Knowledge Graph of Emotional Stress Research in the Era of Big Data under the Epidemic - Visual Analysis Based on CiteSpaceV

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Abstract

In the context of COVID-19, this paper uses the CiteSpace knowledge graph analysis tool to sort out and analyze the relevant literature in the field of mental health research brought about by the information impact in the era of big data. Based on the interpretation of the visualization results, the status and hot spots of research in this field were analyzed. Findings: From the key words, mental health, anxiety, stress and negative emotions are the hot spots of academic research; based on this, the literature analysis method is used to innovatively conclude that reduced travel frequency, increased risk perception, information overload and high prevalence intensity are the main causes of emotional stress.

Keywords: *COVID-19, Citespace, Mental health, Negative emotion*

1. Introduction

The spread of COVID-19 has brought humanity into a state of global health emergency. In this war against the epidemic, in addition to the fear of the threat to life posed by the epidemic, the spread of overwhelming misinformation, false information and even rumors in the Internet era has made the information epidemic more influential and toxic. Due to cognitive dissonance and persistent emotions, individuals can suffer from stress or distress and have different degrees of psychological problems. Currently, scholars focus on mental health problems or factors influencing mental health in specific populations such as healthcare workers and college students, but the research related to emotional stress caused by persistent stimuli under epidemic is not deep enough. Based on this, this paper will use visual analysis and literature analysis to analyze the current situation and root causes of emotional stress from the current situation of people's mental health survey under the epidemic and help individuals to establish corresponding self-defense mechanisms to resist the disorder.

2. Emotional stress: concepts and research

2.1. Generation and development

The term Emotional Stress in this paper was first introduced by Sven-Ake [1] as an emotional state caused by threatening stimuli or events, along with changes in voluntary neural activity and body hormones. Ehlers A [2] suggested that stressful events that cause emotional stress are generally described as violent, shocking, potentially threatening, and traumatic events. Numerous scholars have investigated the mental health status of different types of subjects, including residents in Hubei, college students, patients, and front-line nurses, [3, 4] and although the methods of investigation vary, the results indicate that all of the above subjects have symptoms of anxiety and depression, and that negative emotional stress has become a public mental health disorder.

2.2. CiteSpace Visual Analytics

The CiteSpace knowledge graph can intuitively display the information panorama and identify potential research hotspots and frontiers [5], Compared with other visualization software, Cite Space software is easy to operate, has strong data applicability and good visualization effect. Therefore, this study will apply the Cite Space knowledge map to reveal the key paths of the evolution of the research field and explore the hot content of the research field. The literature was all selected from the Web of Science (Wos) database core collection (SSCI), and the search field was set to TS=("Negative emotions" and "COVID-19") with a time range ending in March 2022, and the search was

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conducted on April 9, 2022, and a total of 837 valid documents were selected as the study sample after excluding irrelevant information among them. Figure 1 is a keyword co-occurrence map presented using Citespace analysis.

Several keywords of an article generally have some relationship, which can be represented by the co-occurrence of keywords in Citespace. Keyword co-occurrence analysis is carried out on the research samples, and the research hotspots in related fields are revealed by analysing the frequency and co-occurrence intensity of keywords in the field. In the knowledge graph of Figure 1, there are a total of 227 keyword nodes, of which "circles" represent nodes, and the size of the nodes represents the frequency of keyword occurrences. The larger the node, the more times the keyword appears. It is a very frequent proper term used by authors in this research field, and it also represents a research hotspot in this field.

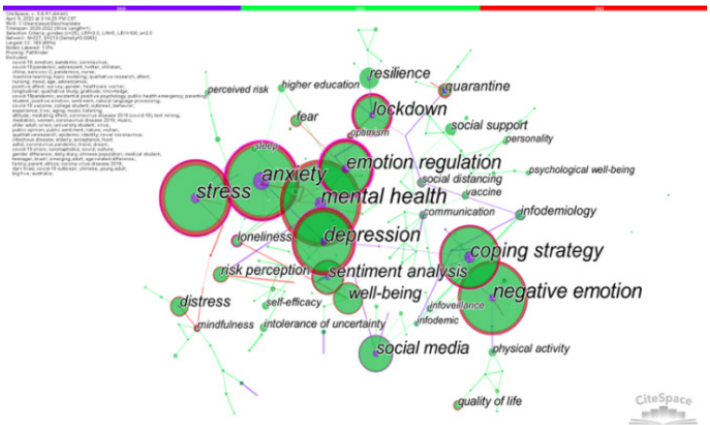

Figure 1. Visualizing Co-present Knowledge Graphs of Mental Health Research Hotspots under the COVID-19.

The high-frequency keywords shown in the keyword co-occurrence graph were listed in the order of their frequency of occurrence, as shown in Table 1. As can be seen from the table, Mental Health, Anxiety, Stress, Negative Emotion, and Depression are among the high-frequency keywords. From these high-frequency keywords, we can see that in the context of the epidemic, mental health and emotional stress are currently very popular and very interesting areas for scholars. The uncertainty and sense of devastation caused by the epidemic have brought great stress to the public, and some negative emotions such as anxiety and depression are also troubling people in the epidemic, so the awareness of these negative emotions is very necessary, and adopting the correct methods to detoxify Emotions and stress relief are important ways to keep the public psychologically healthy under the regular prevention and control of the epidemic, and can also greatly help people to have a correct understanding of the virus.

Table 1.High-frequency keywords for mental health research in the context of the COVID-19.

No.	Frequency	Centrality	Keyword
1	77	0.06	mental health
2	70	0.69	anxiety
3	67	0.43	stress
4	65	0.16	negative emotion
5	60	0.34	depression

2.3. *Mechanism of emotional stress*

To define a particular emotion, one can usually start from its dimensions, and the emotion loop model [6] assumes that emotions are dimensional. Usually, individuals do not recognize emotions as isolated and independent, they prefer to see them as vague and overlapping experiences. [7] Thus emotional stress arises when individuals are in a certain dominant emotional state for a long period of time.

The dissonance between the consciousness of wanting an early end to the epidemic and a return to normal life and the behavioral reality of the prevention and control policies experienced, such as shutting down work and production, home quarantine, and delaying the start of school, in the fight against the COVID-19 epidemic, as an external environment for the formation of emotional stress. In addition to the viral epidemic, the widespread dissemination of false information and rumors under the "information epidemic" has caused the public to blindly follow and secondarily spread rumors, resulting in cognitive biases and dissonance between self-affirming attitudes and misjudged behaviors. Emotional stress is therefore a combination of external threats and internal cognitive dissonance. The impact pathways of public health emergencies on mental health are shown in Figure 2.

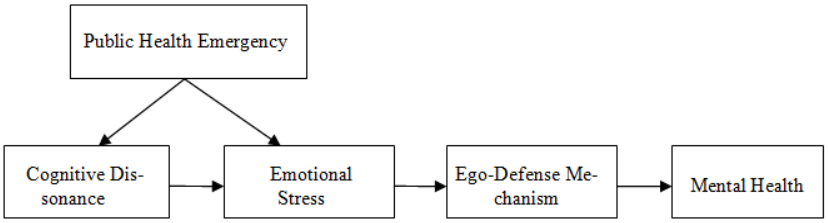

Figure 2.Impact pathways of public health emergencies on mental health.

3. Structure causes

3.1. Reduced travel frequency

Previous studies have shown that low frequency of going out is an important predictor of the occurrence of cognitive impairment. [8, 9] Especially for young people, the reduced travel caused by the epidemic will greatly disrupt their academic, social, professional, and economic activities, and even cause a lot of trouble. In the context of the current epidemic, Wang Zhenni [10] proposed that the stress level of those who stay at home for a long time is significantly higher than that of those who go out more frequently (at least once every three days). It is because of the decrease in the frequency of going out that the lack of social interaction may affect interpersonal communication and emotional problems.

3.2. High risk perception

Risk perception refers to their subjective perception of the epidemic threat, such as self-assessment of the severity of the epidemic in the region, whether they are worried about infection, etc. These perception levels are affected by personal mentality. Even the public who are far away from the central cities of the epidemic or from medium-high risk areas will bear great pressure if their personal risk perception level is high and they think they are at great risk of infection. The continuous recurrence of the epidemic will continue to maintain the risk perception level, more prone to panic and other emotional stress harm physical and mental health.

3.3. Information overload

Known information about the epidemic is enough to create a certain level of stress. The media, the public, and individuals' joint processing of the epidemic information makes the truth about the epidemic confusing, and the semi-uncontrolled state of various online virtual platforms intensifies the spread of false information, which can easily lead to information overload, i.e., "a state of anxiety about not being able to obtain, understand, and use information accurately at any time and place."[11] Information overload is the unsatisfied primitive instinct and the destruction of the "pleasure principle", which is a kind of suppression and regulation of the ego's function by the superego.

3.4. High prevalence intensity

In areas of high epidemic intensity, the public is at significantly increased risk of infection, and the likelihood of abnormal psychological changes is greatly increased by the continued stimulation of increasing deaths and new cases, isolation and uncertain infection.

4. Conclusion

Therefore, individuals should establish appropriate ego-defense mechanisms to suppress instinctive impulses and reshape psychological processes. On the part of the state, state psychological assistance should focus on stable regulation of emotions. In addition, the state should pay attention to the ripple and typhoon eye effects, i.e., the relationship between the level of individual risk perceptions in risk-centered and non-risk-centered regions. This affects the implementation of state psychological assistance. Relevant departments and personnel should disseminate authoritative, truthful and accurate information about the epidemic in an efficient, fast and moderate manner and method to stabilize the order of online information dissemination and prevent the spread of the information epidemic.

References

[1] Sven-ake C 1992 *Emotional stress and eyewitness memory J.* PSYCHOL BULL, **112**(2): 284-309.

[2] Ehlers A and Mauchnik J 2012 *Reducing unwanted trauma memories by imaginal exposure or autobiographical memory elaboration J.* J Behav Ther Exp Psychiatry, **43.**

[3] Jiang X and Tan X 2020 *Investigation of mental health status among front-line nurses during the epidemic of Corona virus Disease 2019 J.* J Nurs Sci, **35**(07):75-77.

[4] Chang Jh and Yuan Yx 2020 *Mental health status and its influencing factors among college students during the epidemic of COVID-19 J.* J South Med Univ, **40.**

[5] Chen Y, Chen Cm and Liu Zy 2015 *The methodology function of Cite Space mapping*

knowledge domains J. Studies in Science of Science,**33**(02):242-253.

[6] Posner J, Russell J and Peterson B 2005 *The circumplex model of affect J*. DEV Psychopathol, **17**(3): 715-734.

[7] Huang Yh 2018 *Emotional Stress and The Impact of Validities Environment on the Using of Decision strategies D*. NENU

[8] Fujita K 2006 *Frequency of going outdoors as good predictors for incident disability of physical function as well as disability recovery in community J.* J Epid,**16**.

[9] Saito J, Kondo N and Saito M 2019 *Exploring 2.5 year trajectories of functional decline in older adults by applying a growth mixture model and frequency of outings as a predictorJ.* J Epid, 29:65-72

[10] *Wang Zn, Liu Wl 2021 Status and factors of pressure in common population under quarantine measures of COVID-19pandemicJ.*CN CHP, **29**(4):569-574.

[11] *Liu M and Sun Ry 2010 Freud's lntepretation of Information Anxiety in Network Environment J.* RLS, **17**:11-14.