# Visualization Analysis of Medical Staff Mental Health Research Based on Citespace

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**Abstract:** Objective through the bibliometric and visual analysis of "medical staff + mental health" literature, to explore the development status, research hotspots and development trend of medical staff's mental health, so as to provide intervention reference for improving the mental health level of medical staff. Methods CiteSpace was used to analyze the authors, institutions and keywords of 203 articles on mental health of medical staff retrieved from CNKI. Result The related literature span from January 2010 to May 2020, and the number of published articles peaked in 2012, 2015 and 2018; 13 high-frequency keywords with CB > 0.1 were obtained by keyword co-occurrence; 8 main clusters were obtained by cluster analysis, which were composed of 158 nodes and 474 lines. The emergence analysis showed that occupational exposure, occupational stress and medical disputes were the current research hotspots of medical staff's mental health. Conclusion due to the heavy workload, high risk and the escalation of doctor-patient conflicts, the mental health problems of medical staff are becoming increasingly prominent. Therefore, more effective intervention measures should be provided for the mental health of medical staff.

Medical staffs are in the environment of heavy infection, high load, high risk and psychological pressure, and their mental health problems are increasingly prominent. Wang Shengnan and other research statistics [1], at present, about 25% - 30% of doctors in China are suffering from depression, and the probability is as high as 4 times that of the general population. Because of the high work pressure and special working environment, more than 80% of the medical staff in the general hospital have poor sleep quality; 72% of the medical staff often feel tired and sleepy; in addition, 48.6% of the medical staff have psychological stress reaction and job burnout; 16% of the medical staff leave because of the physical and mental problems cannot be well solved. Compared with the general population, medical staffs have a higher level of professional knowledge, but their mental health is easy to be ignored. Their mental health status not only affects themselves, but also greatly endangers the health of patients. Therefore, it is particularly important to pay attention to the mental health status of medical staff.

## 1. Data and Methods

### 1.1 Data Sources

With CNKI as the retrieval platform, a professional search was conducted with "theme = medical staff + mental health". The time limit was from January 2010 to May 2020, a total of 1450 articles were searched. After excluding non-academic literature such as newspapers, book reviews, conferences, advertisements and other non-academic literatures, a total of 203 articles met the requirements, including 162 papers in Chinese journals and foreign issues there are 15 published papers, 1 doctoral thesis and 25 master's theses. The 203 related literatures were exported in refwork format and saved as "download"_. TXT "format, CiteSpace tool is used to process and draw the relevant knowledge map. The time parameter setting span is 2010-2020, and the time slice is 1 year. The node type selects author, institution and keyword for visual analysis.

### 1.2 Research Methods

CiteSpace is a scientific literature analysis tool developed by Dr. Chen Chaomei of Drexel University. The tool can visually analyze the cooperation network, keyword co-occurrence and clustering graph, and show the experts, research institutions and hot issues in related research fields in a clear graph, and also show the emergence of related research problems in a specific time span. CiteSpace is relatively novel in the application of research review, which can realize the analysis, interpretation and prediction of related research problems [2].

## 2. Results

### 2.1 Analysis of the Number of Papers Published

In terms of the total amount of mental health research on medical staff since 2010, the fluctuation range of annual papers published in this field is small, and the number of papers published is relatively stable (see Figure 1). In 2015, it reached the peak of more than ten years, about 180 articles, which may be closely related to the problems such as doctor-patient disputes in that year, and also reflected that the global attention on the field of mental health of medical staff has gradually increased.

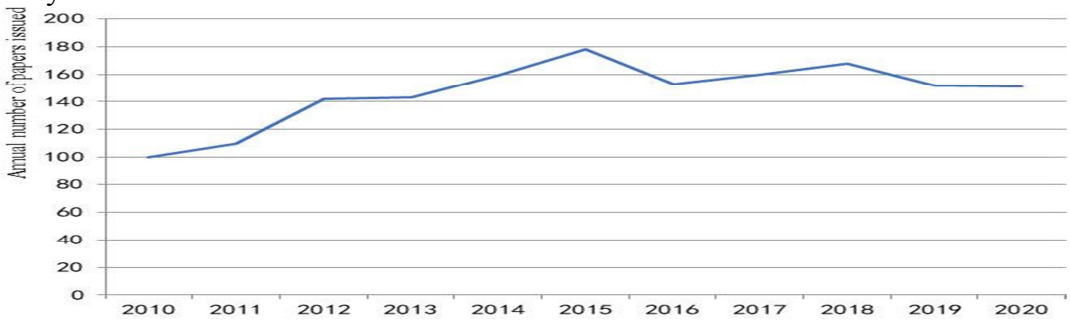


**Figure 1.** Chronological distribution of the number of published papers

### 2.2 Analysis on the Distribution of Authors and Institutions

After ranking the top ten authors (see Figure 2), we can see that Lu XuanZhen published the highest number of articles, with 10 articles, followed by song Jiquan and Wu Jianyuan, both of which published 9 articles, and the rest of the authors published more than 5 articles.

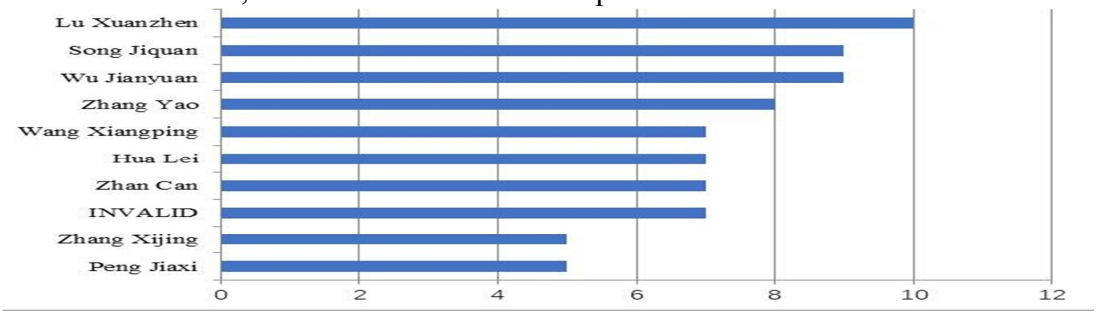


**Figure 2.** Ranking of top ten authors

According to the ranking of the top ten institutions with the largest number of papers (see Figure 3), the school of clinical medicine of Chengdu Medical College, the normal college of Chengdu University, the clinical trial center of Central South Hospital of Wuhan University and the Academic Affairs Office of Chengdu Medical College had the highest number of papers with 10 papers, followed by dermatology department of Central South Hospital of Wuhan University and neurology department of Central South Hospital of Wuhan University, with 9 papers. The number of papers published by other institutions was more than 4. In terms of the nature of the institutions, the top ten institutions with the number of papers are mainly hospitals and medical colleges.

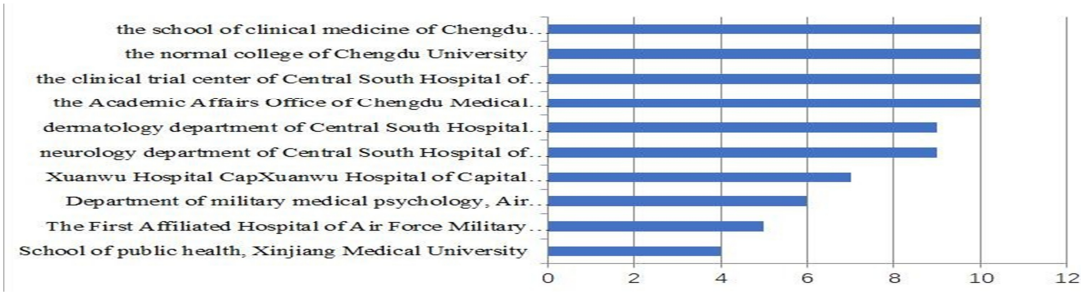


**Figure 3.** Ranking of top ten institutions with document load

## 2.3 Keyword Clustering Analysis

The key words are the main focus of the research. The intermediary centrality ($C_B$) indicates the importance of nodes in the network. The larger the $C_B$, the more important the node is. Generally speaking, high centrality keywords ($C_B > 0.1$) are of great significance in the network [3]. Through the co-occurrence analysis of keywords, the top 10 of frequency ranking and their intermediary centrality are obtained (13 keywords with $C_B > 0.1$ in the top 20 frequency ranking keywords). See Figure 4 and table 1.


**Figure 4.** High frequency keyword map

**Table 1.** Word frequency and centrality of high frequency keywords

| Serial number | keywords | frequency | centrality | year |
|---|---|---|---|---|
| 1 | medical staff | 200 | 0.11 | 2010 |
| 2 | mental health | 135 | 0.10 | 2010 |
| 3 | Novel coronavirus pneumonia | 59 | 0.05 | 2020 |
| 4 | Scl-90 | 32 | 0.03 | 2010 |
| 5 | Psychological intervention | 26 | 0.09 | 2010 |
| 6 | anxious | 26 | 0.29 | 2010 |
| 7 | working pressure | 23 | 0.26 | 2010 |
| 8 | influence factor | 21 | 0.13 | 2012 |
| 9 | social support | 20 | 0.14 | 2010 |
| 10 | psychology | 19 | 0.22 | 2010 |

Cluster analysis is a statistical method to classify the data with multiple indicators. It classifies the data according to the similarity between indicators, and realizes the index classification [4]. The purpose of this study is to find out the sources of psychological stress, psychological difficulties and various factors affecting the mental health of medical staff by cluster analysis of keywords in all literatures. From the analysis, it can be concluded that the cluster knowledge map is composed of 158 nodes and 474 lines, and the clustering modularity Q value and clustering profile index s value are 0.5093 ($Q > 0.3$) and 0.7475 ($s > 0.5$), respectively, which indicates that the structure is significant and the clustering is reasonable (Fig.5).


**Figure 5.** Clustering analysis of high frequency keywords

In this paper, seven clusters are analyzed. The smaller the number of cluster labels (#) is, the larger the scale of the cluster is. The research directions of these seven clusters are summarized.

Species # 0 is the largest cluster, the cluster size is 23, and the S value is 0.723. The medical staff industry itself has the uncertainty of high risk, high load and sudden crisis events. The tense doctor-patient relationship, frequent doctor-patient disputes, and various pressures from the public opinion environment and personal life all pose a great psychological threat to the medical staff, and their mental health problems cannot be ignored.

Species # 1 is the second group, the cluster size is 21, S value is 0.544. He Yunjuan et al. Have shown that [5], anxiety and depression are negatively correlated with social support. The higher the level of social support, the less anxiety, depression and other psychological problems of medical staff, that is, the higher the level of mental health. Studies by Huang Wanqi and others have shown that [6] under occupational stress, medical staff who lack social support and do not have good coping styles are twice as dangerous as the general population.

Species # 2 is the third group, with cluster size of 20 and S value of 0.831. Due to the strong sense of responsibility, high work pressure, long working time, high medical risk and tense doctor-patient relationship, more and more medical staff have psychological problems such as anxiety and depression. According to the survey results of 3665 medical staff by Tu Ling et al [7], about 34% of medical staff have been in psychological state of anxiety, depression, compulsion and irritability for a long time. Kerrien m and other foreign statistics show that [8], about 13% of junior doctors are in depression state, and 28.7% are in anxiety state.

Species #3 is the fourth group with cluster size of 19 and S value of 0.885. Through meta-analysis, Huang Lishu et al[9]Found that the mental health level of Chinese doctors in recent years is generally lower than the national norm. In addition, the SCL-90 symptom checklist showed that the scores of all dimensions of medical staff were higher, that is, the psychological status was poor, and mental health problems should be paid more attention.

Species #5. A large number of literature studies [6, 10-12] have shown that workload, job risk, working conditions, medical disputes, job burnout, occupational exposure and so on are negatively correlated with the assessment results of physical and mental health of medical staff, which will gradually lead to psychological and physiological fatigue of medical staff, resulting in the decline of work ability and loss of work enthusiasm.

Species # 6 is the sixth group with cluster size of 12 and S value of 0.832. A large number of literature studies[13-17] have shown that medical staff with different gender, different departments, different levels of hospitals, different posts and different technical positions have adverse psychological reactions such as somatization, compulsion, anxiety and terror, and their scores are significantly higher than the domestic norm. It means that the mental health level of medical staff is low.

Species # 7 is the seventh group, the cluster size is 10, S value is 0.767. Yao Yongcheng and

other studies have shown that [18], under the condition of the same job burnout, the general self-efficacy level of medical staff has a negative correlation with physical and mental stress. Generally, medical staff with low self-efficacy will have self-doubt, and they will be anxious because they do not believe that they can complete the task, leading to physical and mental stress.

### 2.4 Analysis of Emergent Words

Emergent words are words with high frequency change detected from subject words in a short period of time, which can predict the future development trend to some extent. In the keyword emergence map, we can see the emergence words, the emergence intensity, the beginning time and the ending time of the emergence in the field of mental health of medical staff in recent years (as shown in Figure 6). Job stress is the key word with the highest outburst intensity in recent ten years, with the outburst intensity of 3.1889, that is, from 2010 to 2015, we mainly studied the pressure brought by the working environment, work intensity, job risk and so on of medical staff, resulting in the results of job burnout of medical staff; since 2016, "occupational exposure" and "occupational stress" have become the prominent words, with the outburst intensity of 2.5096, 2.5096, and 2.5096 respectively 1.5836, the professional occupational problems of medical staff have become the focus of research; since 2018, "medical disputes" and "mental health" have gradually emerged among the achievements of most researchers, and the transformation of the research on mental health of medical staff has become a hot research direction at present and even in the future.

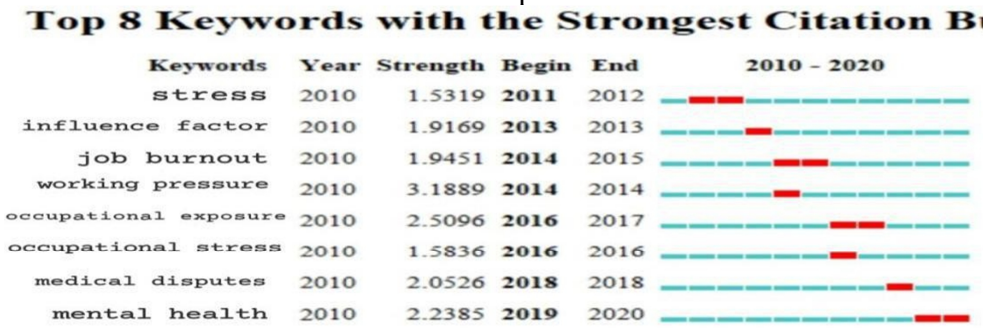


**Figure 6.** Analysis of prominent words

## 3. Conclusion

In this paper, 203 articles retrieved from CNKI are selected as the research samples. The annual number of articles published is stable and has an upward trend, that is, scholars pay more and more attention to the field of mental health of medical staff. From the distribution of authors and institutions, hospitals and medical colleges are the main ones. According to the key words co-occurrence map and the results of the top 10 high-frequency keywords, the research hotspots in the field of mental health of medical staff mainly focus on the psychological problems such as anxiety and depression caused by occupational exposure, work intensity, doctor-patient disputes, etc.; the influence of social support and doctor-patient trust on their physical and mental health; in addition, the emotional and psychological adjustment of medical staff The intervention of psychological crisis is more worthy of further study. According to the analysis of emergent words, the frontier trend is to optimize the working environment of medical staff. Such as strengthening the occupational exposure protection measures of medical staff, improving the quality of canteen catering. Improve the work pressure of medical staff. For example, setting up reasonable work posts, allocating reasonable workload of medical staff, improving working and on duty conditions, etc.; reasonably arranging compensatory leave on the basis of improving various treatment for medical staff with high work intensity and long working hours; and timely psychological counseling for the negative emotions of the staff in each department. We should improve the protection system for the rights and interests of medical personnel. Such as the establishment of medical disputes medical personnel safety protection procedures, also according to the medical service risk of medical personnel, to buy medical liability insurance. Objective to explore the intervention measures of

psychological crisis of medical staff. For example, we should reduce the psychological pressure of medical staff through the psychological health science lectures and psychological counseling service platform, and carry out the necessary psychological assessment; in addition, we should carry out regular health examination for medical staff, early detection, early intervention and early treatment of some diseases, and timely grasp their physical and mental health status.

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