

The Visualization Analysis of Sleep Quality Research Literature of Chinese College Students Based on Citespace

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Abstract: This study explores the current research hotspots and trends of sleep quality in college students by bibliometric analysis, and to provide reference for further research in this field. The study uses CNKI as the retrieval data source and use Citespace and the visualization function of CNKI to visualize the included literatures. A total of 212 literatures were included in this study. The publication of relevant literature shows an increasing trend in general, and there is no cooperative relationship between the publishing institutions. Research hotspots include the status quo, influencing factors and intervention measures of sleep quality of college students. The regression analysis of sleep quality and mental health problems of college students are recent research frontiers. Future research needs to strengthen collaboration between different institutions and authors. In order to solve the problem of college students' sleep quality, it needs not only self-adjustment, but also the joint efforts and care of school, family and government, and the implementation of intervention measures to solve this problem.

1 INTRODUCTION

The quality of sleep directly affects people's life, study and work, and is also closely related to many physical and psychological diseases (Ling and Xin, 2014). According to the 2022 China Sleep Quality Survey report, more than 60 percent of people have trouble sleeping. College students are the pillars of the society. Good sleep is an important prerequisite for smooth study and healthy development of body and mind. Sleep disorders can lead to severe memory loss, affect college students' study and life, and even lead to mental illness (Sun and Liu and Li and Li and Tian, 2022). In recent years, the sleep quality of college students has aroused the concern of many researchers. Studies have shown that 12.5% of college students have poor sleep quality, and the sleep quality of college students can be predicted directly through mobile phone addiction, and indirectly through the mediating effect of anxiety (Wang and Liu and LI, 2021). Through literature review, the research on the sleep quality of college students is currently in the stage of constructing mediation model and intervening experiment (Guo and Dong 2022, Hu and Zhang and Ma and Bai and Liu and Wang and Huang 2022). Some studies show that more college students have sleep quality problems (Yuan, 2016). Especially affected by the outbreak of COVID-19 from the end of 2019 to now, sleep problems increase among college students (Huang and Meng and Bao and Que and Lu and Lu, 2022), and their physical and mental health has been impacted. Therefore, this study analyzes the hotspot and trend of research on college students' sleep quality to provide the reference for later research.

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2 MATERIALS AND METHODS

2.1. Data Sources

In this study, CNKI as the search platform, in the "advanced search" with college students sleep quality as the main topic to search, check the synonym extension. The search period was from January 1, 1994 to March 31, 2022. In order to ensure the quality of the included literature, the source categories of the journal were selected from Peking University Core, CSSCI and CSCD. A total of 251 literatures were retrieved. It is exported and saved in Refworks format for subsequent analysis and processing of CiteSpace software.

2.2. The Research Methods

This study makes use of the visualization function of CNKI to analyze the number and trend of publication. CiteSpace software was used to analyze authors, institutions and keywords in literature, and co-occurrence analysis and cluster analysis were carried out. Draw the Timezone map and set the time span from 1994 to 2022. Through the interpretation of the visualization map, this study explores the research hotspot and evolution trend of college students' sleep quality, and finally points out the future deepening direction of college students' sleep quality research.

3 RESULTS & DISCUSSION

3.1. Publication Trend

The number of annual publications is an important index to reflect the research in related fields, and also a prerequisite to judge the evolution trend and research maturity of related research. The annual number of published literatures on sleep quality of college students

from 1994 to 2022 is shown in Figure 1, with an overall increasing trend. The research started at the end of the 20th century, with only one research published every year from 1994 to 1999, more than 10 researches published since 2008, and the highest number of researches published in 2022 (32). Judging from the growth rate of the number of studies published, the research hotspot of college students' sleep quality will continue to rise.

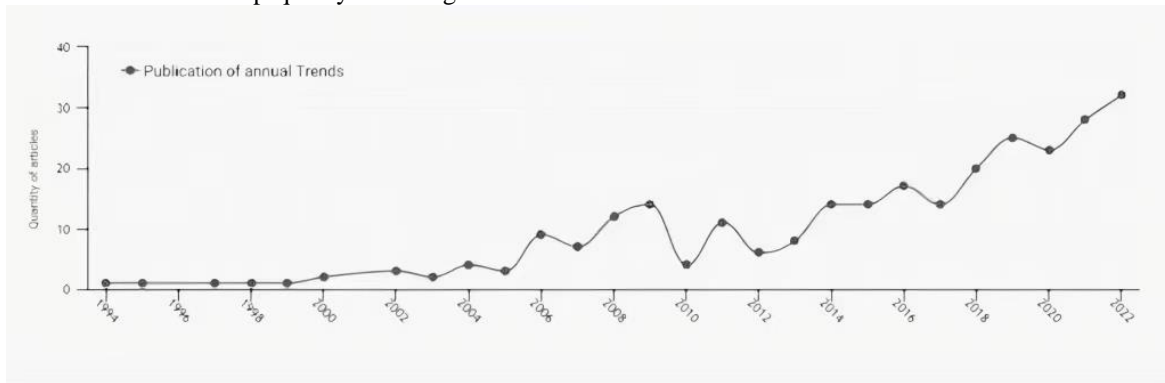


Figure 1. The number of sleep quality of College students research from 1994 to 2022.

3.2. Author Analysis

In the author network cooperation diagram, each node represents an author, each line represents the cooperative relationship between authors, the size of nodes in the diagram represents the number of articles published by each scholar, and the thick line of the line represents the degree of cooperative relationship. The visualization

analysis map of the study on sleep quality of college students is shown in Figure 2, with 392 nodes forming 586 lines. The results show that the degree of cooperation among the authors is low, and the cooperative relationship presents the overall scattered and local centralized pattern. The research on the sleep quality of college students has not formed a stable cooperative team.



Figure 2. A co-author map related to sleep quality of College students research.

3.3. Institution Analysis

Each node in the graph represents an institution, the node radius represents the number of publications, and the lines between nodes represent the cooperative relationship between institutions. The thicker the lines are, the closer the cooperative relationship between institutions is. The

visualization analysis map of institutional cooperation in the study of college students' sleep quality is shown in Figure 3. 197 nodes are obtained in total, and the connection line is 0. The result is that there is no cooperation between the agencies.

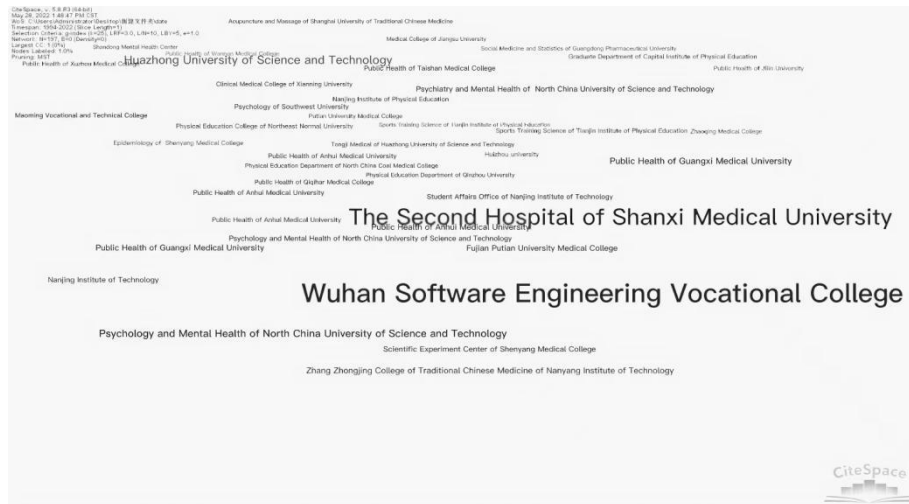


Figure 3. An institution cooperation map related to sleep quality of College students

3.4.Keyword Analysis

3.4.1.Co-occurrence analysis

Co-occurrence analysis of key words can help to understand the content and direction of key research in this field. Through the visualization analysis of the keywords in 212 effective literatures, the key words with frequency ≥ 20 frequency are selected for statistics, which can intuitively display the hot topics in the field of sleep quality of Chinese college students. Among them, the word frequency of "sleep quality" is 134 times (ranking first), the word frequency of "student" is 99 times (ranking second), and the word frequency of "college student" is 91 times (ranking third), as shown in Table 1. The collinear network map of key words of sleep quality

of college students is shown in Figure 4. The map contains 226 nodes and 356 lines.

Mediation centrality is one measure of the importance of a node in the network, the values between 0 and 1, 0.1 or higher said centrality is very high, of which more than 0.1 keywords centrality 10, respectively is "sleep quality" "college students" "sleep" "sleep disorder" "mental health", "depression", "anxiety", "impact factor" "statistical" "mobile phone addiction". The key word that plays an important role is "sleep quality" with a centrality of 0.85, which is almost cooccurrence with other keywords. In addition, the mediating centrality of college students, anxiety and other words is also very high, respectively 0.62 and 0.33, which are closely related to other keywords.

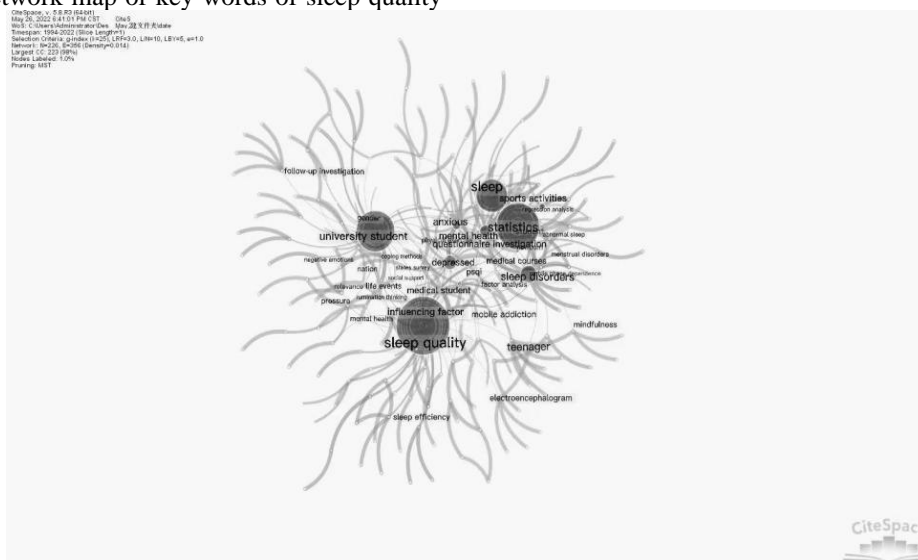


Figure 4. A Keyword co-occurrence map of sleep quality of College students

Table 1 List of collinear keywords in literature

Serial number	Keyword	Frequency	Centrality	Serial number	Keyword	Frequency	Centrality
1	The quality of sleep	134	0.85	11	Factors	16	0.1
2	Students	99	0.08	12	Statistical	14	0.1
3	College students	91	0.62	13	Medical students	13	0.08
4	Sleep	74	0.15	14	Factor analysis	12	0.01
5	Sleep disorders	34	0.22	15	Regression analysis	11	0.02
6	Mental health	30	0.30	16	Mobile phone addiction	8	0.13
7	Oxygen reduction event	29	0.00	17	Medical	7	0.04
8	Analysis of variance	29	0.00	18	Sports activities	6	0.05
9	Depression	27	0.14	19	Pressure	6	0.08
10	Anxiety	21	0.33	20	Mental health	6	0.02

3.4.2. Clustering analysis

In order to further analyze the research hotspot of college students' sleep quality, cluster analysis was conducted on the key based on keyword co-occurrence, and the visualization map was shown in Figure 5. Clustering module value (Q) =0.8042 (> 0.3), average contour value (S) =0.939 (> 0.5), indicating that the keyword clustering map was significant and reasonable.

Key words mainly form 10 clusters, which are #0 college students, #1 medical students, #2 anxiety, #3

oxygen loss events, #4 sleep disorders, #5 stress, #6 mobile phone addiction, #7 statistics, #8 mediating effect, and #9 oxygenated hemoglobin. Through the analysis of cluster and existing literature contents, it can be found that the main groups of sleep quality research of college students are college students and medical students. The research method mostly adopts statistical method and obtains relevant data through questionnaire. College students' psychological problems, anxiety, stress and effective measures to interfere with sleep quality are hot topics in college students' sleep quality research.



Figure 5. A keyword cooccurrence map of sleep quality of College students

3.4.3. Burst keyword analysis

Burst word analysis can show the key words valued by scholars in the research field in a certain period of time, as well as the hot frontier and changing trend of the field. "begin" represents the start time of sudden emergence, "end" represents the end time, and "strength" refers to the intensity of the keyword mutation. The higher the intensity is, the greater the influence will be. The keyword burst analysis of the sleep quality research of college students is shown in Figure 6.

The main content of research including variance analysis and oxygen reduction events from 1994 to 2005.

Later, the authors focus on the factors affecting sleep quality of college students and sleep quality problems of medical students. In recent years, most of the authors have been using statistics and regression analysis in study. With the changes of society, the addiction of mobile phones has become a hot topic in the study of college students' sleep quality, and the sleep quality of college students in recent two years has much attention in psychology field. This study predicts that more articles about college students' sleep quality will be published in the journal of Psychology.

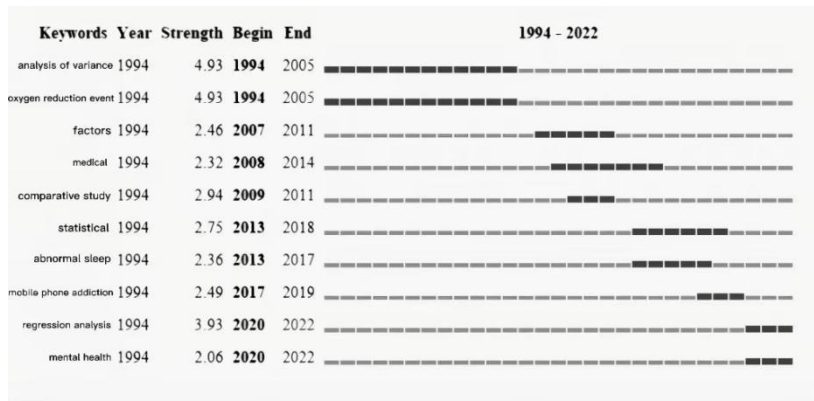


Figure 6. Top 10 keywords with the strongest citation bursts.

3.4.4. Timeline viewer of high-frequency keywords

The time graph of high-frequency keywords can show the clustering time span and research progress of the development and evolution of college students' sleep quality. In the figure, the horizontal coordinate represents the publication year of the literature, the vertical coordinate represents the name of the clustering keyword, the location of the node represents the publication time of the citation represented by the node, and the length of the

horizontal thick line represents the span of time of each cluster. The time graph of high-frequency keywords in the study of sleep quality of college students is shown in figure. 7. Key word clustering mainly focuses on 2010-2022. The study time span of #0 (college students) and #1 (medical students) is relatively long, indicating that the problem of sleep quality of college students and medical students is a continuous hot topic in the research, #7 (statistics) is the most commonly used treatment method in the study of sleep quality of college students.

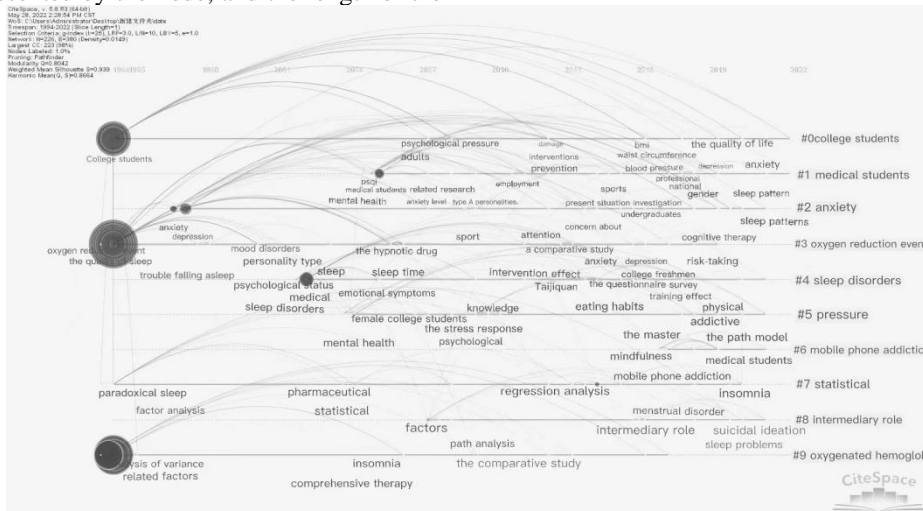


Figure 7. Visualization map of timeline viewer related to sleep quality of College students

The sleep quality of Chinese college students has been declining nearly 20 years (Fang and Liu and Rao and Guo, 2020). Studies show that 18.3 percent to 55 percent of College students in China have sleep problem. (Li and Liu and Yu and Li and Gao 2019, Yuan 2016, Ye and Zhai and Gu and Huang and Fan 2019). The quality of college students' study and life has been seriously affected. In order to attract more attention, the International Foundation for Mental Health and Neuroscience have regarded March 21st as World Sleep Day. The study analyzes the content about the sleep quality of college students from 1994 to 2022. In order to provide a reference for the current hot research trend in this field, the study discusses the following points:

Firstly, the number of research studies about sleep quality of college students showed a wave upward trend, and the number of studies increased significantly from

2020 to 2022. The study analyzed that this result was related to the normal epidemic prevention and home quarantine. Some studies showed that the epidemic would have an impact on the sleep quality of college students (Huang and Meng Shi ang Bao and Que and Lu and Lu, 2022). But post author cooperation is less and institutions are lack of cooperation relationship. The increase in the number of published studies during the epidemic period did not promote the cooperative relationship between authors and institutions. Therefore, such sporadic attention is not conducive to the development of future research on sleep quality of college students, and the trend of published studies is hard to predict.

Secondly, in terms of research objects, scholars mainly divide college students into medical students and non-medical students. Due to medical students are the special group of college students, the content they learn is

specialized and heavy, so the pressure will be even greater, in the meantime, the quality of their sleep problems of attention is more. Most of the research showed that the quality of the medical students sleep are poor (Jia and Xu and Liu and Wang and Song 2019, Sun and Jiang and Chen and Zhang and Li and Ren 2013), there are no difference among medical and non-medical students in few studies (Wang and Li and Chen and Guo and Xu and Li, 2014). Therefore, the sleep quality of medical students is controversial and will still be a hot research direction.

Thirdly, in terms of the development trend of the research content, it is at the initial stage of basic research. The main content of the research is the analysis of the status quo of sleep quality of college students and the comparison with other factors. With the discovery that there are many factors affecting the sleep quality of college students, scholars have begun to confirm the influencing factors through investigation and analysis. From 2013 to 2018, scholars began to pay attention to using statistics to processing data. So far, the research on college students' sleep quality in China has entered the stage of intervention experiment. Studies have shown that physical exercise can effectively relieve sleep disorders (Mi 2021, Yuan and Gong and Ha and Lu and Guo and Ji and Meng and Zou 2021), and mindfulness training (Liu and Xue and Wang and Sun 2018, Li and Li and Ma 2013) can also promote sleep quality. Based on the analysis and summary of the development trend of the previous research content, the author hopes to provide further reference for future scholars on the sleep quality of college students.

4 CONCLUSION

Through visualization analysis, the general direction of this field can be fully understood, which has certain reference significance for the research of college students' sleep quality problems. Although the problem of sleep quality of Chinese college students has increased in recent years, there are few researches on this aspect. In the future, scholars should strengthen cooperation and do more researches on sleep quality of college students. As mentioned above, the research focuses on the sleep quality of medical students and non-medical students, hoping that authors in this field can conduct more experiments to provide effective intervention methods and effectively solve the sleep quality problems of college students.

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