

Analysis of Research Hotspots on Mental Health of the Elderly in China in the Last Two Decades--Based on Citespace Visualization

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Abstract. With the advent of China's aging society, the mental health of the elderly is receiving more and more attention. This study used CiteSpace visual scientometric software to analyze 1370 Chinese journal papers on "mental health of the elderly" included in the authoritative database China National Knowledge Infrastructure. This study analyzed and researched 1370 Chinese journal papers on "mental health of the elderly" collected in the authoritative database China National Knowledge Infrastructure using the CiteSpace visual scientometric software. It was found that Chinese research on mental health of the elderly can be divided into three notable phases: the initial period (1984-2000), the rapid growth period (2001-2010), and the fluctuating and fluctuating period (2011-2022), with research hotspots of "elderly", "mental health", "influencing factors", "social support", and "psychological care", concentrating on exploring the different influences on the mental health of older adults. The nature of research institutions is diverse, but not enough cooperation, and "urban aging" is the key to future research on the mental health of the elderly in China.

Keywords. Citespace; Elderly; Mental health; Knowledge mapping

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1. Introduction

With the acceleration of population aging in China, aging problems are increasing, among which the health of the elderly is of great concern, which directly affects people's quality of life and quality of life, among which the mental health of the elderly is particularly important. Therefore, this study used the scientometric software CiteSpace literature visualization analysis tool to analyze 1370 related literature included in China National Knowledge Infrastructure, to sort out and understand the development of mental health research of the elderly in China, so as to better improve the mental health of the people.

Mental health refers to normal mental activities and psychological state, including the internal consistency of individual mental activities, the coordination of the mental process of knowledge, emotion and intention; subjective reflection and objective reality; individual and environment coordination, interpersonal relationships and harmony; personality integrity, personality psychological characteristics are relatively stable.[1] The personality is sound and relatively stable. Scholars at home and abroad have studied the mental health of different populations through questionnaires, but there

are not many comprehensive studies on mental health of the elderly in China, and the measurement of psychological measures is not perfect. Chinese scholars are also actively developing localized mental health self-assessment scales for older adults[2]. Chen Lixin et al. studied the influence of social support on the mental health of the elderly, and concluded that social support has a main effect and buffering effect on the mental health of the elderly[3].

2. Method

Citespace is a powerful information visualization software developed by Chaomei Chen of Drexel University in 2004, with powerful functions of scientometrics, citation analysis and research frontier analysis, which has been widely disseminated in China.[4] Citespace Knowledge Graph plays a great role in detecting the frontiers of disciplines, managing knowledge and selecting research directions.[4] It can be used to analyze China Knowledge Network, China Knowledge Network, and China Research Network. It can be used to analyze databases such as China Knowledge Network, Chinese Social Science Citation Index, Science Citation Index, etc., and to analyze selected literature for citation from multiple perspectives such as collaborating institutions, keywords, countries and regions. At present, the research on literature visualization in China is mainly applied to management and technical science fields, but less applied to psychology. [5] This study will use Citespace to study the research process and hotspots of mental health of the elderly in China..

The data base is the source of all scientific knowledge mapping. In this study, the most authoritative database in China, China National Knowledge Infrastructure, was used as the data base, and "mental health of the elderly" was used as a keyword in the advanced search, and 4882 documents were retrieved as of May 24, 2022. After excluding foreign literature, conferences, newspapers, and special journals, a total of 1370 valid documents were obtained after filtering, and the caption information of these documents, including authors, institutions, keywords, journals, titles, and abstracts, was exported and saved, and Citespace software was used to visualize and analyze them .

3. Results

3.1. *The temporal trend of the literature volume*

The number of publications in the literature reflects the progress of research in the field and the changes in the volume of scientific knowledge, and is an important indicator of the development of scientific research.[6] . For example, from 1984 to May 24, 2022, 1504 articles were published in academic journals, and the temporal change in the number of articles published can effectively measure the development of a research field.[7] The change in the number of articles published over time is a good indicator of the development of a research field. In order to visualize the progress of research on "mental health of the elderly" in China, the trend of the number of articles published over time was plotted using the year as the horizontal coordinate and the number of articles as the vertical coordinate (see Figure 1). As shown in Figure 1, the research on mental health of the elderly in China can be divided into three distinct phases: the initial phase (1984-2000), the rapid growth phase (2001-2010), and the fluctuating phase (2011-2022). The number of publications in the initial period is low and tends to be stable, with only 107 papers accumulated in 16 years, accounting for only 7% of the total. The first Chinese scholars studied the mental health of the elderly in this period was "A Preliminary Study on Mental Health of the Elderly" in 1986, which was the first time Chinese scholars paid attention to the mental health of the elderly. The most influential one in this stage was "The relationship between physical exercise and mental health of middle-aged and elderly people in Beijing city - a study of emotional dimensions" published in 1996, which proved through experiments and physiological indicators that different exercise methods such as tai chi, sword and jogging have positive effects in relieving anxiety, anger, fatigue and panic.[8] . It opened the door for subsequent physiological experiments on mental health of the elderly. In the second stage, the number of papers output increased dramatically, with 431 papers published in 10 years, accounting for 30% of the total, from 22 papers published annually in 2000 to 76 papers published annually in 2010, a three-fold increase and a rapid growth and spurt. At this stage, Chinese scholars became increasingly aware of the importance of mental health research on the elderly, and it was also the stage when the

psychological community became interested in mental health of the elderly, and studies on mental health of the elderly were published one after another in psychological journals such as the Chinese Journal of Mental Health, Advances in Psychological Science, Chinese Journal of Clinical Psychology, and Journal of Psychology. The third stage fluctuates in ups and downs, but the overall trend of rapid growth, especially in 2016, 110 papers were published, and the number of literature reached a record high, which shows that there is a trend of continuous growth in mental health research on the elderly. As the research progresses, the research on mental health of older adults will become more extensive, and the research and application for mental health in China will continue to develop.



Figure 1. Statistics on the number of articles published on the topic of mental health of Chinese elderly people

3.2. Author cooperation analysis

The authors and institutional collaborations were analyzed to understand the distribution and collaboration of important scholars and institutions in mental health research on older adults. The statistical literature was imported into Citespace, and the Time Slicing column was set to "2000-2022", the time slice was set to one year, the Node Types were set to "Author" and "Institution", the Pruning column was set to "Pathfinder", and the Top N was selected. The time slice is set to one year, the Node Types are set to "Author" and "Institution", the Pruning column is set to "Pathfinder", and the Top N is set to 50, i.e., the top 50 nodes with the highest citation frequency in each time slice. The visualization analysis between authors and institutions is shown in Figure 2, and the number of nodes N is 774, the number of links E is 749, and the network density is 0.0025. At present, this is related to the actual mental health research: the development of mental health research on older adults in China is relatively short, the general public and the government do not pay enough attention to it, and mental health research is more often conducted by teacher training colleges and psychology colleges, with different research directions, and no cooperation is formed between schools and schools, resulting in a sparse network of cooperation among research scholars and institutions. As the country pays more attention to mental health and the influence of mental health of the elderly continues to become bigger, more and more scholars and institutions will study it, and the cooperation network of authors and institutions will increase.

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 CSSCI: D:\京南文件\data for citespace\老年心理\data
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 Selection Criteria: q-index (k=25), LRF=3.0, L/N=10, LBY=5, e=1.0
 Network: N=774, E=749 (Density=0.0025)
 Largest CC: 35 (4%)
 Nodes Labeled: 1.0%
 Pruning: Pathfinder



Figure 2. Collaborative authorship mapping of mental health research on older adults

3.3. Analysis of research hotspots

Keywords are the concentration of a research topic and the distillation of research content in a literature. The frequency of keywords is positively correlated with research hotspots.[9] The frequency of keywords is positively correlated with research hotspots. According to the theory of co-occurrence analysis, the more the keywords appear in relation to the literature, the more the research themes of the literature are similar.[10] . Node centrality is also an important indicator to measure the research hotspots, centrality can reflect the importance of nodes in the co-occurrence network, through centrality can visually present the key information in the co-occurrence network, node centrality is also positively correlated with the linkage effect in the co-occurrence network, the higher the centrality and frequency of keyword nodes, the more important the keyword is in the field, so the high frequency in citespace software , high centrality of keywords can be used to identify research hotspots in a field. In this study, we used keyword co-occurrence technology to construct a keyword co-occurrence map of Chinese elderly mental health research, firstly, we set the time window as 2000-2022, the time slice as 1, the node type as Keyword, i.e., keywords, and the network crop as Pathfinder, and conducted visual analysis to get a clear, objective and simple keyword co-occurrence map (Figure 3). And I ranked the core keywords according to their frequency, and selected the top 20 keywords in terms of frequency (as shown in Table 1). As Table 1 shows, the top 5 keywords appearing in the Chinese elderly mental health research literature were "elderly", "mental health", "influencing factors", "social support", and "psychological care" , indicating that current research on older adults' mental health in China focuses on exploring different influencing factors on older adults' mental health, and also these five keywords have the highest centrality, indicating that they are important intermediary nodes in the knowledge map of elderly mental health research. Second, the occurrence of "psychological care", "quality of life", "depression", "subjective well-being", etc. in the top 20 of the frequency ranking shows that the keywords "psychological care", "quality of life", "depression", "subjective well-being", etc. , etc. It can be seen that the research direction of Chinese scholars on the mental health of the elderly is

focused on the regulation of emotions and mental health, which reflects the gathering and changes of the mental health research of the elderly in the development process.

Table 1. Hot words of mental health of the elderly

| Serial number | Frequency | Centrality | Year | Keywords | Serial number | Frequency | Centrality | Year | Keywords |
|---------------|-----------|------------|------|---------------------|---------------|-----------|------------|------|--------------------------|
| 1 | 723 | 0.65 | 2000 | Mental Health | 11 | 29 | 0.05 | 2004 | Senior living facilities |
| 2 | 714 | 0.88 | 2000 | Seniors | 12 | 28 | 0.04 | 2001 | Psychological |
| 3 | 77 | 0.07 | 2002 | Influencing Factors | 13 | 26 | 0.04 | 2004 | Physical exercise |
| 4 | 71 | 0.07 | 2000 | Social Support | 14 | 23 | 0 | 2000 | The concept of old age |
| 5 | 66 | 0.08 | 2001 | Psychological care | 15 | 23 | 0 | 2000 | Re-employment |
| 6 | 54 | 0.1 | 2001 | Health Education | 16 | 23 | 0.03 | 2000 | Middle-aged and elderly |
| 7 | 42 | 0.06 | 2000 | Depression | 17 | 23 | 0.03 | 2006 | Nursing |
| 8 | 39 | 0.06 | 2002 | Quality of life | 18 | 18 | 0.04 | 2003 | Taijiquan |
| 9 | 39 | 0.04 | 2003 | Community | 19 | 18 | 0.02 | 2000 | Health Status |
| 10 | 32 | 0.05 | 2001 | Health | 20 | 18 | 0.01 | 2005 | Rural |

The keyword clustering function can identify the research hotspots in a certain field and clarify its development trend.[11] Keyword clustering The keyword co-occurrence frequency clustering view focuses on reflecting the structural features among clusters, highlighting key nodes and important links. As shown in Figure 3, in the keyword co-occurrence mapping, the circle represents the node of the keyword, the larger the circle indicates the higher frequency of the topic, the link between the nodes represents the co-occurrence relationship, the thickness indicates the co-occurrence intensity, the color and thickness of the circle indicates the time period of the node, the thickness of the annual cycle is proportional to the cited frequency of the year, the thicker the color ring inside the circle, the higher the frequency of the year, the cooler the blue color to the warm red color, the indicates the change of time from early to recent. The clustering results show (see Figure 3) that there are 651 nodes and 1363 links in the keyword co-occurrence map of research related to mental health of Chinese elderly people, and the overall density of the network is 0.0064. Compared with the author and institutional cooperation network, the network structure of the keyword knowledge map is more optimized.

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 Network: N=651, E=1363 (Density=0.0064)
 Largest CC: 584 (89%)
 Nodes Labeled: 1.0%
 Pruning: Pathfinder

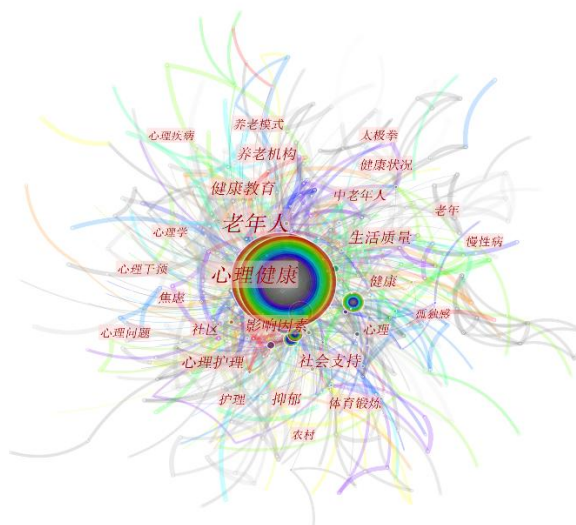


Figure3. Co-presentation mapping of mental health keywords in the elderly

3.4. Research trend analysis

Sudden words are words that are used more frequently in a short period of time. citespace software can determine the frontiers and trends of research fields based on the changes in the frequency of sudden words. As shown in Figure 4, "aging", "psychology", "mental health of the elderly", "urban aging" etc. are the hot spots of research.

Top 11 Keywords with the Strongest Citation Bursts

| Keywords | Year | Strength | Begin | End | 2000 - 2022 |
|----------|------|----------|-------|------|-------------|
| 老年 | 2000 | 4.55 | 2001 | 2006 | |
| 心理学 | 2000 | 3.54 | 2004 | 2008 | |
| 心理护理 | 2000 | 5.02 | 2010 | 2012 | |
| 护理 | 2000 | 4.6 | 2010 | 2014 | |
| 社区 | 2000 | 4.41 | 2012 | 2015 | |
| 心理状况 | 2000 | 4.2 | 2012 | 2014 | |
| 影响因素 | 2000 | 5.59 | 2015 | 2016 | |
| 心理弹性 | 2000 | 3.98 | 2015 | 2019 | |
| 生理健康 | 2000 | 3.42 | 2017 | 2022 | |
| 养老机构 | 2000 | 5.05 | 2018 | 2022 | |
| 老龄化 | 2000 | 4.06 | 2018 | 2019 | |

Figure 4. Mental health emergent word mapping of the elderly

The keyword co-occurrence time series view focuses on representing the process of knowledge

evolution in the time dimension. The time-series view can both visualize the layout characteristics of keywords in different time zones in the spatial dimension and grasp the development process of knowledge evolution in the temporal dimension, and then obtain the dynamic process of the mental health research hotspots of the elderly from the whole to the local constantly changing over time. The keyword co-occurrence time series view (see Figure 5) shows the distribution characteristics of the research in different time zones. Chinese research can be divided into three phases. The first stage is the initial period (1984-2000). The key words involved were "elderly", "mental health", "social support", "elderly mental health", "depression". This is the period when the mental health of the elderly took root and sprouted in China is the period when it drew nutrients from foreign cutting-edge research. During this period Chinese scholars just introduced foreign research on mental health of the elderly, although Chinese scholars have made great contributions to the introduction and introduction of mental health of the elderly, but the research mainly focused on the background, meaning, content and other deficiencies, research methods and localized research are less, and have not yet conducted systematic and in-depth research on. The second stage is the rapid growth period (2000-2010). The key words involved are "influence factors", "health education", "health", etc. This period is a period of rapid development of mental health research on Chinese elderly people, and the research is further deepened, both in terms of in-depth research on research areas and applications in various fields, and there are changes in research hotspots. Research in China gradually shifted from theoretical to applied research, with more empirical studies on emotional distress such as anxiety and depression, and penetrated into specific subject areas and integrated with mental health. At the same time, the field of psychology in this period also gradually recognized the importance of mental health of the elderly, and a large number of studies on meditation emerged in core psychology journals such as Journal of Psychology and Advances in Psychological Science during this period. The third stage is the period of fluctuation and fluctuation (2010-2020). The key words involved are "aging model" and "aging". This is a period of continuous development for Chinese research. After the explosive growth, Chinese research in this period is more refined and deeper, applying mental health to clinical research and following the times.

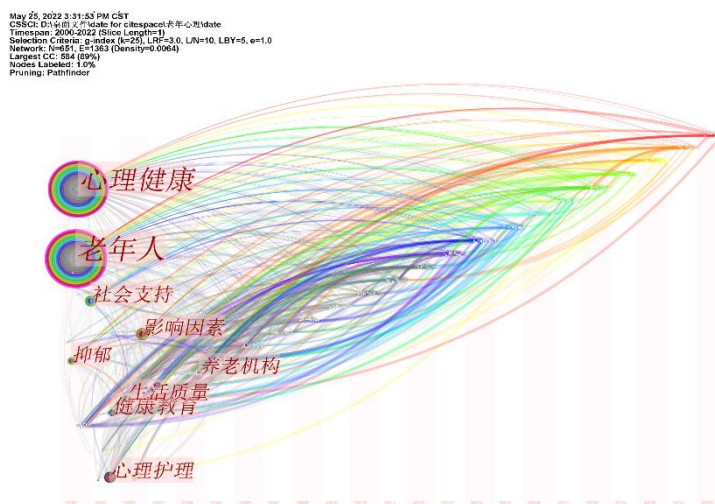


Figure 5. Time-series mapping of mental health research frontiers in older adults

4. Conclusion

This paper uses the authoritative database China National Knowledge Infrastructure as the data source, based on CiteSpace visual analysis technology, from 2000 to 2022, China's "mental health of the elderly" in terms of keyword co-occurrence, collaborating institutions and co-authors, etc. We analyzed 1370 research documents in the field of "mental health of the elderly" from 2000 to 2022. The following conclusions can be drawn: the number of literature on mental health of the elderly in China has been increasing, which fully indicates that the relevant research is developing and

improving; the current hotspots of research in China are "elderly", "mental health", "influencing factors", "mental health", and "mental health of the elderly". At present, the hotspots of research in China include "elderly", "mental health", "influencing factors", "social support", "psychological care", etc. The research units on mental health of the elderly in China are diverse in nature, including colleges and universities, publishers and primary and secondary schools. publishers and primary and secondary schools, etc. However, there is not enough cooperation about researchers and researchers, which is not conducive to innovation and further development of research.

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