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Visualization Analysis of Mental Health of Patients with Chronic Kidney Disease at Home and Abroad Based on CiteSpace

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Abstract: *Objective*: To analyze the current status, hotspot and trend of mental health research in patients with chronic kidney disease at home and abroad. *Methods*: China National Knowledge Infrastructure, WanFang, VIP, China Biology Medicine database, PubMed, and Web of Science core collection database were used as search sources from January 2004 to December 2024, and CiteSpace software was used for visual analysis and knowledge mapping. *Results*: A total of 2059 Chinese and 1678 foreign literatures were included. The number of publications showed a fluctuating upward trend, but the collaboration among authors was relatively loose. Negative psychology, such as depression and anxiety, as well as the quality of life of chronic kidney disease patients, were the main research hotspots. *Conclusion*: In the future, it is necessary to enhance cooperation and communication among researchers, continue to explore the mechanism of mental health, optimize research designs, innovate psychological nursing intervention measures, and focus on improving the psychological resilience and social support levels of patients.

Keywords: Chronic kidney disease; Mental health; Research hotspot; Visual analysis

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1. Introduction

Chronic Kidney Disease (CKD) refers to kidney damage or decreased kidney function caused by multiple factors, with a disease duration of ≥ 3 months [1]. With the aging of the population and the increasing prevalence of chronic diseases year by year, the prevalence of CKD has also increased. Globally, the prevalence of CKD has reached 9.1%, with nearly 697.5 million people affected [2]. In China, the number of patients has reached 118.4 million and is expected to continue to increase to 153 million by 2045 [3]. CKD is characterized by insidious onset, long duration, recurrent episodes, and difficulty in curing, and it may ultimately progress to end-stage renal disease, requiring long-term renal replacement therapy. During treatment, patients not only face physical pain caused by the disease

itself and its complications (such as anemia and bone disease) but also bear a huge economic burden. These factors can increase patients' mental health risks, inducing negative psychological states such as anxiety and depression. Moreover, negative psychology and poor health outcomes can form a vicious cycle, leading to a decline in quality of life and a higher risk of death [4, 5]. Modern medical concepts have gradually expanded from a purely biological perspective to a comprehensive model that takes into account psychological factors and social environmental impacts. This has led to increasing attention being paid to patients' psychological states by medical and nursing workers. The "Healthy China 2030" planning outline also emphasizes the need to strengthen early intervention for common psychological disorders such as depression and anxiety to achieve early detection, diagnosis, and treatment [6]. Researchers at home and abroad have conducted studies on the mental health of CKD patients from multiple perspectives, such as biology, psychology, and sociology. However, existing research mostly focuses on a single perspective and lacks comprehensive and systematic bibliometric analysis and visualization. Therefore, this study will use CiteSpace software to systematically review and analyze the current status, hotspots, and trends of research on the mental health of CKD patients, providing references for further exploration of new research directions.

2. Materials and methods

2.1. Search strategy and results

Chinese databases, including CNKI, Wanfang, VIP, and the Chinese Biomedical Literature Database, as well as international databases such as PubMed and the Web of Science Core Collection, are systematically searched. Advanced search techniques are employed, covering the period from January 2004 to December 2024. The Chinese search strategy is: [Subject: Chronic Kidney Disease OR Chronic Renal Failure OR Chronic Renal Insufficiency OR Hemodialysis OR Uremia OR End-Stage Renal Disease OR Peritoneal Dialysis OR Renal Transplantation (precise)] AND [Subject: Mental Health OR Psychological Status OR Psychological Resilience OR Rumination OR Anxiety OR Depression OR Demoralization Syndrome (precise)]. This yields a total of 2,059 Chinese articles.

The English search formula is: [TS = ("Chronic Kidney Disease*" OR "Chronic Kidney Insufficiency*" OR "Chronic Renal Disease*" OR "Chronic Renal Insufficiency*" OR "Kidney Insufficiency*" OR "Renal Insufficiency*" OR "Kidney Disease*" OR "Renal Disease*" OR hematodialysis OR "peritoneal dialysis" OR uremia OR "end-stage renal disease" OR "kidney transplant" OR "renal transplant")] AND [TS = ("mental health" OR "mental hygiene" OR "psychological status" OR "mental status" OR "psychological problem*" OR "mental problem*" OR "psychological situation*" OR "mental situation*" OR "psychological condition*" OR "mental condition*" OR anxiety OR depression OR "negative emotion" OR resilience OR rumination OR demoralization syndrome)]. A total of 1,678 foreign articles are included.

2.2. Inclusion and exclusion criteria

Articles that are relevant to the search topic, publicly published, and available in full-text are selected. Communications, discussions, conference papers, dissertations, news reports, and duplicate or incomplete articles are manually excluded.

2.3. Research methods and tools

The retrieved articles were exported in bibliographic format to NoteExpress. After duplicate checking, two researchers screened the articles by reviewing their titles, abstracts, and full texts, excluding those that did not

meet the criteria. A third person made decisions when there were disagreements. The selected articles were then exported in RefWorks-CiteSpace format and imported into CiteSpace 6.3.R1 software for analysis. The time slicing was set from January 2004 to December 2024, with a single time slice of 1 year. The G-index was set to 9 and TOP N=50 for Chinese articles, and the G-index was set to 11 and TOP N=50 for foreign articles. After setting the parameters, the publication volume, authors, and keywords are analyzed, and knowledge maps are generated.

3. Results

3.1. Analysis of publication volume in Chinese and foreign literature

Through screening relevant literature, 2059 Chinese articles and 1678 foreign articles were included. The overall publication volume has shown a fluctuating increase in the past 20 years. Except for 2022 and 2023, the annual publication volume of Chinese literature is higher than that of foreign literature; the publication volume of Chinese literature peaked in 2021, while foreign literature peaked in 2023. **Figure 1** shows the details.

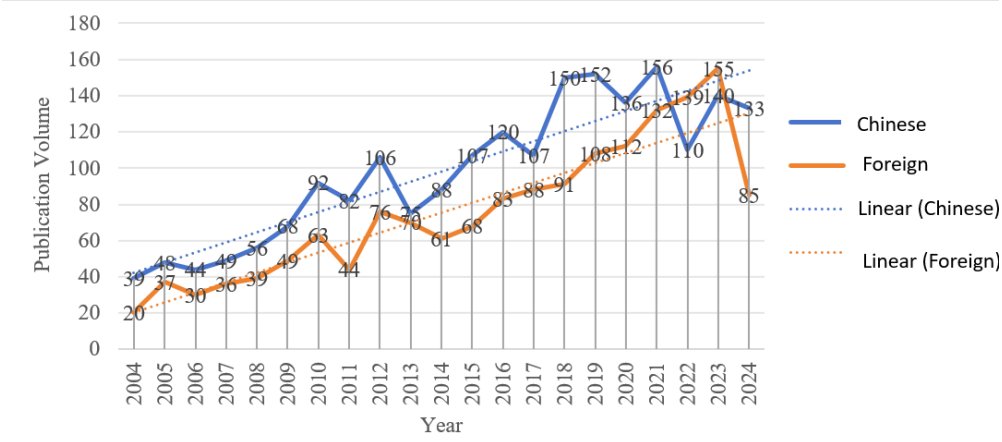

Figure 1. Publication volume of Chinese and foreign literature

3.2. Analysis of authors in Chinese and foreign literature

Among Chinese literature, the top 5 authors with the highest publication volume and their respective articles are: Diao Yongshu (9 articles), Huang Yanlin (7 articles), Dong Jie (7 articles), Shi Yaoxun (5 articles), and Wang Tao (4 articles). Among foreign literature, the top 5 authors with the highest publication volume and their respective articles are: L, Kimmel P (20 articles), Cukor, D (19 articles), Griva, K (12 articles), Chilcot, J (11 articles), and Honig, A (10 articles). Refer to **Table 1** for details.

The co-authorship network can show the core authors and their team collaborations in this field. The nodes in the graph represent each author, and the size of the nodes and names is proportional to the publication volume. The connections between nodes indicate the degree of collaboration between authors. The analysis results show that there are 295 nodes (N) and 229 edges (E) in Chinese literature, with a network density of 0.0053 (Density). Foreign literature has 284 nodes, 431 edges, and a network density of 0.0107. Refer to **Figure 2** and **Figure 3** for details.

Table 1. Publication volume of Chinese and foreign authors (Top 15)

Chinese publications			Foreign publications		
Publication volume	**Year of first publication (Chinese)**	**Name**	**Publication volume**	**Year of first publication (Chinese)**	**Name**
9	2011	Yongshu Diao	20	2006	L, Kimmel P
7	2009	Yanlin Huang	19	2006	Cukor, D
7	2007	Jie Dong	12	2014	Griva, K
5	2015	Yaoxun Shi	11	2011	Chilcot, J
4	2004	Tao Wang	10	2010	Honig, A
4	2018	Juan Zhang	10	2005	A, Peterson R
4	2016	Jing Shangguan	9	2012	W, Dekker F
3	2009	Yanjuan Teng	7	2023	Zhang, L
3	2021	Min Liu	7	2014	L, Yu Z
3	2016	Pingping Liang	7	2021	C, Abrahams A
3	2016	Zhenyun Li	6	2018	Gerogianni, G
3	2009	Juanfeng Long	6	2012	S, van Dijk
3	2009	Haoyu Li	6	2007	A, Tavallaii S
3	2016	Ting Li	6	2022	Chen, Y
3	2009	Jianshan Lin	6	2019	J, Vleming L

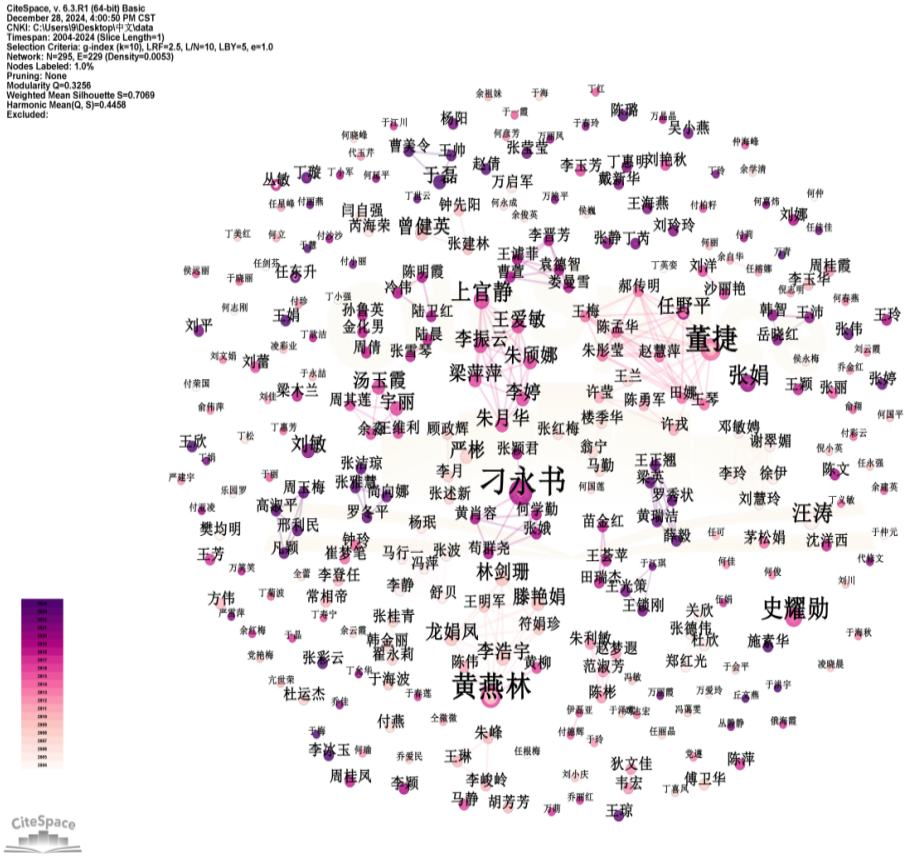

Figure 2. Co-authorship network of Chinese authors

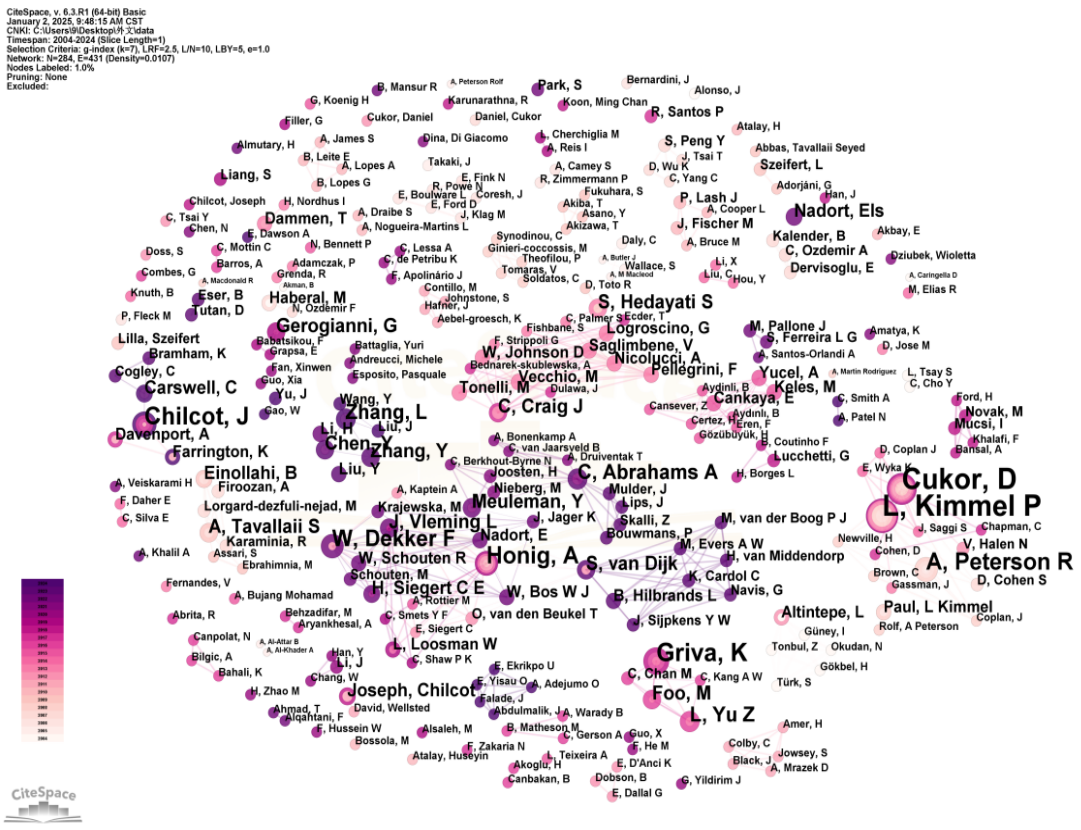

Figure 3. Co-authorship network of foreign authors

3.3. Keyword analysis in Chinese and foreign literature

3.3.1. Co-occurrence analysis of keywords

Keywords can directly reflect the main theme and core viewpoint of the article. The larger the node in the graph, the higher the frequency of the keyword. The greater the centrality, the greater the importance and influence of the keyword in the research. By analyzing node size, centrality, and keyword frequency, the focus and research hotspots within this field can be effectively identified.

The results in **Table 2**, **Figure 4**, and **Figure 5** show that, excluding keywords related to the theme, the top 10 high-frequency keywords with centrality > 0.1 in Chinese literature are: hemodialysis, depression, anxiety, uremia, psychological nursing, quality of life, peritoneal dialysis, and end-stage renal disease; the top 10 high-frequency keywords with centrality > 0.1 in foreign literature are quality of life and end stage renal disease. Hemodialysis, peritoneal dialysis, end-stage renal disease, depression, anxiety, and quality of life are common high-frequency words at home and abroad.

Table 2. High-frequency keywords in Chinese and foreign literature (Top 15)

High-frequency keywords		Frequency		Centrality	
Chinese	**Foreign**	**Chinese**	**Foreign**	**Chinese**	**Foreign**
血液透析	Chronic kidney disease	631	287	0.26	0.28
抑郁	Quality of life	364	214	0.15	0.36
焦虑	End stage renal disease	326	134	0.11	0.23
尿毒症	End-stage renal disease	316	112	0.14	0.09
心理护理	Peritoneal dialysis	299	85	0.19	0.07
生活质量	Kidney transplantation	281	72	0.1	0.06
慢性肾衰竭	Mental health	189	69	0.11	0.08
腹膜透析	Psychosocial factors	161	63	0.17	0.06
慢性肾脏病	Depressive symptoms	134	61	0.08	0.03
心理状态	Major depression	121	59	0.06	0.04
终末期肾病	Dialysis patients	119	36	0.14	0.02
心理干预	Chronic kidney-disease	116	31	0.07	0.02
护理干预	Social support	116	29	0.05	0.02
护理	Hemodialysis patients	115	27	0.1	0.04
心理弹性	Psychological distress	103	26	0.05	0.03

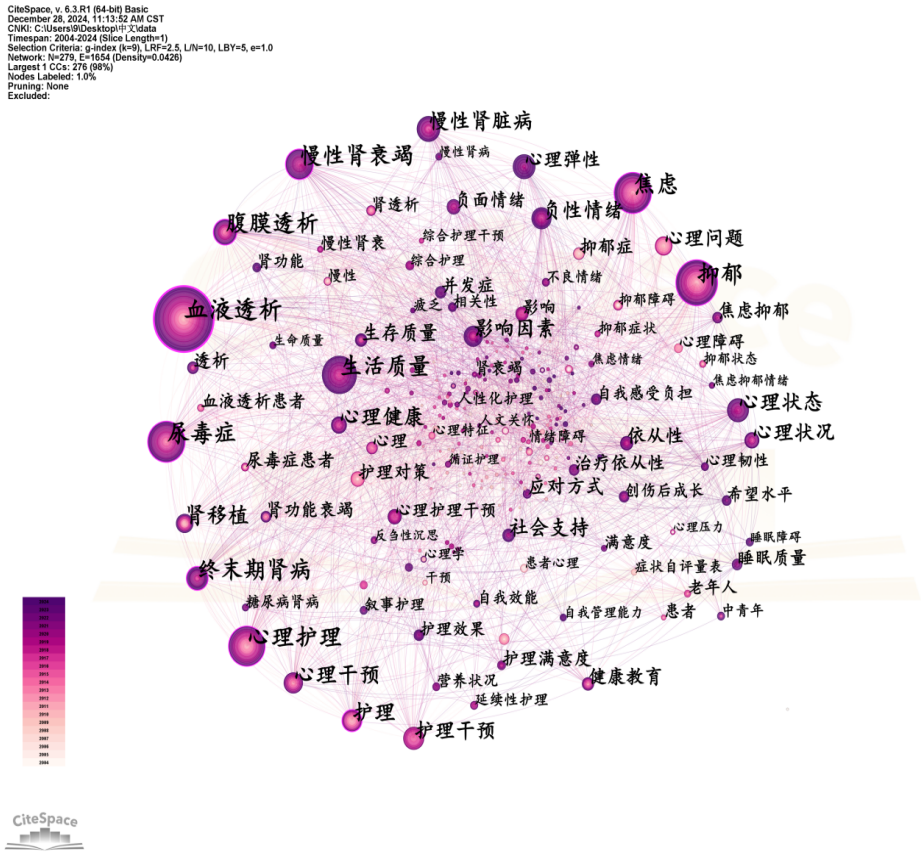

Figure 4. Co-occurrence network of Chinese keywords

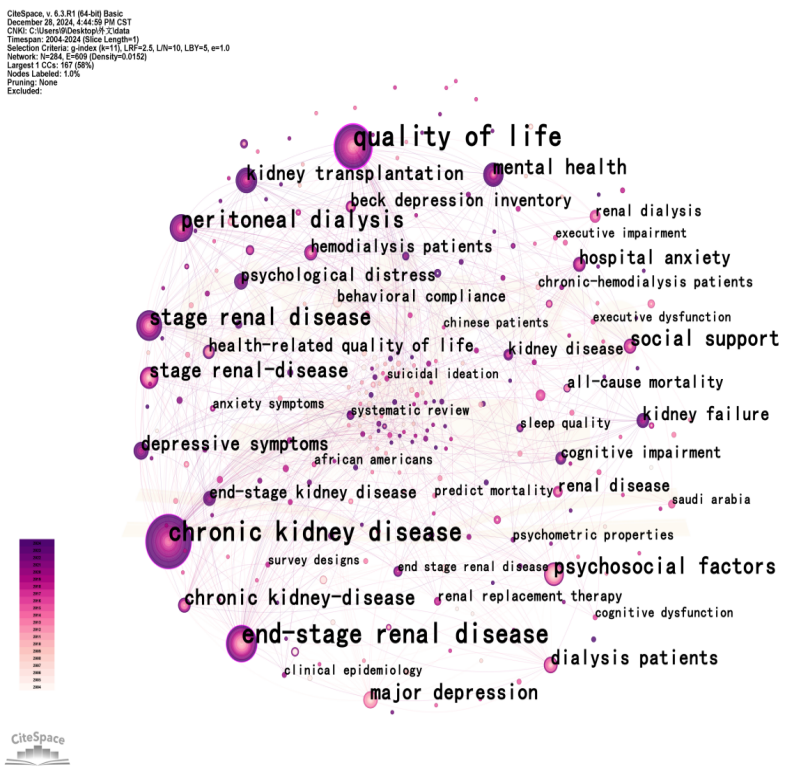

Figure 5. Co-occurrence network of foreign keywords

3.3.2. Keyword cluster analysis

Keyword clustering can categorize similar keywords, reflecting research hotspots and themes. In the cluster map, the Q and S values represent the effectiveness of the mapping. A Q value greater than 0.3 indicates a significant structural division, while an S value greater than 0.5 signifies a convincing cluster. In this study, the Q value for Chinese literature was 0.3256, and the S value was 0.7069. For foreign literature, the Q value was 0.4058, and the S value was 0.7593, indicating reasonable and reliable clustering results. Based on the keyword co-occurrence network analysis, seven cluster labels were obtained. The results for Chinese literature were #0 Uremia, #1 Chronic renal failure, #2 Anxiety, #3 Chronic kidney disease, #4 Psychological resilience, #5 End-stage renal disease, and #6 Psychological intervention. See **Figure 6** for details. The results for foreign literature were #0 End-stage renal disease, #1 Major depression, #2 Chronic kidney disease, #3 Stage renal disease, #4 Mental health, #5 Family functioning, and #6 Depressive symptoms. Refer to **Figure 7** for details.

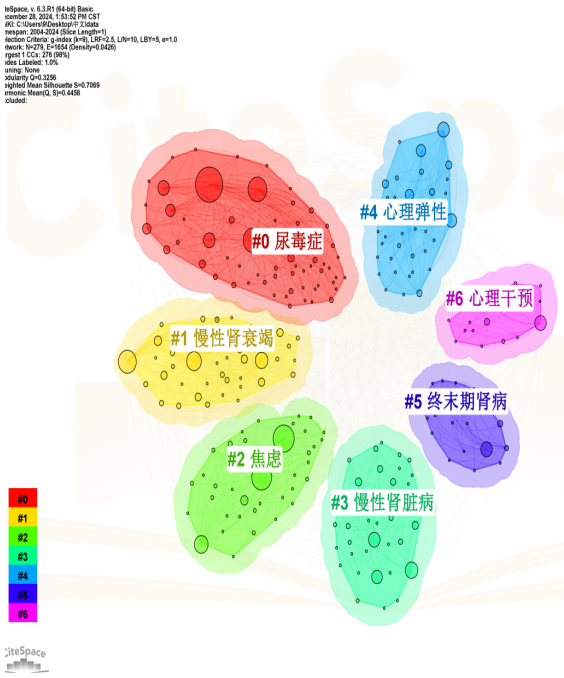

Figure 6. Chinese keyword cluster map

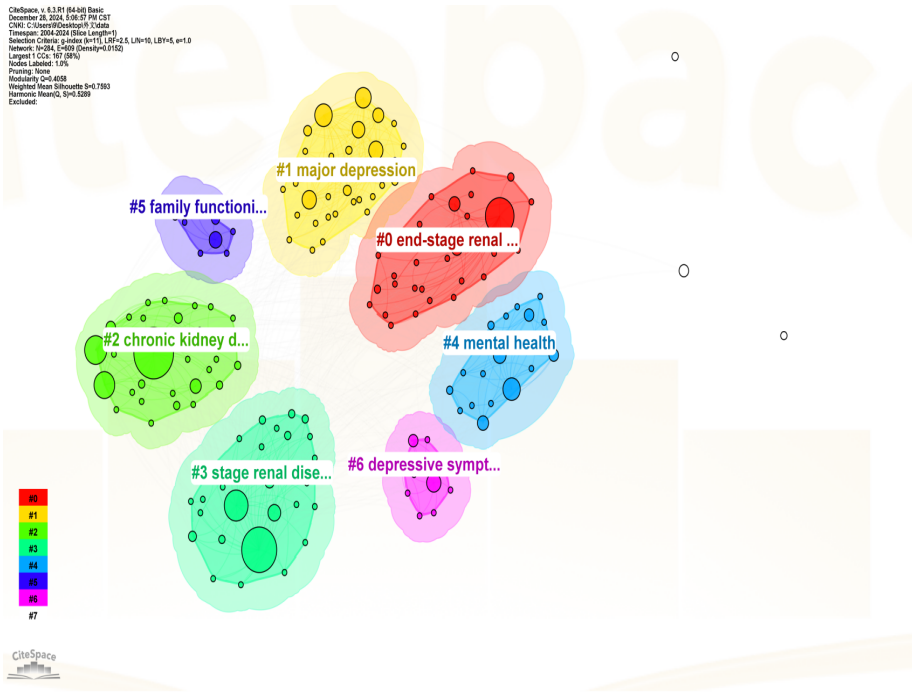

Figure 7. Foreign keyword cluster map

3.3.3. Keyword timeline analysis

Based on the keyword clustering results, a keyword timeline map was created to reflect the evolution of keywords within a cluster over time. A longer horizontal line segment indicates a longer duration of the cluster. Excluding clustering words related to the theme, the clusters in the domestic (**Figure 8**) keyword clustering analysis that

extended to the past two years were #0 Uremia, #2 Anxiety, #4 Psychological resilience, and #5 End-stage renal disease. In the foreign (**Figure 9**) keyword clustering analysis, the clusters that extended to the past two years were #0 End-stage renal disease, #3 Stage renal disease, #4 Mental health, #5 Family functioning, and #6 Depressive symptoms.

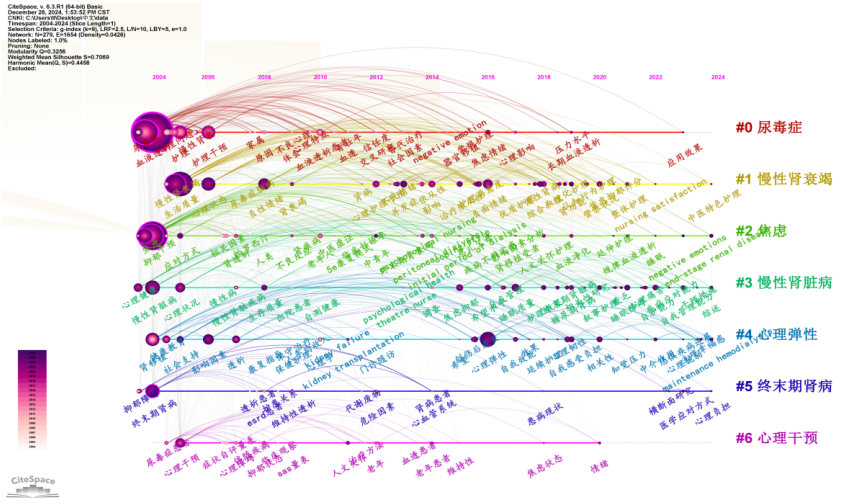

Figure 8. Chinese timeline map

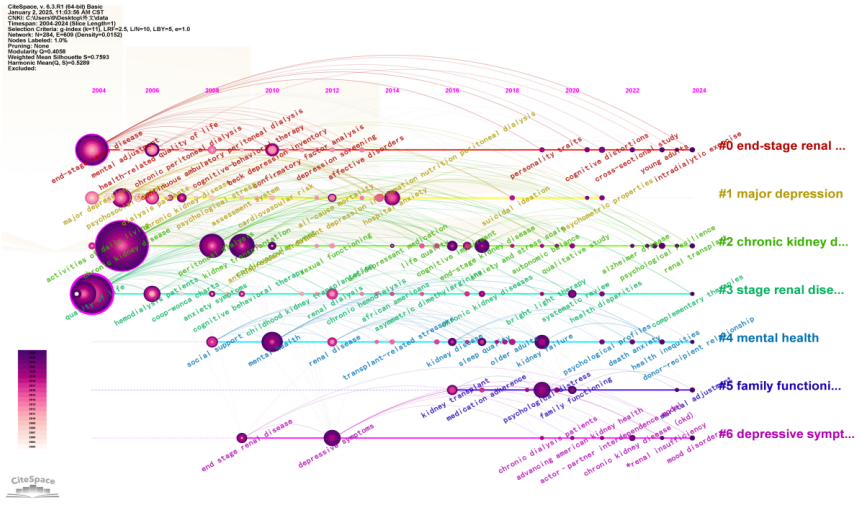

Figure 9. Foreign timeline map

3.3.4. Analysis of keyword emergence

Emerging keywords refer to those that appear frequently in a short period, reflecting changes in research hotspots and helping to predict trends in the field. The red lines indicate the years when a keyword is emerging, and their length represents the duration of the keyword's popularity. "Strength" denotes the intensity of emergence, with a higher value indicating greater influence of the keyword. By selecting "Burstness" in the control panel, the γ value is set to 1.0, while all other parameters remain at their default settings.

In Chinese literature (**Figure 10**), there are 25 emerging keywords, presenting three stages based on their

changes: From 2004 to 2014, emerging keywords included “psychological problems,” “nursing countermeasures,” “psychological analysis,” “psychological obstacles,” “psychological nursing,” and “psychological intervention,” focusing on analyzing patients’ psychological issues and providing psychological care. From 2014 to 2020, emerging keywords shifted to “compliance behavior,” “negative emotions,” “psychological state,” “sleep quality,” “treatment adherence,” and “nutritional status,” examining the impact of psychological states on patients’ sleep, nutrition, and treatment adherence.

From 2021 to 2024, emerging keywords included “psychological resilience,” “complications,” and “nursing effect,” focusing on patients’ nursing outcomes and psychological coping abilities in the face of adverse stress events. Depression, psychological problems, nursing countermeasures, psychological analysis, and psychological obstacles are among the longer-lasting emerging keywords, while psychological resilience, psychological problems, nursing, nursing intervention, and kidney transplantation have greater influence. Recent research hotspots center on psychological resilience, psychological state, treatment adherence, complications, and nursing effect.

Figure 10. Emergence map of Chinese keywords

In foreign literature (**Figure 11**), there are 15 emerging keywords, also presenting three stages: From 2004 to 2005, emerging keywords were “major depression,” “psychosocial factors,” and “behavioral compliance,” analyzing the impact of psychological states on patients’ treatment adherence. From 2006 to 2012, emerging keywords included “dialysis patients,” “end-stage renal disease,” “renal transplantation,” and “renal dialysis,” exploring research related to different renal replacement therapies. From 2014 to 2024, the focus shifted to patients’ psychosocial issues, with emerging keywords such as “hospital anxiety,” “psychological distress,” and “mental health.” Major depression, psychosocial factors, and dialysis patients are among the longer-lasting emerging keywords, while recent research hotspots concentrate on psychosocial distress, mental health, and end-stage kidney disease.

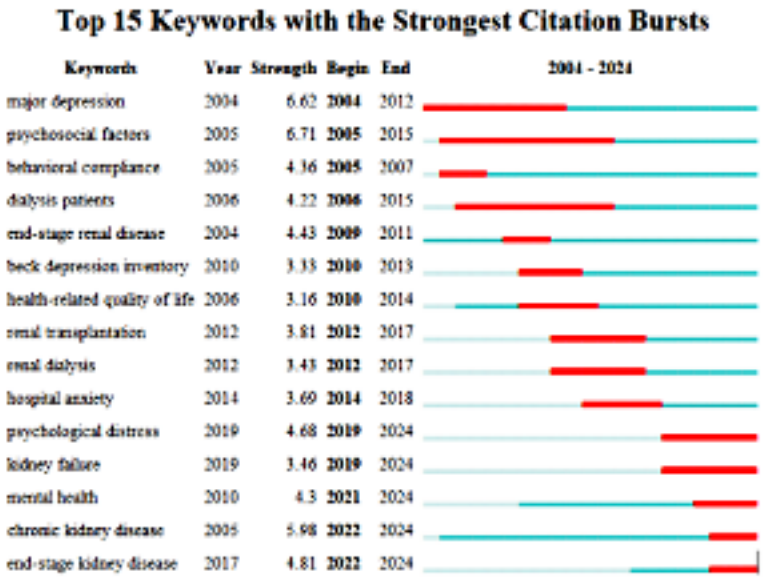

Figure 11. Emergence map of foreign language keywords

4. Discussion

4.1. Current research status

The number of publications in a research field can reflect the level of attention given to that field. From 2004 to 2024, there has been an overall upward trend in the number of research articles on the mental health of patients with CKD both domestically and internationally, indicating that mental health issues are receiving increasing attention in the management of this disease. Specifically, in Chinese literature, the peak number of publications was reached in 2021, while foreign literature peaked in 2023. This difference may be related to varying levels of investment and interest in chronic kidney disease research across different regions. The network of collaboration among authors facilitates interdisciplinary and cross-regional research exchanges. However, as can be seen from the figures, current collaborations among researchers both domestically and internationally are relatively fragmented, with most operating in independent research states and small team radiation ranges. Therefore, it is suggested that researchers strengthen cooperative exchanges, realize resource sharing, and carry out interdisciplinary and multi-professional collaborations to broaden research ideas and further promote the development of mental health research for patients with CKD.

Based on keyword co-occurrence and clustering maps, it can be seen that research on the mental health of patients with CKD, both domestically and internationally, is mainly focused on patients undergoing dialysis and those with end-stage renal disease. This may be because dialysis is the main replacement therapy for patients with end-stage renal disease, and these patients, who endure long-term dialysis treatment, are more prone to mental health issues. According to research, by the end of 2020, the number of hemodialysis patients in China had reached 690,000, an increase of 3.1 times compared to 2011, making China the country with the largest number of hemodialysis patients in the world [7]. Among adult patients with CKD, the proportions in CKD stages 1–2, 3, and 4–5 are 73.3%, 25.0%, and 1.8%, respectively. From this, it can be inferred that the prevalence rate for stages 1-3 is as high as 98.3%, indicating a large number of early-stage patients [8]. Therefore, while focusing on dialysis patients in the future, attention should also be paid to the psychological state of early-stage CKD patients,

and appropriate nursing interventions should be implemented to reduce the impact of psychological issues on the disease and effectively delay its progression.

4.2. Research hotspots

4.2.1. Anxiety and depression

Anxiety and depression are common among patients with CKD, with depression identified as the most prominent negative psychological issue faced by these patients [9, 10]. A systematic evaluation revealed that the overall incidence of depression among patients with CKD is 26.5%, and epidemiological data shows a continuous upward trend in its incidence [11]. The detection rates of anxiety and depression among patients undergoing maintenance hemodialysis are 16.38% and 34.48%, respectively [12]. An international multicenter study found that depressive symptoms are also widespread among CKD patients in various countries, but there are significant differences in their incidence rates, such as 2% in Japan and 21.7% in the United States [13]. These differences may be attributed to factors such as regional cultural variations, CKD staging, age, renal replacement therapy modalities (hemodialysis and peritoneal dialysis), research methods, and heterogeneity in assessment tools.

Anxiety and depression can not only cause neurological dysfunction and neuropathy but also reduce immune function, accelerate disease progression, lead to a decline in quality of life, and increase mortality [14]. Research has shown that depression is an important risk factor for increasing hospitalization rates and mortality among dialysis patients, even when dialysis is adequate [15]. For CKD patients not receiving dialysis treatment, moderate to severe depressive symptoms can accelerate the progression of renal function deterioration [16]. Many patients often experience anxiety and depression due to concerns about disease progression, poor treatment outcomes, and a significant decline in quality of life. Long-term treatment brings pain, social isolation, changes in social roles, loss of life goals, economic pressure, and other factors that can cause patients to lose the courage to live. Focusing on patients' psychological states and providing timely diagnosis and care for anxiety and depression can mitigate adverse consequences and improve outcomes. Wang *et al.* have found that strengthening sleep management for patients can promote the prevention and treatment of anxiety and depression in patients with CKD [17]. Shen *et al.* have proposed that mindfulness therapy can effectively improve the negative psychology of patients with CKD [18].

4.2.2. Resilience

The concept of resilience, also known as psychological resilience or toughness, was first established by American scholar Anthony *et al.* in the 1970s [19]. It specifically refers to an individual's ability to maintain or restore a normal psychological state when facing stress or trauma. Research has shown that good resilience not only effectively alleviates the impact of psychological obstacles but also enhances the body's resistance to diseases [20, 21]. Under the framework of contemporary positive psychology research, resilience is recognized as an important protective factor that promotes individual health development and has become a research hotspot in the field of psychology. Regarding the mechanism and influencing factors of resilience, existing research presents diversified theoretical perspectives. In the field of clinical medicine, Hou *et al.* found through analysis that resilience has a mediating effect between the level of hope and fatigue symptoms among hemodialysis patients, meaning that patients with high resilience can effectively regulate the negative impact of disease stress [22]. Similarly, Hou *et al.* research points out that resilience plays a key intermediary role between the social support system and various dimensions of patients' quality of life [23]. These findings provide empirical evidence for understanding the mechanism of resilience. From the perspective of developmental psychology, Felicity *et al.* combining longitudinal

and qualitative research, found that improving interpersonal relationships and cultivating personal strength traits (such as optimism and self-efficacy) can significantly enhance patients' resilience levels [24]. Shafiei *et al.* research further confirms that a well-established social support network can not only improve the resilience of terminal patients but also effectively alleviate their death anxiety [25]. As research progresses, intervention studies to promote resilience have gradually increased. Currently, intervention programs in clinical practice include cognitive nursing intervention, mindfulness therapy intervention, personalized psychological intervention, social support, and sandplay therapy. These interventions help alleviate patients' psychological obstacles and significantly improve their resilience levels through different pathways.

4.3. Research trends

4.3.1. Improving social support levels to promote physical and mental health of CKD patients

Social support refers to the emotional care, sense of self-worth, and material support that individuals obtain from others and society [26]. It includes three aspects: individual subjective experience, objective social support, and the utilization of social support [27]. Subjective experience refers to an individual's emotional experience of being understood, respected, and cared for; objective social support includes material aid and social relationship networks [28]. Among them, social relationship networks can be further divided into formal and informal support. Governments, institutions, businesses, and communities are considered formal support, while support from family, neighbors, friends, and colleagues is informal support [29, 30]. The utilization of social support reflects an individual's tendency to actively seek and accept help, and patients with high utilization are more likely to actively participate in social interactions [31]. It's worth noting that different individuals have varying degrees of social support utilization [32]. For example, some people may avoid or refuse support despite having a social support network, which can directly affect the actual effectiveness of the support system.

For CKD patients, the integrity of the social support system can directly affect disease prognosis. Issues such as dysfunction, economic pressure, and care dependency caused by the disease often lead to significant psychosocial distress. Research has shown that patients who lack effective social support are more prone to treatment resistance or even abandonment of treatment [33]. In addition, when encountering social isolation or discrimination, patients are prone to depression and social difficulties, which may accelerate the deterioration of renal function through neuroendocrine mechanisms [34]. On the contrary, a good family and social support system can effectively alleviate patients' psychological distress, improve their psychological endurance, and help them adjust to feelings of social isolation. For example, family and friends can provide emotional venting channels, helping patients express emotions, reduce stress responses, build treatment confidence, and positively impact treatment adherence and quality of life.

Governments and medical companies can use community hospitals and health service stations to improve the social support system, and also provide professional rehabilitation guidance and employment support to promote patients' return to society. Based on existing research, future clinical practice should focus on evaluating patients' social support levels, exploring the mechanisms of different forms of support, developing personalized support programs with a focus on strengthening informal support systems, and integrating medical, community, and family resources to form a comprehensive support system. This will promote the physical and mental health development of CKD patients and provide new practical ideas for psychosocial intervention.

4.3.2. Innovative nursing interventions to alleviate psychological barriers for patients with chronic kidney disease

Psychological nursing, based on the patient's psychological state, involves targeted nursing interventions that can improve patients' psychological barriers and create an optimal psychological state conducive to treatment and recovery. As understanding of the mental health issues facing CKD patients deepens, researchers have begun to explore diverse psychological nursing interventions, such as traditional Chinese medicine nursing, continuous nursing, cognitive behavioral nursing, high-quality nursing, individualized nursing, holistic nursing, and treatment adherence. Among these, traditional Chinese medicine nursing shows significant potential and advantages in improving the mental health of CKD patients. For instance, Shi pointed out in his research that high-quality nursing in traditional Chinese medicine can effectively alleviate generalized anxiety and depression in CKD patients, thereby improving their quality of life [35–37]. Tang *et al.* have expanded upon various traditional Chinese medicine intervention methods, offering multiple treatment options for hemodialysis patients with emotional disorders [38].

Meanwhile, the "Healthy China 2030" planning outline also clearly proposes to fully leverage the unique role of traditional Chinese medicine in the prevention and treatment of chronic diseases, innovate and develop traditional Chinese medicine's preventive healthcare services, and promote the inheritance and innovation of traditional Chinese medicine. Combining the unique advantages of traditional Chinese medicine with innovative approaches from modern medicine enhances the promotion of both physical and mental health in patients with chronic kidney disease (CKD). Continuous nursing, which extends medical and nursing services from hospitals to families and communities, has developed gradually in China since 2003 [39]. It includes various forms such as telephone consultations, home visits, online consultations, community health lectures, and patient support groups. With the rapid development of mobile medical information technology, intelligent continuous nursing models can achieve more precise psychological state monitoring and intervention, significantly improving the accessibility and effectiveness of nursing care [40].

Furthermore, multiple studies have verified the positive effects of compound psychological nursing. Wang *et al.* have confirmed that health education combined with focused psychological nursing can effectively enhance medication adherence among CKD patients, improve disease awareness, and reduce negative emotions [41]. Similar research conclusions have been reached by Tan *et al.* and Zhang et al., further confirming the positive effects of this nursing model [42, 43]. Xu pointed out that cognitive behavioral group psychological intervention has a significant effect on hemodialysis patients, which can not only effectively alleviate anxiety and depression but also improve patients' psychological resilience and subjective well-being [44]. These innovative interventions provide important references for promoting the mental health of CKD patients. Future research should focus on exploring optimal combinations of different intervention programs and longitudinally tracking long-term intervention effects to provide a more reliable evidence-based basis for clinical practice.

4.4. Limitations

This article only searched for literature from January 2004 to December 2024, potentially missing some important literature and causing deviations in the results. Additionally, the CiteSpace software analysis only selected authors and keywords as node types, without analyzing co-citation or author contribution. Future research could expand the scope of the study and explore the publishing institutions, co-citations, author nationality, and author contribution to improve the comprehensiveness and accuracy of the research results.

5. Conclusion

In summary, this study utilized CiteSpace software to review research on the mental health of patients with chronic kidney disease over the past 20 years, objectively presenting the current research status, hotspots, and trends in this field, and providing references for future research. Through keyword analysis, it was found that negative psychological states such as depression and anxiety, as well as quality of life, are the main research hotspots in patients with chronic kidney disease. Hemodialysis, peritoneal dialysis, and end-stage renal disease patients are the main research subjects. Additionally, foreign studies tend to focus more on psychosocial distress and social support systems, while domestic scholars are more focused on exploring psychological resilience training and nursing intervention measures. From a methodological perspective, most of the current literature at home and abroad consists of cross-sectional studies, and there is a lack of high-quality longitudinal follow-up studies. The research methods are relatively homogenous, with insufficient application of qualitative and mixed research methods. Intervention studies often suffer from small sample sizes and short intervention and follow-up periods, making it difficult to observe the continued effects of interventions. In the future, research design should be gradually optimized. Drawing on effective intervention programs from abroad, it is possible to develop targeted measures that align with China's medical and cultural context. This approach continuously promotes the translation of basic research findings into clinical practice, thereby rapidly and efficiently advancing the research level in this field within China.

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Disclosure statement

The authors declare no conflict of interest.

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