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Knowledge Mapping of Rural Elderly Health Research - A CiteSpace Bibliometric Analysis Based on the WOS Database

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Abstract

Using Cite Space 6.1. R6 bibliometrics software, we retrospectively analyzed and mapped 1,184 articles in WOS in terms of co-citation, authors, institutions, keyword co-occurrence, keyword emergence, and keyword frequency, to summarize the hotspots and trends of the research on the health of the rural elderly, and to provide a basis for the research on the health of the rural elderly. The results of the analyses show that the research on the health of the rural elderly generally shows an annual trend of "fluctuating upward" [1,2]. The inter-institutional and inter-authorship collaborations show low network density and intermediary centrality, with fragmented research efforts and fewer collaborative achievements [3]. There are some differences in the research hotspots of rural elderly health, but the keyword cluster analysis shows that the research hotspots involve more areas. In the future, we should continue to broaden the depth and breadth of rural elderly health research.

Keywords: Population ageing, Rural, Elderly health, Visual measurement, Cite Space

1. Introduction

According to the internationally accepted standard of 10 per cent of the total population being over 60 years of age, China began to enter an ageing society in 1999, and the process has continued to accelerate with an ir-reversible trend. According to data published in the Seventh National Population Census 2021, China has a large elderly population base, the degree of aging is further aggravated, and there are large differences in aging between urban and rural areas, with the proportion of elderly people aged 60 years in China's rural areas ac-counting for 23.81 per cent of the total population, which is 7.99 percentage points higher than that in urban areas, and the proportion of elderly people aged 65 years and older in rural areas accounting for 17.72 per cent of the total population, which is 6.61 percentage points higher than that in urban areas. . As the process of ageing accelerates, especially in rural areas where there are many elderly people, the level of medical and health care development is low, and the quality of the population is low, the degree of ageing is even deeper, and the health problems faced by elderly people in rural areas as a result of weakened physical functions and diminished sources of income are becoming more and more pronounced. In order to better address the health problems of the rural elderly, there has been a boom in research focusing on the rural elderly, so understanding the current status of health research on the rural elderly, as well as exploring its hot spots and research trends, is of great significance to the promotion of the health development of the rural elderly under the strategy of rural revitalization.

In 2022, nearly 190 million older people in China will suffer from chronic diseases, and as many as 45 million will be disabled and demented. Rural elderly occupies a large proportion of the population, and research on the health of rural elderly has become an important means of implementing healthy aging. Through research and combing through the literature, we found that there are very few academic literature review articles on the topic of rural elderly health, and there are not many articles that use bibliometric software to analyses and present rural elderly health in the form of knowledge maps. The current literature on rural older adults mainly focuses on family old age, social capital, public health, and loneliness in chronic diseases and mental health of rural older adults, and in terms of the research method, the selection of variables is relatively single, and there is less cooperation and communication between core authors and core research institutions. In this study, the latest version of Cite Space 6.1. R6 bibliometric software was used to analyses the basic status of rural elderly health research, the distribution of research hotspots, and research trends in the form of a knowledge map. Through the visual knowledge mapping analysis, we can increase the importance of rural elderly health research, and provide certain reference and reference for the development of research to address

the health of rural elderly and other aspects in the context of aging.

2. Materials and Methods

In this study, the Web of Science (WOS) database was searched with the keyword "Health of the elderly in rural areas", and the new version of WOS can export 1,000 documents at a time, and the basic search conditions were set as follows: selecting the database = (The basic search condition is set: choose database = ("web of science core collection"), citation index Science Citation Index Expanded (SCI-EXPANDED)-2002-present, Social Sciences Citation Index (SSCI)-2002-present, and the number of articles in the Citation Index (SSCI)-2002-present. SSCI)-2018-present, Social Sciences Citation Index (SSCI)-2018-present, Current Chemical Reactions (CCR-EXPANDED)-1985-present, Index Chemicals (IC)-1993- Present, Theme = ("Health of the elderly in rural areas"), Time span = ("Time frame: 2002-2022"). A total of 1196 documents were retrieved. Then, we set "literature type" = Huanan ("dissertation, review paper, conference proceedings, online publication"), and finally obtained 1,186 international samples of literature on the health of the elderly in rural areas. Export plain text record types as full records and cited references, use Cite Space 6.1 R6 version remove duplicates function to remove duplicates, document types to retain select article, review, export WOS, export doi, and block size select 500, and finally get 1184 documents. 500, and finally get 1184 documents.

3. Results

3.1. Literature Citation Impact Analysis

In the WOS core collection, the analysis of citations and impact of the included literature showed that the top five articles were journal articles and were mainly related to the topics of novel coronavirus morbidity and mortality and the susceptibility and resistance of older adults in rural America, willingness to vaccinate against NE coronavirus pneumonia in Bangladesh, and the relationship between neighborhood dietary environments and dietary changes in older adults in rural communities in Japan.

No.	Title	Year	Source	Citation
1	Prevalence of metabolic syndrome in mainland china: a meta-analysis of published studies	2016	BMC PUBLIC HEALTH	172
2	Spatial Disparities in Coronavirus Incidence and Mortality in the United States: An Ecological Analysis as of May 2020	2020	JOURNAL OF RURAL HEALTH	121
3	Community Susceptibility and Resiliency to COVID-19 Across the Rural-Urban Continuum in the United States	2020	JOURNAL OF RURAL HEALTH	99
4	Willingness to vaccinate against COVID-19 among Bangladeshi adults: Understanding the strategies to optimize vaccination coverage	2021	PLOS ONE	77
5	Relationship Between Neighborhood Food Environment and Diet Variety in Japanese Rural Community-dwelling Elderly: A Cross-sectional Study	2022	JOURNAL OF EPIDEMIOLOGY	6

Source: Cite Space 6.1. R6 analysis of WOS database documentation.

Table 1: Basic Information on Highly Cited Literature

3.2. Annual Trends in The Volume of Literature

Statistical analysis of the annual publication volume of rural elderly health research literature can intuitively understand the dynamics of research results. 2002-2022, according to the number of literature and the slope of the growth curve in Figure 1 can be divided into three stages of rural elderly health research history. The first stage of research early, rural elderly health research did not get the attention of scholars in the early days. In the WOS core set, the number of annual publications before 2008 was less than 30, the second stage is a slow rise period (2010-2016), the number of research literature have increased, the WOS ensemble reached 67 in 2014; the third stage of rapid growth stage, the number of publications in the WOS core in 2016-2021 showed a high rate of growth, and the number of publications reached 166 in 2021.

Overall, in terms of the number of publications, the number of research results on the health of the rural elderly has shown a fluctuating growth trend, reflecting that after 20 years of historical changes, the health of the rural elderly has increasingly gained the attention of academics, and with the gradual prominence of the problem of aging, especially the problem of aging in rural areas, it has gradually become a new "blue ocean" of research.

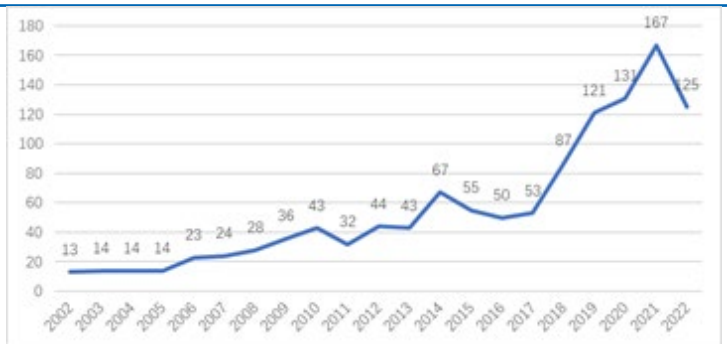

Figure 1: Annual Number of Articles Published in The Study of The Health of Rural Older People.

3.3. Distribution of Issuing Countries and Regions

The research literature on rural elderly included in the WOS Core Collection comes from 315 countries, 3968 research institutions, and 5796 authors, and the distribution of the top 10 countries and the top 10 research institutions with the largest number of journal publications are shown in Figures 2 and 3, respectively. As can be seen from Figure 2, China ranks first with 410 articles, accounting for 38% of the total literature, much higher than other countries. As can be seen from Figure 3, among the top 10 research institutions, except for the University of London (24 articles) in the United Kingdom, Seoul National University (15 articles) in Korea, and Carolina University (15 articles) in the United States, the remaining seven universities (158 articles) are all from China. This indicates that there are more institutions in China that are researching rural elderly health, and that China has a certain scientific research status and international competitiveness in the field of rural elderly health.

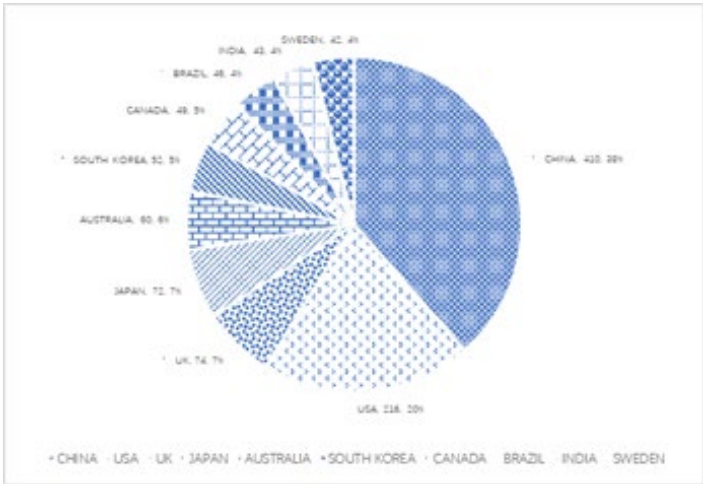

Figure 2: Top 10 Countries in Terms of Wos Dataset Issuance (number and percentage).

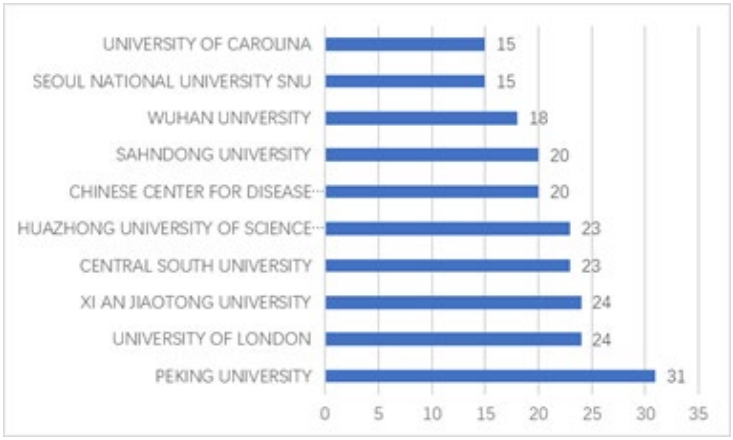

Figure 3: Distribution of Core Organizations in The Wos Dataset (top 10 postings).

3.4. Distribution of Sources of Literature and Journals

In the WOS Core Collection, 1,184 articles come from 486 source journals, indicating that foreign journals that study the health of rural elderly cover a wide range of disciplines. The top 10 journals in the WOS Core Collection have 334 articles, accounting for 28.21% of the total 1184 articles. Among the top 3 journals, INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH & PLOS ONE & BMC PUBLIC HEALTH accounted for 8.4%, 2.84% and 2.49% of the WOS Core Collection re-spectively. The average five-year comprehensive impact factor of the top 10 WOS Core Collection source journals in terms of the number of articles published is 4.92, indicating that the research on the health of the rural elderly has achieved certain academic results and has a certain degree of academic influence in the field of international research.

WOS		
Journals	**Quantities**	**IF**
INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	98	4.614
PLOS ONE	33	3.752
BMC PUBLIC HEALTH	29	4.545
BMC GERIATRICS	28	5.267
JOURNAL OF RURAL HEALTH	28	5.667
BMJ OPEN	27	3.587
FRONTIERS IN PUBLIC HEALTH	27	6.461
BMC HEALTH SREVICES RESEARCH	26	3.647
ARCHIVES OF GERONTOLOGY AND GERIATRICS	23	4.163
JOURNAL OF AMERICAN GERIATRICS	15	7.538

Source: Cite Space 6.1. R6 analysis of WOS database documentation.

Table 2: Top 10 Rural Elderly Health WOS Articles Sent to Source Journals.

3.5. Analysis of Core Authors and Research Organizations

Scientific network mapping of core authors and research organizations in rural elderly health research provides a more intuitive understanding of the collaborations as well as the relevance of this research area. Using Cite Space to run the WOS core ensemble, Times Slicing in Time Slicing Years Per Slice select 1, the main function is to partition the data into time zones, the start and end time of this data analysis for the period 2002-2022, a time span of 20 years, the default setting is 1, that is, 1 year a partition, a total of 20 partitions, network node correlation Strength in Links selects default Cosine, Scope selects Within Slices, Selection Criteria selects g-index, default value k=25, selects Top N=50, indicating the authors who ranked the top 50 authors in the frequency of occurrence in each time slice, and Top N%=10, extracts the top 10% of objects in each time slice. Pruning functional area is network pruning, when the network is relatively dense, retaining important connectivity through pruning can make the network more readable. In order to prevent information loss and ensure the integrity of the analysis, the cropping (Pruning) option is unchecked, and the Node types are selected as Author and Institution options to map the knowledge network. To improve the accuracy of keyword analysis, the default value of Phrase/ Keywords: Maximum Words is changed from 4 to 8.

The WOS core ensemble was analyzed by author collaboration network, N=649, E=686, Density=0.0033 in Fig. 4. From the WOS core ensemble author collaboration network mapping, it can be seen from the publication volume that Abe Takafumi,Huang Fen, Zhou Zhongliang, Puhakka, Riikka, Zhang Chichen, Hu Zhao, Xu Huilian, Lu Jiao are the most fruitful researchers with the publication volume of 4 articles each. Zhang Chichen, Hu Zhao, Xu Huilian, Lu Jiao are the most productive with 4 publications. Chinese scholars accounted for 6 of the 8 WOS core authors, accounting for 80% of the total, which is related to the fact that China has a large population of rural elderly people, and the health problems of rural elderly people have gradually gained the attention of the academic community. The next fruitful core authors of 3 articles are Bootsikeaw Sasivimol, dos santos, tavares, DM, Takeda Miwako, Seangpraw Katekaew, Wilmowska-pietruszynska Anna, Puhakka, Riikka. Wisniowska-szurlej Agnieszka, Meucci Rodrigo Dalke and others. In terms of research team cooperation network and intensity of cooperation, 649 connections and 686 nodes indicate that there are more small research teams and infrequent cooperation between members internally, smaller number of nodes between members of the sub-network and less cooperation between members externally.

Figure 4: WOS Author Collaboration Network Map.

3.6. Analysis of Research Hotspots

Banerjee, S analysed the association between place of residence and the likelihood of healthcare utilisation among older people in India using data from the 75th round of the National Sample Survey conducted in India from July 2017 to June 2018 and found that healthcare utilisation among the older population residing in urban India was 7 percentage points higher than that of rural residents, and that level of education and economic status were the two major determinants [26]. Thu, thuong, NT, van den berg, Yme, Huy, Tran Quang Logistic regression analyses based on a dataset from the 2016 Vietnam Household Living Standards Survey found that although health insurance coverage has increased in Vietnam, the financial protection afforded by health in-surance schemes is still insufficient, especially for major illnesses among rural elderly households [28]. disease expenditures [31]. Tariq, A, Beihai, Tian, Ali, Sajjad conducted a survey of 146 Pakistani residents aged 60 years or older in rural areas to explore the mediating role of interpersonal trust and reciprocity between physical disability and depression among rural older adults in Pakistan. The study found significant correlations between interpersonal trust, reciprocity, depression, and physical disability, and physical disability was directly related to depression.

Keyword co-occurrence and clustering analyses were performed on the WOS core ensemble, with network density Density=0.0269 (N=527, E=3734), clustering modularity value Modularity Q=0.3115, Q>0.3 implies significant clustering structure, Weighted Mean Sihouette S=0.7081, S>0.7 clustering Convincing. The 527 keywords were sorted according to the frequency of occurrence, and from Table 3, it can be seen that its health, prevalence, andolder adult are the top 3 keywords in the keyword co-occurrence mapping, with the frequency of occurrence of 267, 184, and 168, respectively, but their mediational centrality is also ranked low, with the frequency of 0.08, 0.07, and 0.06, respectively, and the other representative keywords are risk factor, mental health, social support, health, elderly people, etc. The co-occurrence network of keywords in this study was divided into 9 clusters such as #0 spatial analysis, #1 southern brazil, #3 mental health, etc., and the size of the clusters gradually decreased. In terms of mediator centrality, the keyword with the highest centrality is care, which plays the most important role in the keyword co-occurrence network, and some of the keywords show the phenomenon of "low centrality and high frequency", such as risk factor (n=127, with a centrality of 0.06 and ranked 5th), adult (n=116, with a centrality of 0.06), and mental health (n=3), etc. The keyword co-occurrence network is divided into nine clusters. (n=116, centrality of 0.06 and 6th in order) mortality (n=93, centrality of 0.07 and 9th in order), indicating that there are fewer studies on the health of the rural elderly in terms of risk factors, adults and mortality.

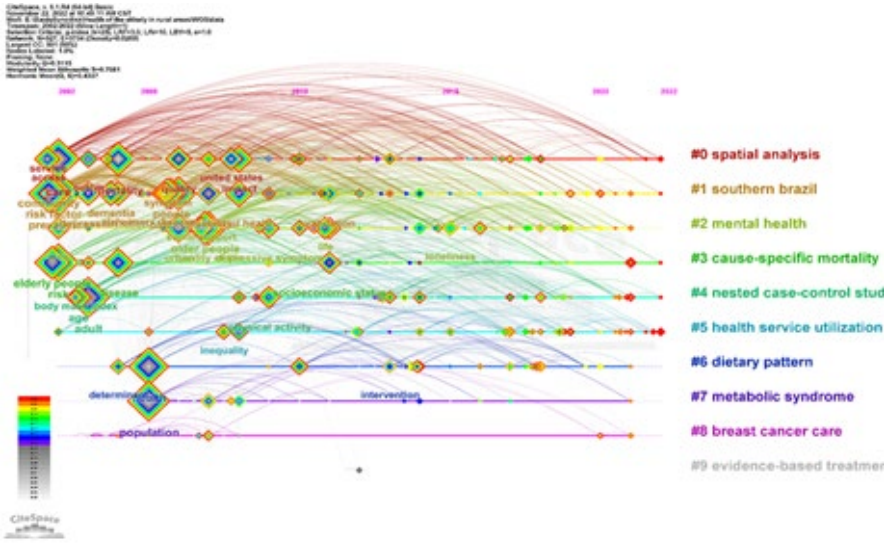

Figure 5: WOS Keyword Co-occurrence Timeline Chart

No.	Key word	frequency	intermediary centrality	Year of first occurrence
1	health	267	0.08	2005
2	prevalence	184	0.07	2002
3	older adult	168	0.06	2006
4	population	142	0.09	2005
5	risk factor	127	0.06	2002

Source: CiteSpace 6.1. R6 analysis of WOS database documentation.

Table 3: Keyword Co-Occurrence Frequency Rankings of The Top 5 Specific Conditions

3.7. Keyword Emergence and Trends

The node algorithm proposed by Kleinberg-J in 2002 is used in Cite Space for detection, according to the different emergent nodes can be divided into emergent topics, literature, authors, journals and fields, etc., the more emergent nodes a certain cluster contains, the more active the field is or the emerging trend of the research, and the emergent words are keywords with a high frequency of emergence in a short period of time, the emergent words are keywords with high frequency of emergence in a short period of time, the emergent words are keywords with high frequency of emergence in a short period of time. Keyword emergence knowledge graph can analyses the trend change of research topics, cutting-edge hotspots, the persistence of research hotspots, year is the node emergence time, strength is the node emergence strength, begin is the node emergence start time, end is the node emergence end time, the red line indicates the emergence duration, the light blue line indicates that the node has not yet appeared, the dark blue line indicates the node In Burstiness, Configure the detection model settings, f(x)="α" e^(-αx),α_1/α_0is set to default value 2.0, α_i/α_(i-1) is set to 2.0, The number of states is set to 2, γ[0,1] is set to 0.1, the smaller the value of γ[0,1], the more the number of emergent words, and the smallest unit of emergence time is set to 2 years. Duration is set to 2 years.

In the keyword emergence map in the WOS core collection, there are 20 emergent words, and the emergence time of "Alzheimer's disease" is up to 8 years, which has become a persistent research hotspot, indicating that Alzheimer's disease has become a hotspot for studying the health of the rural elderly in the international research, and "loneliness" and "mountainous county" are persistent research hotspots, with a duration of 5 years. Loneliness" and "mountainous county" are persistent research hotspots with a duration of 5 years, indicating that loneliness and mountainous countryside have become the focus of research on the health of the rural elderly, and in terms of the intensity of emergence, "loneliness" and "mountainous county", in order, are the most popular hotspots for research on the health of the rural elderly.

In terms of the intensity of emergence, "loneliness", "people", "the elderly", "mountainous county", in order of emergence, are the hotspots of persistent research. mountainous county", with the emergence intensities of 4.85, 4.76, 4.43, and 4.4 respectively, indicating that these research themes have received high attention from cutting-edge research. The keywords "Rural china", "china", and "pulic health" emerge from 2020 and remain hot until 2022. This means that at this time the research hotspot for the health of rural elderly in China is rural China, as well as public health, social support, etc., which has become the focus of international

research, and international research on the health of rural elderly is a little later than the domestic research, which is mainly focused on the research on the physical health of the elderly diseases and mental health loneliness.

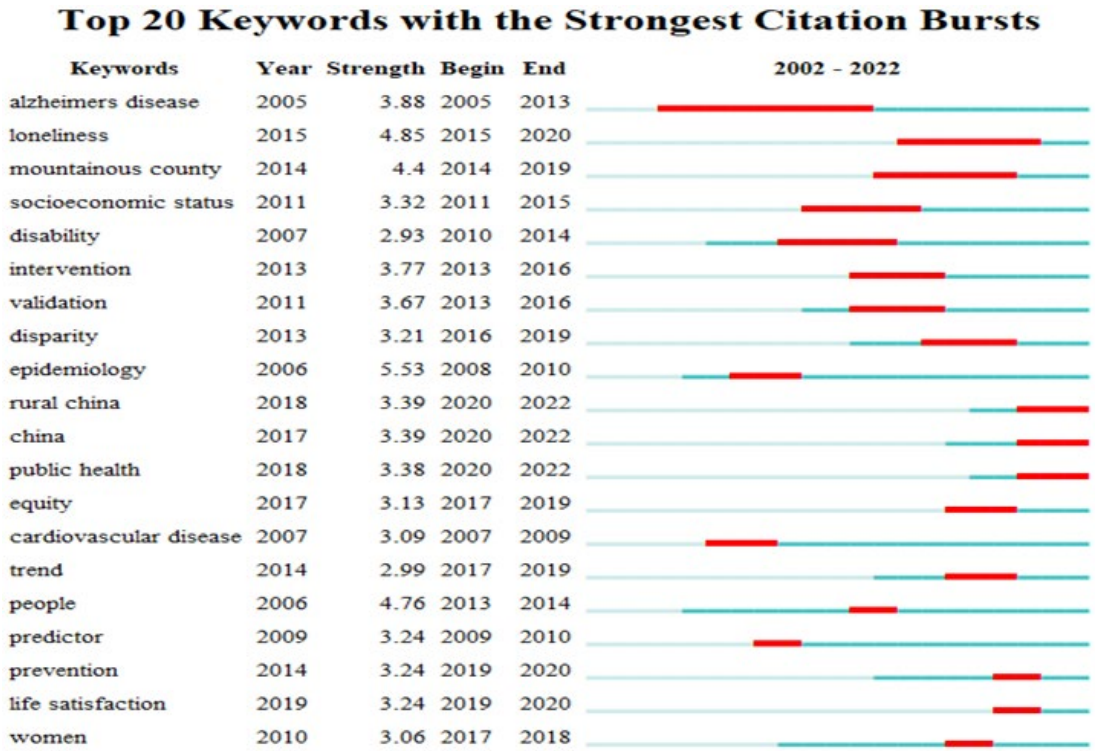

Figure 6: WOS Keyword Emergence Map

4. Discussion

The quantity and quality of research literature on the health of the rural elderly have been increasing, and the scope of disciplinary background has been expanding. Academics have conducted continuous research on rural elderly health from different perspectives, which can be roughly divided into three phases: the early stage of research, slow rise, and rapid growth in terms of the number of external publications and the slope of the growth curve. The quantity and quality of research at different stages of the research have been continuously improved, and the journals with a higher number of publications are generally of a higher quality, with a higher average composite impact factor, and the scope of the disciplinary backgrounds involved is constantly expanding, so that the research of rural elderly health has gradually become a "blue ocean" of research. Rural elderly health research has gradually become a "blue ocean" of research.

5. Conclusions

On the research hotspots of rural elderly health, through the keyword heat ranking found that the keywords of elderly, rural elderly, mental health, rural, health status appeared with the highest degree of heat, which is a highly concerned topic in the research field, and in the WOS keyword heat ranking, removing the search terms, the research not only focuses on the aspects such as mental health, but also pays more attention to the prevalence of disease and risk affecting the health of the rural elderly factors. Through the keyword emergence situation, different periods of research hotspots vary greatly, research hotspots are mainly concentrated in special areas of rural elderly groups, such as mountainous areas of rural elderly, the focus is on Alzheimer's disease and rural elderly inner loneliness, after 2020, the focus of the research is shifted to the rural areas of China and public health above. From this, we can see that research should focus on both medical factors and non-medical factors such as social support, family care and intergenerational care, so as to study the health problems of the rural elderly in an all-round way [13-31].

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