Mental Stress, Psychological State and Coping Style During the COVID-19

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Absract

It is a necessary for modern crisis management to understand public response to behavior under the condition of COVID-19. The 2002 questionnaires were designed to investigate mental stress, psychological states and coping styles of the public during the period of the COVID-19. The three scales were analyzed by exploratory factor analysis, and the factors influencing mental state were regressed in layers. The structural equation model of mental pressure, mental state and coping style was established, The hypothesis is verified, that is, health, less income, work can not be completed, marriage conflicts, family conflicts, media reports on the COVID-19 increase the public panic; public panic significantly increases their positive and negative coping behaviors. Finally, five suggestions are put forward.

Key words: Mental stress; Psychological state; Coping style; Structural equation model

The COVID-19 is a disaster in human history. It has surpassed terrorism and has become the most important threat in today's society. It transcends people's cognition of the traditional threats such as nuclear weapons and terrorism, and makes people have new reflections. In the face of COVID-19, effective management requires two aspects of knowledge. The First is a scientific analysis and quantitative evaluation of the characteristics, recognition and loss of COVID-19,which determines the technical means to cope with the COVID-19.The second is the public perception, which is a part of knowledge which determines the non-technical means to deal with the crisis. In a sense, we should pay more attention to the non-technical means to deal with the crisis. Understanding and grasping the COVID-19's public reaction is the inevitable requirement of modern crisis management. Therefore, it is important and necessary in the perspective of public mental stress, psychological state and coping style to study COVID-19.

According to the analysis of 2144 calls from Wuhan psychological hospital (2020) psychological assistance hotline of Wuhan Mental Health center on February 4, 2020, 47.3% of them had anxiety, 15.3% had somatization reaction, 19.9% had sleep problems, 16.1% had depression, and the need for psychological assistance was prominent. For this reason, this paper compiles the scale of mental stress, mental state and coping measures, investigates and analyzes the mental state of the national public, and compares the differences between Hubei Province and non-Hubei Province. Through the Internet survey from February 25 to 27, 2002 valid questionnaires were obtained.

1. MENTAL STRESS

Among the "main sources of mental stress", there are eight main problems: the physical health of oneself and his family, the difficulty in completing work, the decrease of income, the contradiction between marriage and parents, the excessive investment in childcare, the decrease of outdoor sports and recreational activities, and the reports of various media on the COVID-19 situation. The basic results of the investigation are shown in Table 1. The major sources of mental pressure of the investigated public are worry about "their own and their families' health, income reduction, difficulty in completing work and external reports of the epidemic.

The Cronbach α coefficient of the scale is 0.714, and the KMO value is 0.811, all of which are greater than 0.6, indicating that the reliability and validity of the questionnaire are good and suitable for factor analysis. From the factor load coefficient table, we can see three factors of the source of mental stress, named as: personal factor, family factor, external factor.

Table 1 tests the differences of the three factors from gender, age, residence, annual family income and health status. It is found that there is a significant difference between Hubei Province and other Province in terms of "personal factors", that is to say, the source of mental stress of Hubei Province is significantly greater than that of non-Hubei Province in terms of "physical health of oneself and family, income reduction and work difficulty" People in northern province. □ those over 25 years old have more mental stress on personal factors. There is no significant difference between "family factor" and "external factor".

Table 1
Difference analysis of mental stress

Variables		Personal Factor	Family Factor	External factor
gender（male=1 female=0）	T □	-1.094	-0.005	0.375
	Sig.	0.275	0.996	0.708
residence（HB=1 others=0）	T □	6.231	0.931	2.65
	Sig.	0.000**	0.353	0.009**
annual family income（≤10w =0 ≥10w =1）	T □	-1.174	1.433	0.746
	Sig.	0.242	0.153	0.456
health（good=1 bad=0）	T □	-1.629	-0.57	-0.633
	Sig.	0.105	0.57	0.527
age（≤25 =0 ≥25 =1）	T □	3.744	-0.194	-0.294
	Sig.	0.000**	0.846	0.769

2. MENTAL STATE SCALE

what is the public's mental state during the outbreak? The psychological state designed in this paper includes "fear, anxiety, tension, anger, depression, frustration, compassion, safety, relaxation, calmness, suffocation, helplessness, satisfaction, freedom, secretly joy, happiness, loneliness and disappointment". The reliability and validity of the psychological state scale are all greater than 0.8, which shows that the reliability and validity of the questionnaire are good.

Two factors can be extracted from the psychological state of the investigated public, named "optimistic" and "panic". Cronbach α coefficients within the factors are 0.843 and 0.953, respectively, indicating good internal consistency.

Table 2 compares factor differences of "panic" and "optimism" in terms of gender, residence, annual family income and age. But only "residence" has significant difference in "panic" factor at the level of 5%.

Table 2
Difference analysis of mental state

Variables		Panic	Optimism
Gender（male=1 female=0）	t □	-0.331	-0.614
	Sig.	0.741	0.54
Residence（HB=1 others=0）	t □	-2.322	0.949
	Sig.	0.008*	0.344
Annual family income （≤10w =0 ≥10w =1）	t □	-1.123	0.709
	Sig.	0.263	0.479
Age（≤25 =0 ≥25 =1）	t □	0.164	0.724
	Sig.	0.87	0.47

3. FREQUENCY SCALE ANALYSIS OF COPING WITH STRESS

Lazarus and Folkman (1984) believe that coping refers to the thought and behavior of an individual dealing with internal and external situations that he or she thinks have pressure. Compas et al. (2001) defined coping as an individual's conscious effort to regulate emotion, cognition, behavior and environment in the face of stress events and environment. Therefore, this study defines coping as the cognitive, emotional and behavioral process that people purposefully adopt to reduce the impact of stress in the COVID-19.There are different types of coping strategies. Amirkhan (1990) divides coping strategies into problem-solving strategies, support seeking strategies and avoidance strategies. Billings and moons (1984) propose problem-centered strategies, emotion centered strategies and evaluation centered strategies. Lyne and Roger (2000) divide coping strategies into emotion centered strategies, positive strategies and avoidance strategies. To sum up these classification methods, we can attribute the strategies of problem-solving, problem-centered and seeking support to positive strategies, and the strategies of avoidance and emotion centered to avoidance strategies. Correspondingly, the coping behavior can be divided into two categories: positive coping behavior and avoidance coping behavior.

In COVID-19, what are the ways of coping with stress? This paper makes a statistical analysis of the ways of the respondents' coping with stress. It can be seen that most people deal with stress in a more positive way, such as focusing on work, doing a good job, accepting the reality, looking for positive things, etc., with an average of more than 3.

The reliability of coping behavior scale is 0.771, KMO value is 0.784, which is greater than 0.7. The reliability and validity of the questionnaire are good. Factor load analysis, eliminating the options with a commonality of less than 0.4 (I will let myself pay less attention to crisis through watching movies, TV, reading, daydreaming, sleeping, shopping, etc.; I find comfort from religious

beliefs and spiritual beliefs; I have been learning how to get along with stress), retaining 11 options, and getting 2 factors, named "avoidance behavior" factor and "positive behavior", respectively behavior factor.

4. AN INTEGRATED MODEL OF MENTAL STRESS, MENTAL STATE AND COPING BEHAVIOR

4.1 Mental Pressure and Mental State

Psychological pressure is mental pressure. Everyone has experience in modern life. Generally speaking, mental pressure comes from three sources: society, life and competition. The mental stressors of the public in the new crown epidemic mainly include worrying about their own and their families' health, income reduction, inability to complete their work, family conflicts, media reports on the epidemic information, etc.

From the perspective of phenomenology, fear is mainly composed of three response systems: explicit action system, language cognitive system and physiological response system (Lipp, 2006) novel coronavirus pneumonia, as a SARS, has aroused people's fear of 17 years ago, which is highly infectious, high mortality and disability. Many medical staff are infected with life-threatening disability such as femoral head necrosis. Patients with obsessive-compulsive disorder are more frightened, wash their hands repeatedly and disinfect repeatedly, but they always feel that they can't be cleaned up; even when medical resources are tight, their needs for examination and treatment or hospitalization can't be met, their inner fear increases exponentially, and they will instinctively send out some extreme behaviors such as shouting, tearing, smashing, etc.; the physiological system level is shown as The individual's heart rate increases, cognitive disorder, judgment ability and reaction ability decrease, even physiological function disorder, body immunity decline, etc.

Therefore, there are the following theoretical assumptions:

Hypothesis 1: Health, less income, and inability to complete work increase public panic;

Hypothesis 2: Marriage contradiction and family contradiction increase public panic;

Hypothesis 3: Media coverage of the epidemic has uncertain psychological impact on the public.

4.2 Coping Behaviors Triggered by Fear

Because coping behavior is an action that people take to reduce risk perception, the higher the level of risk perception, the more people fear, and the higher the frequency of coping behavior. Therefore, there are the following theoretical assumptions:

Hypothesis 4: panic increases the positive response of the public;

Hypothesis 5: panic increases the avoidance response of the public

4.3 Structural Equation Model of Mental Stress, Mental State and Coping Behavior

The above hypotheses are verified by using survey data. The variables of structural equation model include personal factors, family factors, external factors, panic psychology, positive coping behavior and avoidance coping behavior. The explanation of variables is shown in Table 17.

The variables of personal factors, family factors, external factors, panic psychology, positive coping behavior and avoidance coping behavior were analyzed.

According to the model fitting index, chi square freedom ratio = 2.019 < 3, GFI = 0.984 > 0.9, RMSEA = 0.071 < 0.1, RMR = 0.007 < 0.05, CFI = 0.97 > 0.9, NFI = 0.945 > 0.9, nnfi = 0.91 > 0.9; the model fitting value is good.

Table 3
Variable design of structural equation model

Name	Variables	Variables explanation
Factor 1	Personal factor	Mental pressure brought by personal health, income and work
Factor 2	Family factor	The mental pressure brought by marriage contradiction and parents contradiction
Factor 3	Outside factor	The mental pressure brought by the media's report on the epidemic
Factor 4	Panic	A state of mind characterized by fear, anxiety, anger, tension, helplessness
Factor 6	Avoidance behavior	——
Factor 7	positive behavior	——

Table 4
Model regression coefficient

Non standardized path coefficient	SE	z	p	Standardized path coefficient
0.311	0.122	2.542	0.011	0.176
0.49	0.171	2.872	0.004	0.192
0.886	0.327	2.706	0.007	0.185
0.53	0.052	10.245	0	0.585
0.087	0.039	2.222	0.026	0.154

The path graph in Figure 1 shows that the standardized path coefficient value of personal factors for public panic psychology is 0.176 (z = 2.542, P = 0.011 < 0.05), which indicates that personal factors will have a significant positive impact on public panic, that is, the greater the mental pressure brought by personal health, income and work, the more panic the public, which verifies hypothesis 1.

The standardized path coefficient value of family factor for public panic is 0.192 (z = 2.872, P = 0.004 < 0.01), which shows that family factor will have a

significant positive impact on public panic, that is, the greater the mental pressure brought by marriage conflict and parents conflict, the more panic the public has, which verifies hypothesis 2.

The standardized path coefficient of external factors for public panic is 0.185 > 0 (z = 2.706, P = 0.007 < 0.01), which indicates that external factors will have a significant positive impact on public panic, that is, the greater the mental pressure brought by the media to the report of the epidemic, the more panic the public will have.

The standardized path coefficient value of panic psychology for avoidance coping behavior is 0.585 > 0 (z = 10.245, P = 0.000 < 0.01), which indicates that panic psychology will have a significant positive impact on avoidance coping behavior. That is to say, panic increases the avoidance response of the public, which verifies Hypothesis 4.

The standardized path coefficient value of panic psychology for positive coping behavior is 0.154 > 0 (z = 2.222, P = 0.026 < 0.05), which indicates that panic psychology has a significant positive impact on positive coping behavior. That is, panic increases the public's positive response behavior, which verifies Hypothesis 5.

5. EMERGENCY MANAGEMENT SUGGESTIONS

The current outbreak of COVID-19 has not yet ended. Although the epidemic has been effectively controlled in China, However, it is not clear when the epidemic will end with the outbreak of overseas epidemic. The experts, such as Zhong Nanshan and Zhang Wenhong concluded that the COVID-19 isn't completely disappearing, and it is possible that the virus will coexist with humans. However, there is still a long process from the development of vaccine to clinical trials and market. The COVID-19 is highly infectious, highly latent and serious. All factors will affect people's work and life. Therefore, it is particularly important to guide the public to establish healthy mental state through effective risk communication.

In terms of emergency response and risk communication, we can start from the following aspects:

i. Establish a Public Health Emergency Big Data Platform to Ensure Accurate, Timely and Transparent Information Transmission

The information transmission is not accurate, timely and opaque at the initial stage of the outbreak of the COVID-19 untile Zhong Nanshan and Li Lanjuan announced "human to human" and "Wuhan Fengcheng". They announced the number of confirmed cases every day, reported the anti epidemic information of various places, and began to publish the information of new cases' residences, which not only alleviated the anxiety and panic of the people, but also reduced the irrational imagination and suspicion. China is fully qualified and capable of achieving information transparency, scheduling balance and monitoring in place with the support of big data technology. Make use of new technology and big data bonus to achieve efficient collection of key data, precise delivery of emergency materials and urban emergency traffic dispatching, and use big data to assist decision-making to improve the efficiency of epidemic command.

ii. Standardize System Construction and Improve the Policy of Humanistic Care During Epidemic Prevention and Control

The primary responsibility in front of infectious diseases is to control their community transmission, and community prevention and control is the basis of epidemic prevention and control. Therefore, community isolation system and community prevention and control system are essential. It is necessary to formulate Beijing Public Health Epidemic Prevention Regulation and Community Emergency Prevention and Control Management Specification in time to provide normative guidance for public health and epidemic prevention and community prevention and control in Beijing. Viruses can be isolated, but people cannot be alienated. During and after the epidemic, through social workers, social organizations and communities, and through online interaction with acquaintances, it has become another important task to strengthen psychological guidance for all groups, especially key groups, in the fight against the epidemic. This is not only the inevitable requirement of building a co governance and sharing social governance system, but also the important task of improving the modernization of Beijing's governance capacity.

iii. We should popularize the basic knowledge of the COVID-19, transmit the details of effective individual response and prevention measures to the public, promote the public to form a scientific understanding and reasonable risk awareness of the COVID-19, and take appropriate response actions to avoid possible harm.

iv. Increase financial support and provide living subsidies to the people who are living in difficulties during the epidemic

During the epidemic period, the price of masks, disinfectants, meat and vegetables, which are necessary for daily life, has increased, but many people's income has been decreasing. About 35% of the respondents' mental pressure comes from their inability to work normally and their income has been reduced, but their living expenses, children's tuition fees and so on have to be spent. They can't make ends meet, so they are prone to be nervous, scared and helpless. Although each province has a certain amount of living subsidies during the epidemic, but the benefits are relatively small, there are still some difficult groups who have not received the care of the government, resulting in loss psychology.

v. Pay attention to the training of public health talents and give full play to the role of public health experts

Previous research shows that the interpretation of the epidemic by scholars and experts such as Zhong Nanshan and Li Lanjuan can significantly reduce public fear, tension, anxiety and helplessness. Experts and scholars have played an irreplaceable role in the epidemic, once again proving the power of professional authority. Therefore, we should establish a reserve of public health talents, train sufficient and well-trained professionals, and be ready to enter the epidemic area with expertise at any time. Their knowledge and experience can help prevent and control the epidemic nationwide. Epidemic prevention and control should be the practice of public health, and protecting people's health is the primary mission when the epidemic comes. Relying more on professional judgment will effectively improve the prevention and control effect.

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