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# Lacking Communication Would Increase General Symptom Index Scores of Medical Team Members During COVID-19 Pandemic in China: A Retrospective Cohort Study

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**Abstract**

There are few studies on the psychological status of medical staff during the COVID-19 outbreak. Our study addresses whether lack of communication affects the psychological status of medical team members supporting Wuhan during the COVID-19 pandemic in China. We used general symptom index (GSI) scores of the Symptom Checklist-90 (SCL-90) to evaluate participants' psychological status. We adopted a stratified sampling method and selected the fourth team, with a total of 137 members, as participants. In total 76.6% and 69.7% of female and male participants, respectively, had bachelor's degrees; 41.6% and 21.2% of female and male participants, respectively, were unmarried. Regarding communication, 14.29% and 6.06% of female and male participants, respectively, reported a lack of communication with the team (LCWT). Additionally, 13.0% and 6.1% of female and male participants, respectively, experienced fear of being infected (FoBI). LCWT and FoBI were positively correlated with GSI score (estimated change = 0.2, 95% CI [0.1-0.3]). When adjusted for gender, age, and FoBI, LCWT was positively correlated with GSI score ($P < .05$). Increasing communication among medical team members can reduce GSI scores.

**Keywords**

psychological status, communication, COVID-19, SCL-90 scale, GSI score

**What do we already know about this topic?**
Medical staff would have less communication with each other when fighting against COVID-19.

**How does your research contribute to the field?**
As far as we know, this study was the first time about the psychological status of medical staff who have less communication with each other when fighting against COVID-19.

**What are your research's implications toward theory, practice, or policy?**
The conclusions of this study can help improve the mental state of medical staff and reduce symptoms of anxiety and depression, which may also has a certain guiding value for their psychological treatment.

## Introduction

In December 2019, an outbreak of coronavirus disease-2019 (COVID-19) was identified in Wuhan, Hubei Province, China. The 2019 new coronavirus (2019-nCoV) is officially called severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2), and the disease is known as COVID-19, which is currently causing a worldwide pandemic. More than 4 million people have been infected with 2019-nCoV, and tens of thousands have died, causing panic throughout society. People who are not infected are afraid of becoming infected.[1,2] COVID-19 patients had higher levels of depression, anxiety, and stress than healthy controls and worried about discrimination, medical expenses, care by healthcare workers.[3] Thus, the COVID-19pandemic has had significant social, psychological, and economic

consequences worldwide.[4] According to data published on World Health Organization (WHO), by 10:00 CEST, May 21, 2020, there were 4 893 186 confirmed cases and 323 256 reported deaths globally.[5] This disease has caused many deaths and significant panic worldwide,[6-8] according to another study conducted by Chew NWS's team, the anxiety prevalence was higher among nonmedical staff than medical workers (20.7% vs 10.8%),[9] and medical staff members are no exception to experiencing such panic.[10] The COVID-19 pandemic had led to significant strain on front-line healthcare worker,[11] Chew NWS's team another study showed that out of the 906, 5.3% medical healthcare workers screened positive for moderate to very-severe depression, 8.7% for moderate to extremely-severe anxiety, 2.2% for moderate to extremely-severe stress, and 3.8% for moderate to severe levels of psychological distress.[12] As far as we know, most current psychological research on COVID-19 has focused on patients,[13,14] while few researchers have paid attention to the psychological status of medical staff, especially entire medical teams.[15]

A previous study found that network communication technologies show promise in the treatment of young people with mental health problems,[16] while another study showed that parents with advanced cancer who reported more illness-related communication with their children also reported more symptoms of general anxiety.[17] Similarly, men and women with hearing impairment and a history of communication difficulties at home are at risk for depression in adulthood.[18] Effective communication can improve people's moods and reduce symptoms of anxiety and depression,[19-22] and one study demonstrated the commitment of their orthopaedic and trauma surgery specialty from government to overcome the pandemic by providing competent personnel as well as close cooperation with hospital administration and other departments.[23] However, to prevent new coronavirus infections, medical staff members need to wear protective clothing, masks, and protective screens. These protective measures may reduce their ability to effectively communicate with others, and isolated working conditions may further cause gaps in or barriers to communication.[24]

However, the question remains as to whether a lack of communication can affect the psychological status of medical staff. To the best of our knowledge, no such research has been published during the COVID-19 outbreak. Therefore, it is of great clinical significance to understand the impact of lack of communication on psychological status, which can provide a theoretical basis for more precise psychological treatment. Further, as far as we know, this is the first report on this topic in the behavior psychological field to be reported during the COVID-19 pandemic.

## Material and Methods

### *Study Design*

We conducted a cohort study, using a single-blind method; the participants were not aware of the study's true purpose.

### *Data Collection*

We used the Questionnaire Star APP (https://www.wjx.cn/) for data collection, and used general symptom index (GSI) scores of the Symptom Checklist-90 (SCL-90)[25] to evaluate the psychological status of medical team members.

### *Flow Chart of the Study*

Anhui Province sent 8 medical teams to support Hubei Province, with a total of 1362 medical team members, including 274 in the fourth medical team, who were selected from the First Affiliated Hospital of Anhui Medical University and the First Affiliated Hospital of University of Science and Technology of China (Anhui Provincial Hospital). A total of 110 (80.29%) team members completed the questionnaire, of which 77 (70.00%) were female and 33 (30.00%) were male. For details, see Figure 1.

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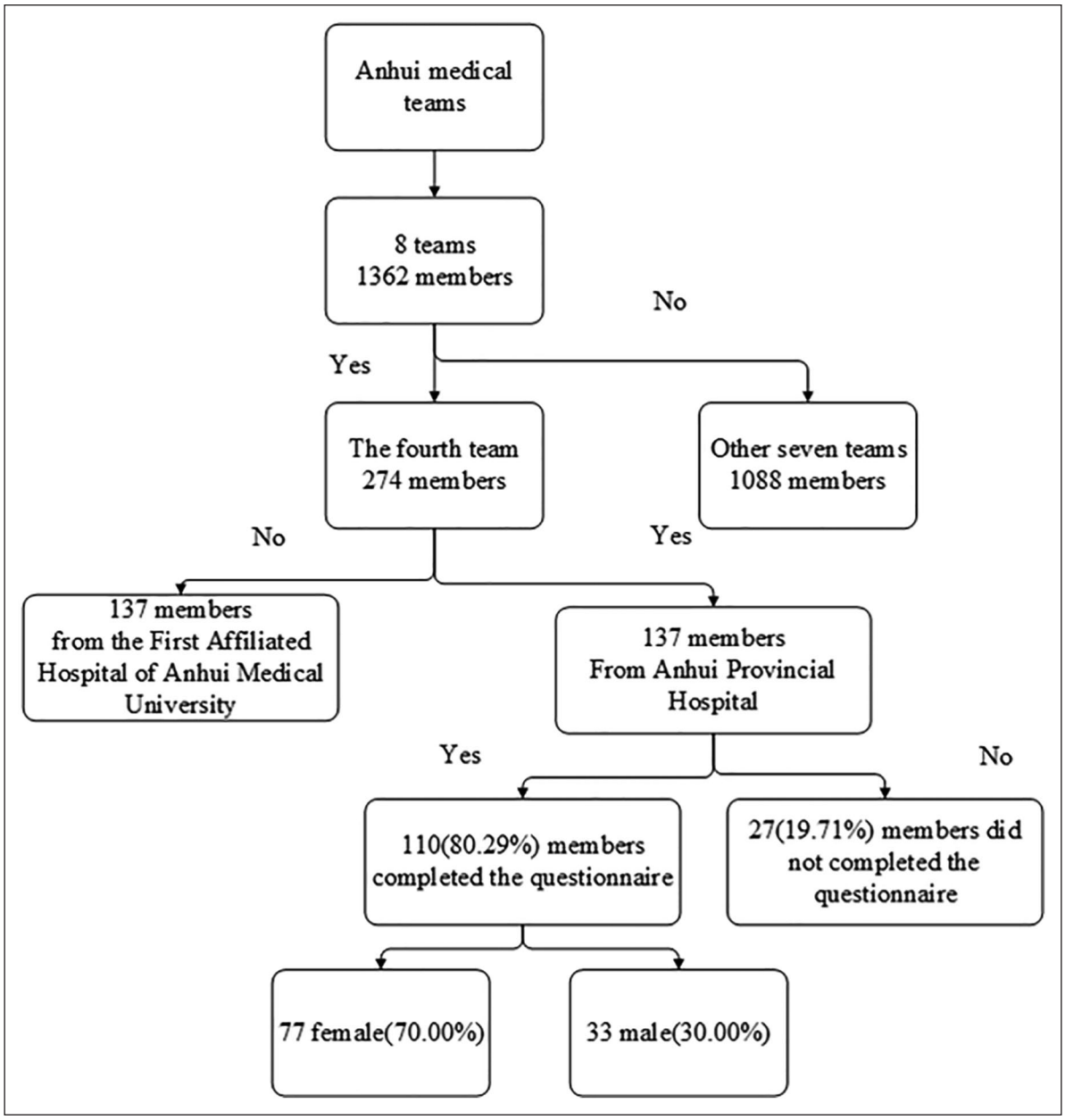


**Figure 1.** Flow chart of the study.

### *Statistical Analysis*

We took a purposive approach with no sample estimation. Data were analyzed using the statistical packages R (R Foundation; http://www.r-project.org;version3.4.3) and EmpowerStats (http://www.empowerstats.com; X&Y Solutions Inc., Boston, MA). Multivariable logistic regression modeling, single factor logistic regression modeling, and generalized estimated equation modeling were used to analyze the data. Estimated change (β) and 95% confidence intervals (CI) were used to represent statistics, and results were considered statistically significant at $P < .05$.

## Results

### *Demographic Characteristics of Team Members*

Regarding educational background, 76.6% and 69.7% of female and male participants, respectively, had bachelor's degrees. The gender difference in educational background was statistically significant ($X^2 = 9.77$, df = 3, $P = .02$, $< .05$). Additionally, 41.6% and 21.2% of female and male participants, respectively, were unmarried, and this gender difference was also statistically significant ($X^2 = 4.18$, df = 1, $P = .04$, $< .05$). Furthermore, 11 (14.29%) female and 2

**Table 1.** Demographic Characteristics of Members.

| Sex | Female | Male | Total | *P*-value |
|---|---|---|---|---|
| N | 77 (70.0%) | 33 (30.0%) | 110 | |
| Age, years | | | | .118 |
| ≤30 | 28 (36.4%) | 7 (21.2%) | 35 (31.8%) | |
| >30 | 49 (63.6%) | 26 (78.8% | 75 (68.2%) | |
| Working age, years | | | | .705 |
| ≤10 | 45 (58.4%) | 18 (54.5%) | 63 (57.3%) | |
| >10 | 32 (41.6%) | 15 (45.5%) | 47 (42.7%) | |
| Education background | | | | .021* |
| Junior | 9 (11.7%) | 0 (0.0%) | 9 (8.2%) | |
| Bachelor | 59 (76.6%) | 23 (69.7%) | 82 (74.5%) | |
| Master | 9 (11.7%) | 9 (27.3%) | 18 (16.4%) | |
| Doctor | 0 (0.0%) | 1 (3.0%) | 1 (0.9%) | |
| Only child of the family | | | | .215 |
| No | 62 (80.5%) | 23 (69.7%) | 85 (77.3%) | |
| Yes | 15 (19.5%) | 10 (30.3%) | 25 (22.7%) | |
| Marital status | | | | .041* |
| Unmarried | 32 (41.6%) | 7 (21.2%) | 39 (35.5% | |
| Married | 45 (58.4%) | 26 (78.8%) | 71 (64.5%) | |
| Childbirth status | | | | .174 |
| No | 34 (44.2%) | 10 (30.3%) | 44 (40.0%) | |
| Yes | 43 (55.8%) | 23 (69.7%) | 66 (60.0%) | |
| Family relationships | | | | .855 |
| Poor | 4 (5.2%) | 2 (6.1%) | 6 (5.5%) | |
| Good | 73 (94.8%) | 31 (93.9%) | 104 (94.5%) | |
| LCWT | | | | .337 |
| No | 66 (85.71%) | 31 (93.94%) | 97 (88.18%) | |
| Yes | 11 (14.29%) | 2 (6.06%) | 13 (11.82%) | |
| FoBI | | | | .286 |
| No | 67 (87.0%) | 31 (93.9%) | 98 (89.1%) | |
| Yes | 10 (13.0%) | 2 (6.1%) | 12 (10.9%) | |
| Mean ± SD | | | | |
| GSI score | 1.20 ± 0.24 | 1.17 ± 0.16 | 1.19 ± 0.22 | .744 |

*$P$-value < .05.

(6.06%) male participants self reported experiencing a lack of communication with the team (LCWT). Finally, 10 (13.0%) female and 2 (6.1%) male participants reported fear of being infected (FoBI); however, the gender differences were not statistically significant (see Table 1).

### *Crude Correlations of LCWT and GSI Score*

As shown in Table 2, we analyzed exposure risk factors, and single factor analysis showed LCWT and FoBI had positive correlations with GSI scores, β = .2, 95% CI [0.1-0.3], and the difference was statistically significant ($P$ = .002, < .05, $P$ = .0005, < .05, respectively; see Table 2).

### *Multivariate Logistic Regression Modeling for LCWT and GSI Score*

Multivariate logistic regression analysis showed that, in model 1, when adjusted for gender and age, LCWT was positively correlated with GSI score ($P$ < .05). In model 2, when adjusted for FoBI, LCWT was also positively correlated with GSI score ($P$ < .05; see Table 3). A covariate test showed that FoBI was a covariate of LCWT; therefore, we adjusted for FoBI. Additionally, we also conducted an interactive test and found that FoBI was not an effect modifier of LCWT (see Supplemental Tables S1 and S2).

## Discussion

The COVID-19 outbreak has been shown to have a negative effect on the psychological status of older adults, resulting in anxiety and depression.[26] However, our study found that the GSI scores of medical team members were not affected by age, nor were they affected by working age, educational background, family relationships, marital status, and whether had a children. Medical work requires close cooperation between medical staff, and the foundation of cooperation is

**Table 2.** Crude Correlation Associations of LCWT and GSI Score of Members.

| | Statistics (Number, N%) | GSI score (β 95%OR) | *P*-value |
|---|---|---|---|
| Age,years | | | |
| ≤30 | 35 (31.8%) | 0 | |
| >30 | 75 (68.2%) | −0.0 (−0.1, 0.0) | .383 |
| Working age, years | | | |
| ≤10 | 63 (57.3%) | 0 | |
| >10 | 47 (42.7%) | −0.0 (−0.1, 0.1) | .504 |
| Education background | | | |
| Junior | 9 (8.2%) | 0 | |
| Bachelor | 82 (74.5%) | 0.1 (−0.1, 0.2) | .387 |
| Master | 18 (16.4%) | 0.1 (−0.1, 0.3) | .215 |
| Doctor | 1 (0.9%) | −0.1 (−0.6, 0.3) | .577 |
| Only child of the family | | | |
| No | 85 (77.3%) | 0 | |
| Yes | 25 (22.7%) | −0.0 (−0.1, 0.1) | .904 |
| Marital status | | | |
| No | 39 (35.5%) | 0 | |
| Yes | 71 (64.5%) | −0.0 (−0.1, 0.1) | .740 |
| Childbirth status | | | |
| No | 44 (40.0%) | 0 | |
| Yes | 66 (60.0%) | −0.0 (−0.1, 0.1) | .745 |
| Family relationships | | | |
| Poor | 6 (5.5%) | 0 | |
| Good | 104 (94.5%) | −0.2 (−0.3, 0.0) | .088 |
| LCWT | | | |
| No | 97 (88.2%) | 0 | |
| Yes | 13 (11.8%) | 0.2 (0.1, 0.3) | .002* |
| FoBI | | | |
| No | 98 (89.1%) | 0 | |
| Yes | 12 (10.9%) | 0.2 (0.1, 0.3) | .005* |

*$P$-value < .05.

**Table 3.** Multivariate Logistic Regression Model for LCWT and GSI Score of the Members.

| | Non- adjusted | | Adjust I | | Adjust II | |
|---|---|---|---|---|---|---|
| Exposure | β (95% CI) *P-value* | | β (95% CI) | *P-value* | β (95% CI) | *P-value* |
| LCWT | | | | | | |
| No | 0 | – | 0 | – | 0 | – |
| Yes | 0.2 (0.1, 0.3) | 0.002* | 0.2 (0.1, 0.3) | 0.004* | 0.1 (0.0, 0.3) | 0.035* |

*Note.* Non-adjusted model adjust for: None. Adjust I model adjust for: Sex; Age. Adjust II model adjust for: FoBI.
*$P$-value < .05.

effective communication. As mentioned in the Introduction, medical staff wear protective clothing which may reduce communication among team members. In the present study, 11.82% of medical team members had LCWT. Nurse–physician communication is very important to the work performed by medical teams.[27] However, a lack of communication between medical staff members in the workplace will not only affect patients' treatment but also cause anxiety and depression in medical staff members.

Our study found that participants' LCWT had a positive correlation with GSI scores from the SCL-90, while a previous study found that GSI scores contributed substantially to interpersonal relationships and communication.[28] Thus, improving communication may benefit individuals' psychological status, as demonstrated by a previous study that showed using more communication tools, including the Internet, led to greater compliance during treatment for depression.[29] However, it is not easy to improve

communication skills, as it requires bringing attention to 3 contextual dimensions of communication: organizational complexity, cognitive load, and social context. Researchers have posited that communication improvements may be more successful if physicians and nurses acknowledge the complexity of communication and the context in which it occurs.[30]

COVID-19 has led to a worldwide pandemic, causing hundreds of thousands of deaths, and millions of infections. Therefore, the fear of being infected (FoBI) people are experiencing is a normal psychological reaction; however, FoBI may cause people to develop symptoms of anxiety and depression.[31] Globally, WHO estimates 30 to 50% of individuals affected by a disaster will suffer from diverse psychological distress, and individuals with post-traumatic stress disorder (PTSD) are more at risk for suicidal ideation, suicide attempts, and deaths by suicide. In China, a study found that there was longitudinal reduction in mean Events Scale-Revised (IES-R) scores after 4 weeks, nevertheless, the reduction in scores was not clinically significant for PTSD cut-off scores ($>24$)[32]; and in Vietnam, 233 (16.4%) participants reported low level of post-traumatic stress symptom(PTSS),76 (5.3%) rated as moderate, and 77 (5.4%) reported extreme during the first nationwide partial lockdown[33]; Furthermore, another research conducted in Philippines found that the IES-R mean score was 19.57 ($SD = 13.12$) during COVID-19 pandemic.[34] Moreover, for worldwide, a review study concluded that 7% to 53.8% PTSD was reported for general population in China, Iran, Spain, Italy, Turkey, US, Denmark, and Nepal.[35] Notably, healthcare workers are already considered to be in at-risk occupations.[36] Therefore, FoBI may be the same as LCWT, which will also lead to anxiety and depression. Our research found that FoBI was a covariate of LCWT. Then, when adjusted for FoBI, LCWT also had a positive correlation with GSI score. Moreover, we also conducted an interactive test and found that FoBI is not an effect modifier of LCWT.

These results help to more fully support the correlation between LCWT and GSI score; therefore, it is necessary to pay close attention to the relationships among medical team members and increase their communication to reduce their anxiety and depression. Timely psychological interventions for healthcare workers with physical symptoms should be considered once an infection has been excluded.[12] Cognitive behavior therapy (CBT) was evidenced useful for them,[37] internet cognitive behavior therapy (I-CBT) has been known to be a high cost effective treatment during COVID-19,[38] which also can improve sleep quality for patients with insomnia.[39] Moreover, providing I-CBT can minimize virus transmission from face-to-face CBT. So, identifying high risk of psychological disorders for targeted early I-CBT was necessary and important for healthcare workers.

Although we provided some novel information regarding the psychological status of medical team members during pandemic, this study still had limitations, especially with respect to its methods. We did not follow-up with medical team members regarding GSI score; however, this did not affect the relationship of the LCWT and GSI score in our study, because our study design was a retrospective cohort study. The number of participants was not large enough, even though the LCWT was still statistically found to increase GSI score. Another limitation is that this was a single-center study and the results cannot be generalizable to other cohorts. In the next year, we will collect data again and conduct further multicenter study, in order to determine whether this population sample has symptoms of PTSD, expanding the sample size and conduct further analyses to examine whether LCWT can lead to PTSD.

## Abbreviations

GSI: General symptom index;
SCL-90: Symptom Checklist-90;
COVID-19: coronavirus disease-2019;
LCWT: lack of communication with team;
FoBI: fear of being infected;
PTSD: post-traumatic stress disorder;
Post-traumatic stress symptom: PTSS;
2019-nCoV: 2019 new coronavirus;
SARS-CoV-2: Severe acute respiratory syndrome-coronavirus-2;
Events Scale-Revised: IES-R;
Cognitive behavior therapy: CBT;
Internet cognitive behavior therapy: I-CBT.

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## Authorship Contributions

CW organized the Study; JLZ drafted the manuscript; YYF and JLZ conducted the analyses; all authors provided critical revisions and approved the final version of the manuscript prior to publication.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## Ethical Approval

The participants of this study filled out the questionnaire anonymously. Our research was approved by the Ethics Committee of the First Affiliated Hospital of University of Science and Technology of China (Anhui Provincial Hospital); the approval number was 2020-P-026.

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## Supplemental Material

Supplemental material for this article is available online.

## Availability of Data

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

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