

Investigation on psychosomatic status of entry quarantine personnel during the COVID-19 pandemic

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Abstract

To investigate the anxiety, depression, fatigue and insomnia of the entry quarantine personnel during the COVID-19 pandemic, and the influencing factors of psychological status were also explored. The Self-Rating Anxiety Scale (SAS), Self-Rating Depression Scale (SDS), Fatigue severity scale (FSS) and the Insomnia Severity Index (ISI) of 630 entry quarantine personnel were performed and the correlation analysis of the four types of scales was performed. The incidence rates of anxiety, depression, fatigue and insomnia were 4.76%, 20.00%, 48.57% and 22.86%, respectively. There was a positive correlation between the four indicators. Univariate analysis showed that age, education level, occupation, continent and reasons for going abroad were the main influencing factors of psychosomatic status. The lower the age group, the higher the education level, and the healthier the psychosomatic health of the entry quarantine personnel. The psychological status of international students was healthier than that of the staff. The psychological condition of the quarantined people in Asia was healthier than that in other continents. 630 entry quarantine personnel had different degrees of anxiety, depression, fatigue and insomnia, there was a positive correlation between them. Age, education level, occupation, continent and reasons for going abroad were the main influencing factors of psychological status.

Keywords: COVID-19; entry quarantine personnel; psychological status; questionnaire.

Practical Application: This study takes the entry quarantine personality as the observation population, focusing on the changes of psychological state of such people in the face of major public health emergencies, in order to effectively reduce the psychological damage of isolation and improve compliance; Through the analysis of the characteristics and laws of mental health and mental unhealthy, it is convenient to adopt targeted measures to protect the mental health of isolated personnel, reduce the adverse effects of isolation measures, and even reduce the psychological panic of the whole population.

1 Introduction

Novel Coronavirus Disease 2019 (COVID-19), as an acute infectious respiratory disease with global pandemic characteristics, has become a major global public health event (Yang et al., 2020). The World Health Organization (WHO) has declared that the outbreak of COVID-19 in China is a public health emergency of international concern (PHEIC) (Eurosurveillance Editorial Team, 2020; Li et al., 2020a). With the valiant efforts of the whole country, China has achieved initial results in the epidemic situation, but the epidemic outside China is intensifying and spreading. The number of infected people in some countries and regions has risen sharply, and various clustering events caused by imported cases have attracted great concern in China (China, 2020b; Yuan et al., 2020). Since March 5, 2020, when imported cases were included in the epidemic statistics, “External Anti Input” has gradually become the main body of epidemic prevention and control at the present stage in China.

Due to the outbreak of COVID-19, people inevitably have suffered from many psychological problems. Domestic and foreign scholars have studied the psychological status of medical workers, domestic quarantine personnel and other groups, but there is a lack of investigation and understanding of the psychological status of entry quarantine personnel (non-Chinese nationality). Therefore, in order to explore the psychological status of entry quarantine personnel and the influencing factors, we carried out a special investigation among entry quarantine personnel who entering Fuyang City.

2 Materials and methods

2.1 Subjects

A total of 630 entry quarantine personnel who entered Fuyang City from March 5 to March 31, 2020 were enrolled in this study. Inclusion criteria: (1) People who came from

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overseas, including Hong Kong, Macao and Taiwan; (2) People who were informed consent and voluntary participation in the study. Exclusion criteria: People entering Fuyang from other provinces in China.

2.2 Research tools and methods

The following contents were included and self-made questionnaire through questionnaire star, and link is generated and shared with those entry quarantine personnel. The personnel answer and submit questionnaire through their own mobile phone.

(1) General information, including country, gender, age, occupation, education level, reason for going abroad, quarantine point, overseas living time, whether they have been in contact with patients with COVID-19; (2) Anxiety and depression status, which were evaluated by using Self-Rating Anxiety Scale (SAS) and Self-Rating Depression Scale (SDS); (3) Fatigue and sleep status, which were evaluated by using fatigue severity scale (FSS) and the Insomnia Severity Index (ISI).

2.3 Scoring criteria

SAS consists of 20 items, which are divided into 4 grades. The score below 50 points is normal; 50-60 is mild anxiety; 61-70 is moderate anxiety; and more than 70 is severe anxiety. SDS contains 20 items, which are divided into 4 grades. The score below 50 points is normal; 51-60 is mild depression, 61-71 is moderate depression, and more than 70 is severe depression (Wang et al., 1999). FSS score below 36 points indicates that people may not feel fatigue, and a score of greater than or equal to 36 indicates that people may need a doctor for further evaluation (Wei & Song, 2017). ISI score of 0 to 7 points indicates no clinically significant insomnia, 8 to 14 indicates sub-threshold insomnia, 15 to 21 indicates moderate and severe clinical insomnia, 22 to 28 indicates severe clinical insomnia (Li, 2018).

2.4 Statistical analysis

Statistical software SPSS 21.0 was used for statistical analysis of the collected data. The measurement data were described as means \pm standard deviation (SD). The count data were described

as percentages. The comparison between groups was conducted by t-test and one-way ANOVA. Least significant difference (LSD) method was used for pairwise comparison. Pearson correlation analysis was used for anxiety, depression, fatigue and insomnia scores. $P \leq 0.05$ was the difference with statistical significance.

3 Results

3.1 Baseline data

From March 5 to March 31, 2020, a questionnaire survey was conducted on 652 entry quarantine personnel in Fuyang City. A total of 630 questionnaires were returned, with a recovery rate of 96.63%. Among the 630 entry quarantine personnel, 384 were males (60.95%) and 246 were females (39.05%). There were 318 subjects (50.48%) between 20-29 years old, and 180 (28.57%) had a bachelor degree. In terms of occupation, the number of employees (342, 54.29%) was slightly more than international students (288, 45.71%). Hotels were the most concentrated quarantine points, with a majority of 402 (63.81%). Most of the entry quarantine personnel were as international students and returned to China, accounting for 288 (45.71%). Most of the entry quarantine personnel live abroad within one year.

As shown in Table 1, among the 630 subjects, the majority were Asian (306, 48.57%), followed by 198 cases (31.43%) in Europe, and 24 cases (3.81%) in Oceania have the smallest proportion. The composition of entry quarantine personnel in different countries on the same continent was different. Among them, 150 subjects (23.81%) in the UK in Europe was higher than that of other countries in the European region. Meanwhile, the UK was the country with the highest proportion of entry quarantine personnel. Moreover, Cambodia in Asia, the USA in the Americas and Nigeria in Africa had a higher composition of entry quarantine personnel than other countries or regions in their continent. In Oceania, only 24 cases (3.81%) came from Australia.

3.2 Incidence of anxiety, depression, fatigue and insomnia among entry quarantine personnel

As shown in Table 2, among the 630 entry quarantine personnel, the incidence of fatigue was the highest (48.57%),

Table 1. Composition of quarantine personnel from different continents.

Continent	Country	Number of cases	Constituent ratio (%)	Continent	Country	Number of cases	Constituent ratio (%)
Asia (306 cases)	Cambodia	84	13.33	Europe (198 cases)	Britain	150	23.81
	Thailand	48	7.62		France	27	4.29
	Macao, China	36	5.71		Germany	15	2.38
	Myanmar	30	4.76		Switzerland	6	0.95
	Philippines	24	3.81		USA	60	9.52
	Laos	24	3.81	America (72 cases)	Canada	7	1.11
	Malaysia	21	3.33		Uruguay	5	0.79
	Singapore	17	2.70		Nigeria	12	1.90
	Pakistan	8	1.27	Africa (30 cases)	Tanzania	12	1.90
	Bangladesh	5	0.79		Ethiopia	6	0.95
Japan	5	0.79	Oceania (24 cases)	Australia	24	3.81	
Viet Nam	4	0.63					

Table 2. Anxiety, Depression, Fatigue and Insomnia in entry quarantine personnel.

	Items	Number	Incidence (%)
Anxiety	Normal	600	4.76
	Mild anxiety	30	
Depression	Normal	504	20.00
	Mild depression	72	
	Moderate depression	48	
	Severe depression	6	
Fatigue	Normal	324	48.57
	Fatigue	306	
Insomnia	No clinically significant insomnia	486	22.86
	Subliminal insomnia	114	
	Moderate to severe clinical insomnia (moderate to severe)	24	
	Severe clinical insomnia	6	

Table 3. Correlation analysis of anxiety, depression, fatigue and insomnia among entry quarantine personnel (*P* value).

	Depression score	Fatigue score	Insomnia score
Anxiety score	0.773*	0.278 [†]	0.575 [†]
Depression score		0.291 [†]	0.592 [†]
Fatigue score			0.398 [†]

[†]Represents significant correlation at 0.01 level (bilateral).

the incidence of sleep and depression were 22.86% and 20.00%, respectively. The incidence of anxiety was the lowest (4.76%).

3.3 The incidence of anxiety, depression, fatigue and insomnia among entry quarantine personnel in different continents

The incidences of anxiety, depression, fatigue and insomnia were different in different continents. Among them, the incidences of anxiety in entry quarantine personnel from the Europe and Asia were 6.06% and 3.92%, respectively. However, those subjects from the Americas, Africa and Australia had not anxious. The incidences of depression in entry quarantine personnel from the Africa, Asia, Australia and Europe were 40.00%, 29.41%, 25.00%, and 9.09%, respectively. Those from the Americas did not experience depression. The entry quarantine personnel from Asia, Europe, Americas, Africa, and Oceania all experienced fatigue, and the rates were 20.95%, 14.29%, 7.62%, 2.86%, 2.86%, respectively. The incidence of insomnia among entry quarantine personnel from Asia, Europe, Africa, and Oceania was 15.24%, 5.71%, 0.95% and 0.95%, respectively. Those from the Americas did not experience insomnia.

The incidence rates of anxiety and depression among the entry quarantine personnel from different countries were also not consistent. The incidence of anxiety and depression of entry quarantine personnel from the Macao of China was higher than that in other countries, the incidence of depression in Pakistan was higher than that from other countries, and the incidences of fatigue and insomnia in the British were higher than those of other countries. Some entry quarantine personnel from the Britain, Macao, China and Myanmar had different

degrees of anxiety, depression, fatigue and insomnia, as shown in Figure 1 and Figure 2.

3.4 Correlation analysis of anxiety, depression, fatigue and insomnia among entry quarantine personnel

The correlation of anxiety score, depression score, fatigue score and insomnia score of 630 entry quarantine personnel were analyzed by Pearson correlation analysis. There were positive correlations between anxiety score and depression score, fatigue score and insomnia score (0.773, 0.278, 0.575). There were also positive correlations between depression score and fatigue score, insomnia score (0.291, 0.592). There was also positive correlation between fatigue and insomnia scores (0.398) (Table 3).

3.5 Univariate analysis of anxiety, depression, fatigue and insomnia among entry quarantine personnel

The survey results showed that there were significant differences in anxiety scores among subjects with different occupations, continents and reasons for going abroad ($P < 0.05$). In terms of occupation, the anxiety score of the staff was higher than that of the overseas students. The anxiety score of entry quarantine personnel from the Asia was higher than that from the Americas, and the anxiety score of the African entry quarantine personnel was higher than that of the American group. In terms of reasons for going abroad, the anxiety score of the quarantined personnel who went abroad for work was higher than those for visiting relatives and studying abroad.

Moreover, there were statistically significant differences in depression scores among subjects with different education levels, occupations, states and reasons for going abroad ($P < 0.05$). In terms of education level, the depression scores of doctoral students, graduate students and undergraduate students were lower than those of specialist and other groups. In terms of occupation, the depression score of staff was higher than that of overseas students. In terms of continent, the depression score of Asian quarantine personnel was higher than that of European and American groups. For the reason of going abroad, the depression score of entry quarantine personnel who went abroad

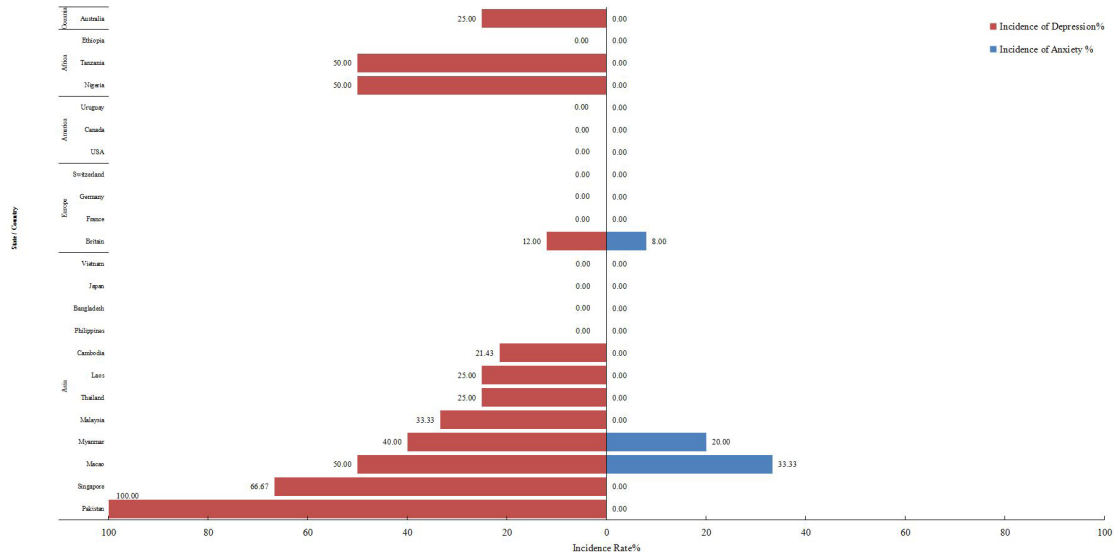


Figure 1. Incidence of anxiety and depression in different continent.

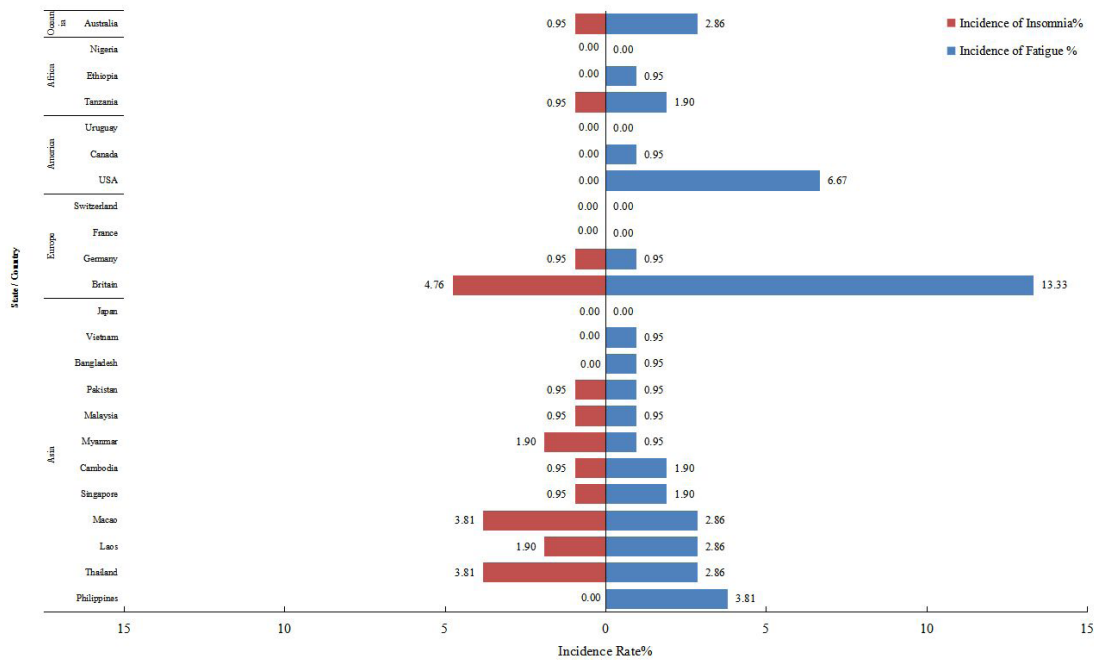


Figure 2. Incidence of fatigue and insomnia in different continents.

for work was higher than that of subjects who went abroad for family visit and study.

However, there were no significant differences in fatigue scores among subjects with different genders, ages, educational levels, occupations, concentrated isolation points, States, reasons for going abroad, and time of living abroad ($P > 0.05$).

Furthermore, there were statistically significant differences in insomnia scores among subjects with different ages and educational levels ($P < 0.05$). In terms of age, the insomnia scores among entry quarantine personnel in the three age groups of 20-29, 30-39 and 40-49 years old were lower than those in

the age group of less than 20 years old. In terms of education level, the insomnia scores of entry quarantine personnel who were doctoral students, graduate students and undergraduates were higher than those who were specialty and other groups. The results were shown in Table 4.

4 Discussion

The COVID-19 epidemic is spreading globally. At present, China has achieved some results in epidemic prevention and control. However, the imported cases with COVID-19 in Harbin and Mudanjiang, Heilongjiang province, have been warned

Table 4. Univariate analysis of anxiety, depression, fatigue and insomnia among entry quarantine personnel.

Items	Number of persons	SAS score			SDS score			FSS score			ISI score			
		$\bar{x} \pm SD$	t/F	P	$\bar{x} \pm SD$	t/F	P	$\bar{x} \pm SD$	t/F	P	($\bar{x} \pm s$)	t/F	P	
Gender	Male	384	36.04 ± 6.96	1.252	0.213	44.82 ± 11.20	1.714	0.090	33.97 ± 12.45	-0.865	0.389	5.53 ± 5.23	1.622	0.108
	Women	246	34.33 ± 6.58			41.59 ± 8.13			36.10 ± 12.05			4.12 ± 3.67		
Age	<20 years	84	33.21 ± 4.38	0.775	0.544	40.09 ± 7.26	1.005	0.409	33.71 ± 11.93	0.071	0.991	1.64 ± 1.69	2.611	0.040
	20-29 years	318	35.47 ± 6.99			43.18 ± 8.78			35.32 ± 11.25			5.66 ± 4.48		
	30-39 years	138	36.20 ± 6.71			46.68 ± 11.18			34.87 ± 14.34			5.61 ± 4.79		
	40-49 years	72	36.77 ± 8.85			43.85 ± 15.95			33.83 ± 14.62			5.42 ± 6.78		
	≥50 years	18	31.67 ± 5.91			41.25 ± 8.75			34.00 ± 13.12			2.00 ± 1.00		
Educational level	Specialist	72	37.71 ± 9.47	1.943	0.109	48.65 ± 14.69	4.279	0.003	38.08 ± 16.00	0.702	0.593	8.75 ± 6.69	2.995	0.022
	Bachelor's degree	180	32.96 ± 6.66			40.00 ± 7.62			34.13 ± 9.94			3.90 ± 3.20		
	Postgraduate studies	96	34.22 ± 6.11			39.22 ± 5.63			31.31 ± 10.95			3.50 ± 3.01		
Vocational	Ph..D.	18	35.42 ± 6.29	-2.006	0.047	36.25 ± 5.00	-2.991	0.004	40.00 ± 4.58	-0.007	0.995	6.33 ± 5.77	-1.339	0.184
	Other	264	36.79 ± 6.08			46.68 ± 10.40			35.27 ± 13.42			5.14 ± 4.99		
The concentration / Isolation Point	International Students	288	33.93 ± 6.31	0.880	0.418	40.57 ± 6.34	1.473	0.234	34.79 ± 10.35	0.462	0.631	4.31 ± 4.20	1.139	0.324
	Staff member	342	36.58 ± 7.07			46.07 ± 12.05			34.81 ± 13.79			5.54 ± 5.07		
	Hospitals	174	36.12 ± 7.49			46.03 ± 10.90			35.97 ± 13.56			6.10 ± 4.81		
	Hotel	402	34.76 ± 6.35			42.29 ± 9.40			34.75 ± 11.42			4.55 ± 4.69		
	Other	54	37.50 ± 8.20			45.00 ± 12.98			31.44 ± 14.98			4.56 ± 4.48		
Grand State	Asia	306	36.50 ± 6.84	4.860	0.001	46.30 ± 12.03	3.27	0.015	34.47 ± 13.73	0.446	0.775	5.90 ± 5.22	2.150	0.080
	Europe	198	34.70 ± 6.55			40.45 ± 6.68			33.70 ± 10.46			4.21 ± 3.55		
	Americas	72	29.06 ± 3.89			37.81 ± 5.47			35.50 ± 11.16			2.25 ± 2.34		
	Africa	30	42.00 ± 4.20			49.00 ± 10.58			40.00 ± 15.64			5.00 ± 5.29		
State service	Oceania	24	37.19 ± 6.24	3.198	0.016	44.69 ± 6.16	4.452	0.002	39.50 ± 6.86	0.479	0.751	7.75 ± 7.89	1.843	0.127
	Work	186	38.19 ± 6.27			48.55 ± 10.96			35.65 ± 13.91			5.35 ± 4.92		
	Family visits	24	29.06 ± 3.13			34.69 ± 3.87			40.25 ± 12.23			1.75 ± 1.71		
	Study abroad	288	33.96 ± 6.38			40.36 ± 6.42			34.79 ± 10.27			4.15 ± 3.91		
	Travel	60	34.00 ± 6.06			44.63 ± 11.21			34.30 ± 12.97			7.10 ± 5.02		
Overseas living / Time of residence	Other	72	36.98 ± 8.80	0.673	0.570	45.52 ± 14.96	1.791	0.154	31.25 ± 15.56	1.172	0.324	6.67 ± 6.53	0.870	0.459
	<1 month	150	35.40 ± 7.75			44.35 ± 12.03			33.36 ± 14.04			6.20 ± 5.85		
	1-6 month	210	34.18 ± 7.38			40.61 ± 9.53			33.03 ± 11.57			4.23 ± 4.77		
	6 month-1year	162	35.93 ± 6.01			44.40 ± 9.08			38.48 ± 8.82			4.78 ± 3.72		
>1 year	108	36.81 ± 5.54	46.94 ± 9.57	34.72 ± 15.05	5.06 ± 4.19									

(China, 2020d). Therefore, the epidemic prevention and control still cannot be ignored in China. Since February 29, 2020, China has continuously reported imported cases from abroad. As of June 11, 2020, there were 63 confirmed imported cases from abroad, and 1803 cases have been reported. At present, preventing the spread of the COVID-19 epidemic from overseas has become the focus of epidemic prevention and control in China (Qian et al., 2020).

The spread of the COVID-19 has brought different psychological pressure and psychological illness to the community, and has caused different degrees of harm to all kinds of people's lives and psychology (Pan, 2020; Ma & Yan, 2020; China, 2020c). The entry quarantine personnel are the key population for epidemic prevention and control at present stage. In order to minimize the mental health problems faced by various populations during the development of the epidemic, strengthen psychological counseling and psychological interventions for key populations, help immigrants adapt to the isolation environment, and improve the entry management and service level, the relevant national departments have formulated the <Guiding Principles for Emergency Psychological Crisis Intervention in the Novel

Coronavirus Infected Pneumonia Epidemic> and the <Notice on Strengthening Psychological Assistance and Social Work Services in the Response to the Novel Coronavirus Pneumonia Epidemic> (China, 2020a; Li et al., 2020b).

The age distribution and occupation composition of entry quarantine personnel who entry China are different. Li *et al.* showed that the age of imported cases tended to be younger, and the majority was overseas students (Sheng et al., 2020). Our results showed that the age of the quarantine personnel was mainly 20-29 years old, and foreign students were the main immigrants. Relevant studies have shown that, in the early stage, Chinese imported cases were mainly imported from ports, and the UK and USA were the main sources (Yang et al., 2020). This survey found that the UK, Cambodia and USA ranked the top three in terms of entry quarantine personnel, and the UK and USA were mainly foreign students, while Cambodia was mainly composed of staff. During the epidemic period, the management of international students from developed countries and Chinese surrounding countries should be strengthened.

The continuous spread of COVID-19 has brought serious psychological pressure to all kinds of people in the society (China,

2020c). In this survey, 630 entry quarantine personnel all have psychological status, including various degrees of anxiety, depression, fatigue and insomnia. Age, education level, occupation, continent and the reason for going abroad were the main influencing factors of psychological status. The lower the age group, the higher the education level, the healthier the psychological status. The psychological evaluation of international students was healthier than that of staff. The psychological status of Asian entry quarantine personnel was lower than that from some continents. Research by Yang Xinping (Yang et al., 2020) and others showed that the risk of Chinese import from land-based countries bordering China was higher. This survey showed that Asia accounted for a high proportion, which further indicated that the control of inbound personnel in Chinese neighboring countries should be strengthened. Pearson correlation analysis showed that there was a positive correlation between the four indicators among entry quarantine personnel. Relevant studies also showed that sleep quality had a certain correlation with anxiety and depression (Cao et al., 2020), which was similar to the results of ours. The psychosomatic status of entry quarantine personnel is affected by many factors. Previous research showed that sleep status was the influencing factor of anxiety and depression (Chinazzi et al., 2020).

The COVID-19 epidemic situation has been effectively delayed due to Chinese early travel restrictions. More than half of the international output cases have been reduced, which has won valuable time for the international prevention and control measures to cope with the COVID-19 epidemic situation (Anhui, 2020). The Foreign Affairs Office of the people's Government of Anhui Province issued a notice. All personnel from overseas to Anhui (including direct entry from overseas or transit from other cities in China), regardless of Chinese citizens or foreign citizens, shall implement relevant prevention and control measures and strictly implement isolation observation measures. All entry personnel shall implement 14-day centralized isolation medical observation according to relevant regulations Preliminary screening of nucleic acid detection. None of the 630 entry quarantine personnel in this survey was positive detected by nucleic acid test. In order to better prevent and control the follow-up entry quarantine personnel, according to the survey results, we should formulate exercise measures to enhance their immunity, reasonably guide sleep time, and increase the psychological education and training plan for entry quarantine personnel, so as to improve their life experience during the isolation period. Targeted training and psychological counseling measures, such as one-to-one online counseling and other psychological counseling measures, should be carried out to ensure the physical and mental health of the entry quarantine personnel as far as possible.

Conflict of interest

The author declare that they have no conflict of interest.

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