

# The self-psychological safety maintenance and its influencing factors of community frontline staff during COVID-19 pandemic

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## Abstract

The present study was designed to determine the self-psychological safety maintenance and its influencing factors of community staff on the front-line during Coronavirus Disease 2019 (COVID-19) pandemic.

A total of 126 frontline staff in community were involved in the current cross-section study. Online questionnaires including the anxiety sensitivity index-3 (ASI-3), patient health questionnaire (PHQ-9), simple coping style questionnaire (SCSQ) and general self-efficacy scale (GSES) were utilized to analyze psychological state, coping style and self-efficacy of the surveyed staff.

The ASI-3 standard score of 126 community frontline staff was  $10.01 \pm 2.82$ , of which 21 community frontline staff scored  $> 16$ , and the detection rate of anxiety was 16.67%. The anxiety state of doctors and nursing staff was significantly lower than that of administrative staff, logistics staff and other staff, and the rate of anxiety of having colleagues with suspected symptoms was significantly higher than that without colleagues with suspected symptoms ( $P < .05$ ). The PHQ-9 standard score was  $2.03 \pm 0.16$ , of which 19 frontline staff in the community scored more than 5, and the detection rate of depression was 15.08%. Among them, the depression state of those with bachelor degree or above was significantly lower than that of those with junior college education, and the rate of depressive symptoms of community frontline staff with colleagues harboring suspected symptoms were significantly higher than those without colleagues with suspected symptoms ( $P < .05$ ). The aggregated results showed that most of the community frontline staff in anxiety state group and depression group adopted negative coping style while most of the community frontline staff in the non-anxiety group and the non-depression group adopted positive coping style ( $P < .05$ ). Additionally, lower score of self-efficacy of the community frontline staff was observed in the anxiety state group and the depression state group ( $P < .05$ ).

During the outbreak of COVID-19, several community frontline staff showed negative psychology of anxiety and depression, which could affect their coping style and self-efficacy. Early and effective psychological safety maintenance was required to alleviate the negative psychology of community frontline staff.

**Abbreviations:** ASI-3 = anxiety sensitivity index-3, COVID-19 = Coronavirus Disease 2019 pandemic, GSES = general self-efficacy scale, PHQ-9 = patient health questionnaire, SCSQ = simple coping style questionnaire.

**Keywords:** COVID-19 pandemic, community frontline staff, psychology, coping style, self-efficacy, psychological safety maintenance

## 1. Introduction

COVID-19 is an acute respiratory infectious disease caused by novel coronavirus, which has appeared in China and almost every part of the world since December 2019<sup>1-3</sup>. China has

actively taken a series of measures against the disease to minimize its harm. Currently, the COVID-19 pandemic was totally under control in China after tremendous efforts by the government, the hospitals, and the frontline community staff. However, the

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YX and HZ contributed equally to this paper.

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The authors have no conflicts of interests to disclose.

All data generated or analyzed during this study are included in this published article [and its supplementary information files].

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disease is still spreading widely and quickly in other countries and has been a major public emergency. Stipulated by the Law of the People's Republic of China on the Prevention and Control of Infectious Diseases, COVID-19 were included as Class B infectious diseases but managed in accordance with the standards of Class A infectious diseases.<sup>[4]</sup> According to the guidelines for the prevention and control of the epidemic of COVID-19 issued by the National Health Commission, frontline staff in the community not only have to complete their regular work, they were also required to do the epidemiological investigation (health screening for returnees from high-risk areas and track and manage people in close contact with patients), to complete medical observation of centralized isolation or home isolation, to assist disease control departments to guide epidemic prevention in enterprises, and to do the popularization of science about COVID-19 to the public. The abovementioned work poses a great challenge to the frontline staff in the community and mental health of frontline staff is critical in primary prevention and management of COVID-19.<sup>[5]</sup> Therefore, it is important for government and society to pay attention to the mental health status of community frontline staff. To offer insight of the psychological safety of community frontline staff, 126 frontline staff in the community were enrolled in the current study for further psychological analyze. Our results have found that several community frontline staff showed negative psychology of anxiety and depression and suggested that early psychological screening and intervention should be applied to those staff.

## 2. Methods

### 2.1. Study participants

This study was approved by the Ethics Committee of the Affiliated Tangshan Peoples Hospital of North China University of Science and Technology (approval number is RMY-LLKS-2020-056). A total of 126 community staff, including 34 doctors, 36 nurses, 20 administrative staff, 18 logistics staff and 18 other staff, on the frontline of COVID-19 pandemic prevention and control from February 3, 2020 to March 30, 2020 were volunteered to participate in current research. All the community frontline staff involved in the study were signed informed consent, and all the questionnaires were filled out on Wenjuanxing (<https://www.wjx.cn/>), an online data collection platform. In order to ensure the validity of the questionnaire, it was necessary to complete the questionnaire before handing in the paper. A total of 126 questionnaires were delivered online and 126 valid questionnaires were received.

### 2.2. Investigation methods

- Self-designed questionnaire: This self-designed questionnaire was meant to collect basic information of the frontline staff in the community including age, sex, nationality, marital status, education and understanding of novel coronavirus (SARS-CoV-2).
- Anxiety sensitivity index-3 (ASI-3)<sup>[6]</sup>: The ASI-3 scale, compiled by Taylor and other scholars, includes 3 dimensions: cognitive attention, physical attention and social attention. Each dimension contains 6 items with a total of 18 items. The score used 5-point Likert scale, with a score range of 0 to 72, and the score >16 means mild anxiety. The higher score represents the higher the anxiety level. The specificity and

sensitivity of the scale are 76.7% and 71.1% respectively, and community frontline staff were populations of high reliability and validity, which made ASI-3 an excellent tool for anxiety evaluation.

- Patient health questionnaire (PHQ-9)<sup>[7]</sup>: The PHQ-9 was developed in accordance with diagnostic criteria of depression of American Diagnostic and Statistical Manual of Mental Disorders (fourth Edition). There were 9 questions with a score of 0–3 each and a total score of 0–27. 0–4: no depression; 5–9: mild depression; 10–14: moderate depression; 15–19 moderate-to-severe depression, 20–27: severe depression. It has been confirmed that if PHQ-9  $\geq 10$ , the specificity and sensitivity for the diagnosis of major depression are 94% and 86%. It can be widely used in depression screening of community people, inpatients and so on.
- Simple coping style questionnaire (SCSQ)<sup>[8]</sup>: The SCSQ consists of 2 dimensions, including positive coping style and negative coping style, with a total of 20 items and a score of 0–3 each, from “not adopted” to “frequently adopted”. The results were average score of positive coping dimension and negative coping dimension, and higher score of one of the dimensions represents that the participant is more inclined to that coping style. The scale shows good reliability and validity.<sup>[9]</sup>
- General self-efficacy scale (GSES)<sup>[10]</sup>: There are 10 questions in the GSES scale, with a score of 1–4, and each question is answered based on current situation: 1, completely inaccurate; 2, somewhat accurate; 3, generally accurate; and 4, completely accurate. High score represents high self-efficacy. The scale has good reliability and validity in our country<sup>[11]</sup>.

### 2.3. Statistical analysis

All the data in this study were analyzed by CHISS software, and the quantitative data were analyzed by  $\chi^2$  test, and the numeration data comparing difference between 2 group was analyzed by Two-tail Student *t* test. A  $P < .05$  represented significant statistical difference.

## 3. Results

### 3.1. General information of involved community frontline staff

The subjects of this study included 34 doctors, 36 nurses, 20 administrative staff, 18 logistics staff and 18 other staff, aged from 20 to 60 years old, with an average age of  $(34.98 \pm 8.03)$  years old, as shown in Table 1.

### 3.2. Comparison of anxiety level of 126 frontline staff in the community

The anxiety level of community frontline staff was determined by ASI-3. The results have showed that the average score of such population was  $10.0 \pm 12.82$ , of which a total of 21 frontline staff in the community scored more than 16, and the detection rate of anxiety state was 16.67%. According to the detection rate of anxiety comparing gender, education, occupation and colleagues with suspected symptoms, the rate of anxiety in men was significantly higher than that in women ( $P < .001$ ), and the rate of anxiety in those with junior college degree or below was significantly higher than that in those with bachelor degree or above ( $P < .05$ ). The anxiety state of doctors and nursing staff

**Table 1**  
General information of frontline staff in the community.

Item	N (%)	
Sex	Male	39 (30.95%)
	Female	87 (69.05%)
Age (year)	21–30	22 (17.46%)
	31–40	42 (33.33%)
	41–50	34 (26.98%)
	51–60	28 (22.22%)
Marital status	Married	59 (46.83%)
	Unmarried	43 (34.12%)
	Divorced	19 (15.08%)
	Widowed	1 (0.79%)
	Cohabitation	4 (3.17%)
Education	Master	11 (8.73%)
	Bachelor	72 (57.14%)
	Junior college	39 (30.95%)
	High school and below	4 (3.17%)
Occupation	Doctor	34 (26.98%)
	Nurse	36 (28.57%)
	Other staff	18 (14.29%)
	Administrative staff	20 (15.87%)
	Logistics staff	18 (14.29%)
Having kid(s)	Yes	98 (77.78%)
	No	28 (22.22%)
Colleague(s) with suspected symptoms	Yes	9 (7.14%)
	No	117 (92.8%)

was significantly lower than that of administrative staff, logistics staff and other staff, and the rate of anxiety of having colleagues with suspected symptoms was significantly higher than that without colleagues with suspected symptoms, with significant difference ( $P < .05$ ). There was no significant difference of anxiety rate in age, current marital status or whether having kids or not ( $P > .05$ ), as presented in Table 2.

**Table 2**  
Comparison of ASI-3 among 126 frontline staff in the community.

Item	Non- Anxiety N (%)	Anxiety (ASI-3 > 16) N (%)	$\chi^2$	P	
Sex	Male	39 (30.95%)	16 (41.03%)	24.131	<.001
	Female	87 (69.05%)	5 (5.75%)		
Age (year)	21–30	22 (17.46%)	2 (9.09%)	4.023	.258
	31–40	42 (33.33%)	6 (14.29%)		
	41–50	34 (26.98%)	5 (14.71%)		
	51–60	28 (22.22%)	8 (28.57%)		
Marital status	Married	59 (46.83%)	11 (18.64%)	1.615	.806
	Unmarried	43 (34.12%)	5 (11.63%)		
	Divorced	19 (15.08%)	4 (0.11%)		
	Widowed	1 (0.79%)	0 (0%)		
	Cohabitation	4 (3.17%)	1 (25%)		
Education	Master	11 (8.73%)	1 (9.09%)	39.016	<.001
	Bachelor	72 (57.14%)	1 (1.39%)		
	Junior college	39 (30.95%)	16 (41.03%)		
	High school and below	4 (3.17%)	3 (0.75%)		
Occupation	Doctor	34 (26.98%)	2 (5.88%)	21.503	<.001
	Nurse	36 (28.57%)	2 (5.56%)		
	Other staff	18 (14.29%)	6 (33.33%)		
	Administrative staff	20 (15.87%)	6 (30%)		
	Logistics staff	18 (14.29%)	5 (27.78%)		
Having kid (s)	Yes	98 (77.78%)	13 (13.26%)	3.673	.055
	No	28 (22.22%)	8 (28.57%)		
Colleague (s) with suspected symptoms	Yes	9 (7.14%)	8 (88.89%)	48.462	<.001
	No	117 (92.8%)	13 (11.11%)		

### 3.3. Comparison of depression status among 126 frontline staff in the community

Depression status measured by PHQ-9 revealed that the average score of surveyed community staff was  $2.03 \pm 0.16$ , of which 19 frontline staff had a total score of more than 5, and the detection rate of depression was 15.08%. Among them, the depression state of those with bachelor degree or above was significantly lower than that of those with junior college education, and the rate of depressive symptoms of community frontline staff with colleagues harboring suspected symptoms were significantly higher than those without ( $P < .05$ ). There was no significant difference of depression rate comparing different sex, occupation, age, current marital status and whether having kids or not ( $P > .05$ ), as shown in Table 3.

### 3.4. Comparison of coping styles of 126 community frontline staff based on the state of anxiety and depression

The coping styles of enrolled staff were analyzed by their status of anxiety or depression. The aggregated results showed that most of the community frontline staff in anxiety state group and depression group adopted negative coping style while most of the community frontline staff in the non-anxiety group and the non-depression group adopted positive coping style, and the difference was significant ( $P < .05$ ), as shown in Table 4.

### 3.5. Comparison of self-efficacy among 126 community frontline staff according to anxiety and depression

Self-efficacy level of surveyed staff was determined by GSES and were further grouped by their statuses of anxiety and depression. As demonstrated in Table 5, much higher level of self-efficacy were observed in non-anxiety group and the non-depression

**Table 3****Comparison of PHQ-9 among 126 frontline staff in the community.**

Item	Non-depression N (%)	Depression (PHQ-9>5) N (%)	$\chi^2$	<i>P</i>	
Sex	Male	39 (30.95%)	9 (23.08%)	2.821	.093
	Female	87 (69.05%)	10 (11.49%)		
Age (year)	21–30	22 (17.46%)	2 (9.09%)	3.824	.281
	31–40	42 (33.33%)	10 (23.81%)		
	41–50	34 (26.98%)	4 (11.76%)		
	51–60	28 (22.22%)	3 (10.71%)		
Marital status	Married	59 (46.83%)	7 (11.86%)	5.401	.249
	Unmarried	43 (34.12%)	5 (11.63%)		
	Divorced	19 (15.08%)	6 (31.58%)		
	Widowed	1 (0.79%)	0 (0%)		
	Cohabitation	4 (3.17%)	1 (25%)		
Education	Master	11 (8.73%)	2 (18.19%)	32.702	<.001
	Bachelor	72 (57.14%)	3 (4.17%)		
	Junior college	39 (30.95%)	10 (25.64%)		
	High school and below	4 (3.17%)	4 (100%)		
Occupation	Doctor	34 (26.98%)	2 (5.88%)	8.046	.090
	Nurse	36 (28.57%)	3 (8.33%)		
	Other staff	18 (14.29%)	4 (22.22%)		
	Administrative staff	20 (15.87%)	5 (25%)		
	Logistics staff	18 (14.29%)	5 (27.78%)		
Having kid (s)	Yes	98 (77.78%)	13 (13.27%)	1.133	.287
	No	28 (22.22%)	6 (21.42%)		
Colleague (s) with suspected symptoms	Yes	9 (7.14%)	8 (88.89%)	41.234	<.001
	No	117 (92.8%)	11 (9.40%)		

**Table 4****126 community frontline staff were divided into groups based on anxiety and depression.**

Coping style	Anxiety group (N=21)	Non-anxiety group (N=105)	<i>t</i>	<i>P</i>	Depression group (N=19)	Non-depression group (N=107)	<i>t</i>	<i>P</i>
Positive coping style	1.71 ± 0.38	2.28 ± 0.57	-9.340	<.001	1.53 ± 0.49	2.52 ± 0.49	-16.036	<.001
Negative coping style	1.62 ± 0.59	1.29 ± 0.51	4.750	<.001	1.42 ± 0.41	1.23 ± 0.37	3.862	<.001
<i>t</i>	1.440	14.529			1.933	23.583		
<i>P</i>	.151	<.001			.054	<.001		

group while lower score of self-efficacy of the community frontline staff was observed in the anxiety group and the depression group with statistical difference ( $P < .05$ ), respectively.

## 4. Discussion

### 4.1. Psychological anxiety of frontline staff in the community during COVID-19

According to the current study, anxiety statuses of the surveyed community staff was closely related to gender, education, occupation and whether colleagues occurs suspected symptoms or not. The following aspects may contribute to the results:

1. COVID-19 is overwhelming with highly contagious feature, which progresses rapidly. Since the disease spreads mostly in hospitals and families, the frontline staff in the community are high-risk groups. In the face of a sudden epidemic, some frontline staff in the community suffered from obvious psychological stress. To staff without good coping style and social support, the degree of anxiety can be twice as much than that of the general population.
2. The state of anxiety among the frontline staff in the male community is significantly higher than that in the female, which may be due to the fact that male workers have to shoulder heavy tasks and stronger sense of responsibility. Given that the male frontline staff in the community is also the spiritual support and the main source of family income, they

**Table 5****Comparison of self-efficacy among 126 community frontline staff according to anxiety and depression.**

Item	anxiety group	non-anxiety group	<i>t</i>	<i>P</i>	depression group	non-depression group	<i>t</i>	<i>P</i>
General self-efficacy	18.73 ± 1.09	37.93 ± 2.01	-94.256	<.001	17.32 ± 1.92	38.03 ± 2.15	-80.648	<.001

- have to experience high work intensity and high risk, which leads to severe psychological anxiety and affects mental health.
3. The community frontline staff with junior college education and below has insufficient knowledge of the epidemic situation with the lack of effective drugs to treat the disease. Although the disease is analyzed by experts from the aspects of susceptible population, route of transmission, source of infection, the specific pathological process and route of transmission are largely unclear, resulting in anxiety among the community frontline staff with junior college education and below in the process of close contact with residents.
  4. The state of anxiety increases significantly when colleagues have suspected symptoms, mainly because they fail to take effective measures at the beginning of the epidemic, and people suspect each other, especially in areas with serious situation recently.

These people mostly fall into a state of self-doubt and suspicion by others, while colleagues around them are suspected of being infected by themselves or those around them, so they may be more prone to anxiety.<sup>[12]</sup>

#### **4.2. Psychological depression of frontline people in the community during COVID-19**

We and other group have proved that there was a positive correlation between the mental health status of the community frontline staff and the education level. The community frontline staff with undergraduate or above was less likely to have negative psychology such as depression, while the community frontline staff who did not receive higher education were prone to suffer from depression and other negative psychology. According to studies supported by An et al,<sup>[13]</sup> the higher the level of the hospital and the higher the educational background of the nurses, the higher the psychological flexibility they could be. Based on our study, the depression state of those with bachelor degree or above was significantly lower than that of those with junior college education, and the rate of depressive symptoms of community frontline staff with colleagues harboring suspected symptoms were significantly higher than those without colleagues with suspected symptoms, which was similar to the above research. It was suggested that COVID-19 could lead to depression and other negative psychology in some community frontline staff, which was attributed by the following:

1. the frontline staff of the community with bachelors degree or above have more general knowledge, so they manage to be calm, and have the confidence and courage to overcome hardship;
2. the depressive symptoms of community frontline staff with colleagues harboring suspected symptoms increased significantly, which was mainly due to strong infectivity, long incubation period of COVID-19 and fear of being infected at the same time.

#### **4.3. The influence of negative psychological coping style of anxiety and depression on the frontline staff in the community during COVID-19**

Coping style is the measures taken by individuals in the face of stressful events and stressful stages, and different individuals take different measures under external pressure.<sup>[14-15]</sup> The key point

that affects the mental health of the frontline staff in the community is the coping style, which could further be divided into negative and positive coping. The negative coping is to adopt behavior avoidance and talk about emotion to regulate and control it. However, such coping style fails to effectively alleviate the negative psychology. On the other hand, positive coping is to adopt plans and tools to actively solve the current problems, which can play a certain role in alleviating the negative emotions. The results of this study showed that the community frontline staff in the anxiety group and the depression group mostly adopted negative coping styles while the community frontline staff in the non-anxiety group and non-depression group mostly adopted positive coping styles ( $P < .05$ ). Our results suggested that psychological state may determine the coping style adopted by the frontline staff of the community during COVID-19.

#### **4.4. The influence of negative psychology of anxiety and depression on self-efficacy of community frontline staff during COVID-19**

Self-efficacy is the individuals leadership or control of self-action, through a certain behavior can achieve the predetermined goal, and have faith in their ability to achieve the predetermined goal through the behavior. Based on several related studies<sup>[16-17]</sup>, self-efficacy is an effective protective factor for individuals under stress, to effectively maintain their mental health. However, considering the sudden outbreak of COVID-19, there is limited research on the impact of negative psychology of anxiety and depression on self-efficacy of community frontline staff during COVID-19. Our results showed higher score of self-efficacy could be observed in staff with better mental status, indicated that psychological state can directly affect the self-efficacy of community frontline staff.

#### **4.5. Psychological safety maintenance of frontline staff in the community during COVID-19**

**4.5.1. Health education for frontline staff in the community.** During the epidemic period, it is necessary to carry out COVID-19 special health education for community frontline staff through the network regularly and timely, and strengthen professional training on knowledge of prevention and control. Meanwhile, it could improve the adaptability, emergency response ability and professional level of community frontline staff and prevent and reduce negative psychology due to lack of skills. In addition, the community could utilize tools of online meeting and invite authoritative experts to explain latest diagnosis and treatment guidelines, scientific research achievements, prevention and control measures of COVID-19, and answer questions in real-time to provide professional, and accurate method for frontline staff in the community. Video conferencing, Wenjuanxing (<https://www.wjx.cn/>), Ketangpai (<https://www.ketangpai.com/>), and other online learning platforms could be utilized to provide convenient services for the community to implement management, training, and assessment during the epidemic.

#### **4.6. Psychological evaluation and counseling for frontline staff in the community**

According to relevant studies<sup>[18]</sup>, more than 50% of the participants suffered from varying degrees of psychological disorders when dealing with public health emergencies, which

need timely and effective psychological intervention. The leaders of the frontline staff in the community should regularly carry out psychological counseling and provide psychological counseling. The leaders could invite psychiatrists to regularly evaluate the frontline staff, provide timely and effective psychological counseling to different groups as far as possible, open a psychological assistance hotline to answer and solve the psychological problems, and issue a mental health manual for self-counseling. For community frontline staff with psychological problems, rest and psychological treatment should be given, and job shifting should be arranged. The following measures have been applied in our community: a reasonable job shifting was arranged to avoid negative psychology caused by fatigue; the working staff were encouraged to respect objective facts, accept the limits of their own ability, actively chat with themselves, and affirm their self-worth; also, the working staff were informed that appropriate anxiety is conducive to improving their coping ability and using their potential; to properly control the negative psychology of anxiety and tension, they were instructed to do some sports, chanting with close friend and adopt a healthy diet during the period of such stressful work; additionally, all working staff were taught some relaxation training such as breathing relaxation training when mood swing were found.

#### 4.7. Social support and recognition to frontline staff in the community

The implementation of practical social support to the community frontline staff during COVID-19 is the guarantee to deal with the epidemic effectively and calmly. In the implementation of social support, it is necessary to combine support from families, peers and various social organizations, and give additional economic incentives and holiday subsidies, in order to ensure that frontline members of the community establish a firm determination in the face of major public health emergencies and actively take measures to solve the problem.

#### 4.8. Limitations

There are some limitations in the current study. Firstly, this study only investigated the front-line workers in 3 communities in our city, and it does not represent the psychological state of all front-line workers in the community. Secondly, this study did not conduct multi-factor analysis, so the sample size should be further expanded for in-depth research in the later period. Thirdly, since we cannot foresee the outbreak of COVID-19, the anxiety and depression baseline of surveyed community frontline staff were unable to be obtained. Moreover, the current study included only effect of COVID-19 on mental status as major research subject, other factors that may potentially affecting the mental status of frontline staff were not considered in current study.

### 5. Conclusion

Our results have revealed that negative psychology of anxiety and depression with low coping style and self-efficacy were observed in part of community frontline staff in response to outbreak of COVID-19, thus further suggested that mental health of community frontline staff should be carefully monitored and timely and effectively offered psychological services could be important for those staff to maintain their psychological health

and to better counter-reacting with outbreak of acute infectious diseases.

### Author contributions

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