVID-19, the psychological problems of health care workers, especially women, nurses with low educational background, low professional title, and staff in the epidemic prevention and control positions are relatively serious, and targeted intervention measures could be taken according to their psychological needs to improve their mental health.

Declarations

Ethics approval and consent to participate
Since this was an observational study without any interventions, which had no any adverse effects on the study subjects, thus only oral informed consent was obtained, the procedure had been approved by the Medical Ethics Committee of Anhui Chest Hospital (K2020-004).

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

X-HF and LW contributed equally to this work. X-HF, LW, G-CW, D-CM and Y-JX conceived a conceptual framework for research; investigation: L-SL, HW and Y-JX; data analysis: X-HK; writing—original draft preparation: X-HF and LW; writing—review and editing: LW and G-CW; supervision: G-CW and D-CM. The authors all approved the final versions for submission.

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Not applicable.

Abbreviations

COVID-19: Coronavirus disease 2019

PSSS: Perceived Social support scale

SDS: Self-rating Depression scale

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