

Visual Analysis of Geriatric Depression Treatment Based on CiteSpace

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Abstract. CiteSpace software was used to conduct scientometric analysis on the research and intervention measures of geriatric depression (GD) at home and abroad, revealing the research hotspots, evolution process and development trend of Chinese and Western medicine. It was found that the United States remains absolutely dominant, regardless of the breadth of the research area, the number of publications, or the influence. Western medicine has focused its recent research on mortality in a number of domains, including instrumental activity, cognitive assessment, international society, and treatment response. Chinese medicine, on the other hand, focuses on investigating the pathophysiology and holistic treatments of depression in older adults. Traditional Chinese medicine (TCM) treatment of geriatric depression exhibits the qualities of minimal toxicity and side effects, minimal or no trauma, and evident clinical results. As a global public health problem, the active promotion of inter-country cooperation and joint interdisciplinary interventions is the development trend.

Keywords: Geriatric depression; Treatment; Visual analysis; CiteSpace.

1. Introduction

The term "geriatric depression" primarily describes a group of neurological conditions that typically appear in people 60 years of age or older. Apathy, reduced attention span, memory loss, sluggish thinking, and cognitive impairment are some of the main clinical signs of geriatric depression [1]. Elderly people suffering from hypertension, stroke, diabetes, coronary heart disease, and cancer suffer from depression to varying degrees, manifesting as co-morbid depression [2]. Luppá et al. found that GD affects 4.5 % to 37.4 % of older adults globally [3]. In China, the prevalence of GD is about 23.6 %, and may even exceed 32.55 % [4]. This figure can get as high as 81.1% in India [5]. Older persons with depression experience worse quality of life as well as increased suicide thoughts. Over 65-year-old depressed individuals have a 5–10% suicide rate, and 80% of suicides over 74 had depressive symptoms [6]. High morbidity, disability, mortality, heterogeneity and complexity of the course are the distinguishing features of GD [3, 4]. WHO predicts that the global population over 60 years of age will reach 1.4 billion by 2030 [7]. In the face of increasing global population aging, GD has become a public health issue of common concern worldwide.

CiteSpace software has been widely recognized in current bibliometric studies and visualization and analysis [8]. The literature on TCM and Western medicine in the treatment of geriatric depression was scientometric analyzed, compared, and visualized in this study using CiteSpace software. The differences, hotspots and development trends of related studies at home and abroad in recent years are discussed to provide a reference for the in-depth study of geriatric depression.

2. Methodology

2.1. Literature sources

This study retrieved English and Chinese literature in Web of Science and CNKI databases, respectively. In English literature, the topics were "geriatric depression" and "treatment", and the language restriction was "English". The topics of the Chinese literature search were "geriatric depression" and "traditional Chinese medicine", and the language restriction was "Chinese".

2.2. Search strategy

The English literature was searched from January 2013 to December 2022, and the Chinese literature was expanded from January 2003 to December 2022 due to the small number of Chinese literature. Conference papers, letters, newspapers, etc. were excluded from the above search. In the end, 942 and 138 relevant papers were obtained respectively.

2.3. Data analysis

Visualization and analysis were performed using CiteSpace 6.2.R4. The keyword was selected as the node type.

3. Visual analysis results

3.1. Keyword visual analysis

3.1.1. Keyword co-occurrence analysis

Keyword co-occurrence analysis represents the frequency of keyword co-occurrence in a certain field [8]. Higher frequency and centrality reveal that it receives more attention in the field. Here, larger nodes represent a higher frequency of keywords; more node connecting lines represent stronger centrality of different keywords. It is generally accepted that keywords with centrality greater than or equal to 0.1 indicate that these keywords have received a high level of attention.

Figure 1 and Figure 2 show the co-occurrence of keywords in the Chinese and English literature on the treatment of depression in the elderly, respectively. By high word frequency calculation, there are three keywords with centrality greater than 0.1 in Chinese literature, which are depression (0.46), Chinese medicine (0.19), and old age (0.13). These three keywords continue to be virtually as central, even if the retrieval time is in line with the WoS database. However, none of the English literature keyword centrality values reached 0.1, and the top 5 were mortality (0.09), impairment (0.09), association (0.08), mental health (0.08), and cognitive function (0.07) in order.

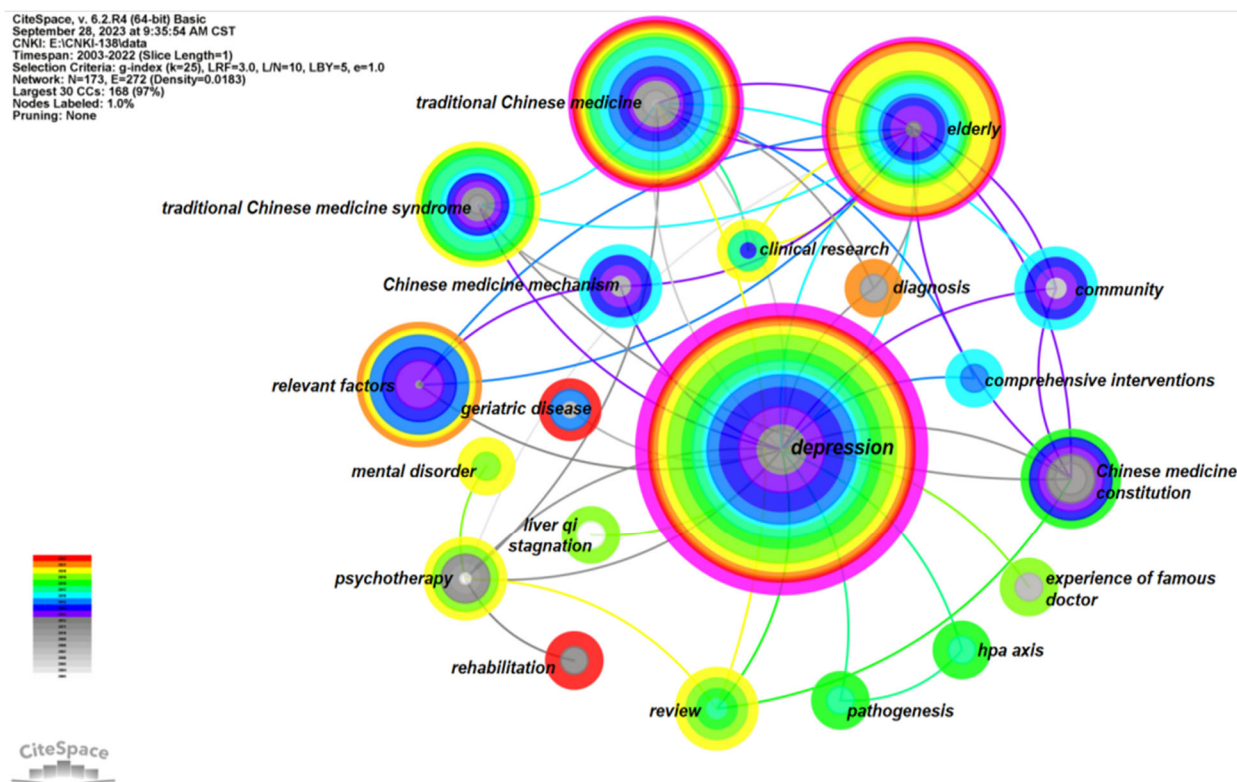


Fig 1. Keyword co-occurrence graph in CNKI on the treatment of geriatric depression.
(Photo Credit: Original)

There are also differences in research hotspots both domestically and internationally. More attention is paid to various influencing factors in China, such as the impact of various TCM, physical therapy methods, and auxiliary treatment methods on the symptoms of GD. Research conducted abroad has a broader focus and emphasizes more closely the correlations between different diseases and GD.

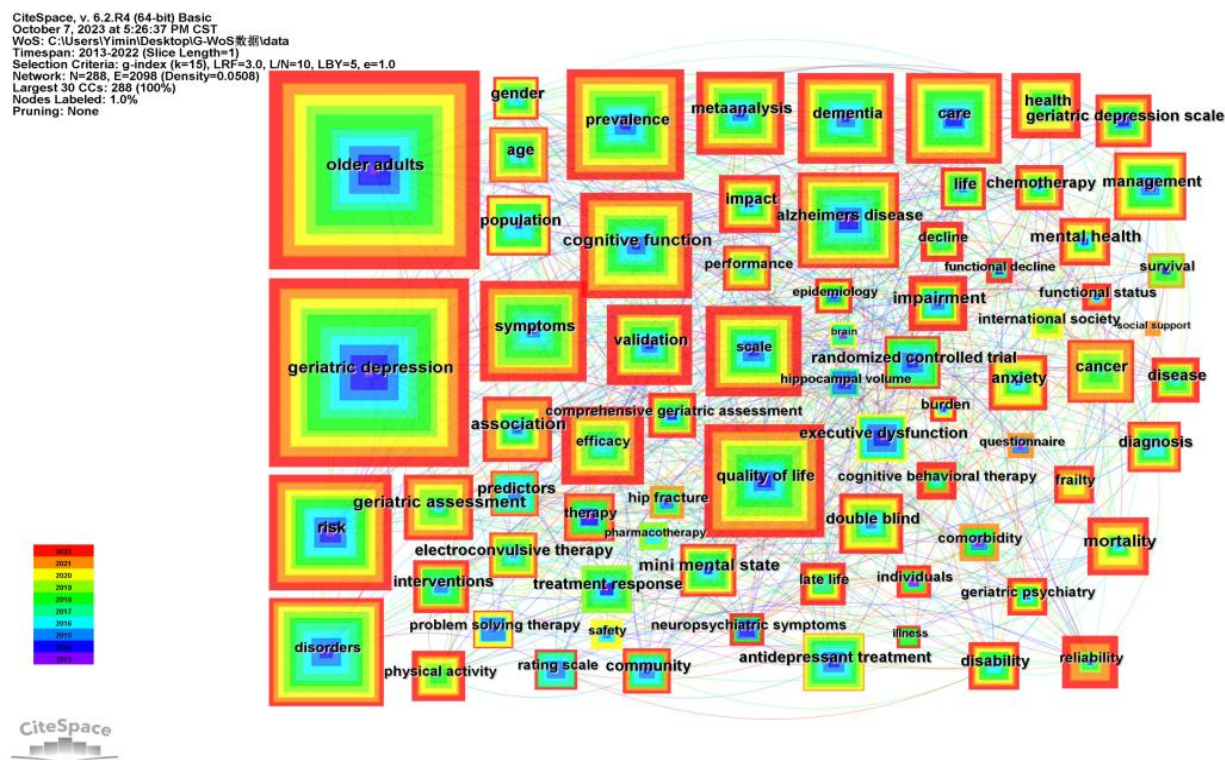


Fig 2. Keyword co-occurrence graph in WoS on the treatment of geriatric depression.
(Photo Credit: Original)

3.1.2. Keywords timeline view analysis

The keyword timeline view not only allows for clustering analysis of keywords but also describes the historical evolution of keywords in the clusters. It is generally accepted that when the modularity Q is greater than 0.3, the clustering structure is significant. When the silhouette value S is greater than 0.5 or 0.7, the clustering is reasonable or convincing [8].

In this study, the Q and S values were $0.6135 > 0.3$ and $0.8809 > 0.7$, $0.3083 > 0.3$ and $0.6321 > 0.5$ in Chinese and English literature, respectively, indicating the significance of the keyword clustering structure and the validity and reliability of the clustering results. Seven natural clusters were identified from the literature in Chinese and English, respectively, as Figures 3 and 4 demonstrate. Nonetheless, the clustering motifs differ from one another.

Figure 3 shows the keyword clustering of Chinese literature. For example, cluster #0 is based on the theme of TCM, including the keywords of TCM syndrome, symptomatic stage, combination therapy; Cluster #2 is based on the theme of geriatric depression, including the keywords of Chinese medicine pathogenesis, Chinese medicine care and related factors. Other clustering tags included #1 community, #3 review, #4 hpa axis, #5 heart-spleen deficiency, and #6 controlled experiment.

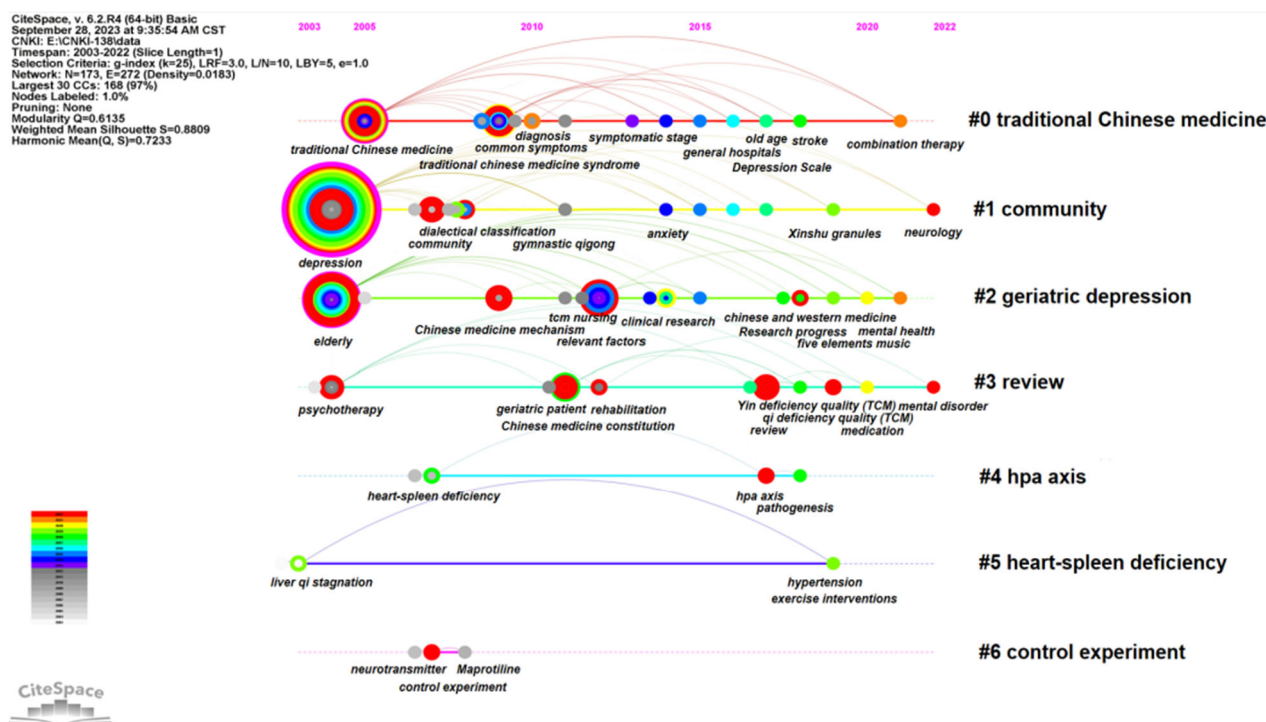


Fig 3. A timeline view of keywords in CNKI on the treatment of geriatric depression.
(Photo Credit: Original)

Figure 4 shows the clustering of keywords in the English literature. The first category clustering labels (#0, #1, #3, #4, #6) target the theme of quality of life and illness in geriatric depression patients, including keywords such as geriatric assessment, frailty, Alzheimer's disease, back pain; the second category clustering label (#2) is group therapy, including the keyword keywords such as interventions, anxiety physical activity, psychological distress, disturbances, risk factor. Depressed symptoms is the third category clustering label (#5), which contains phrases like geriatric psychiatry, fear of falling, sleep, and abuse.

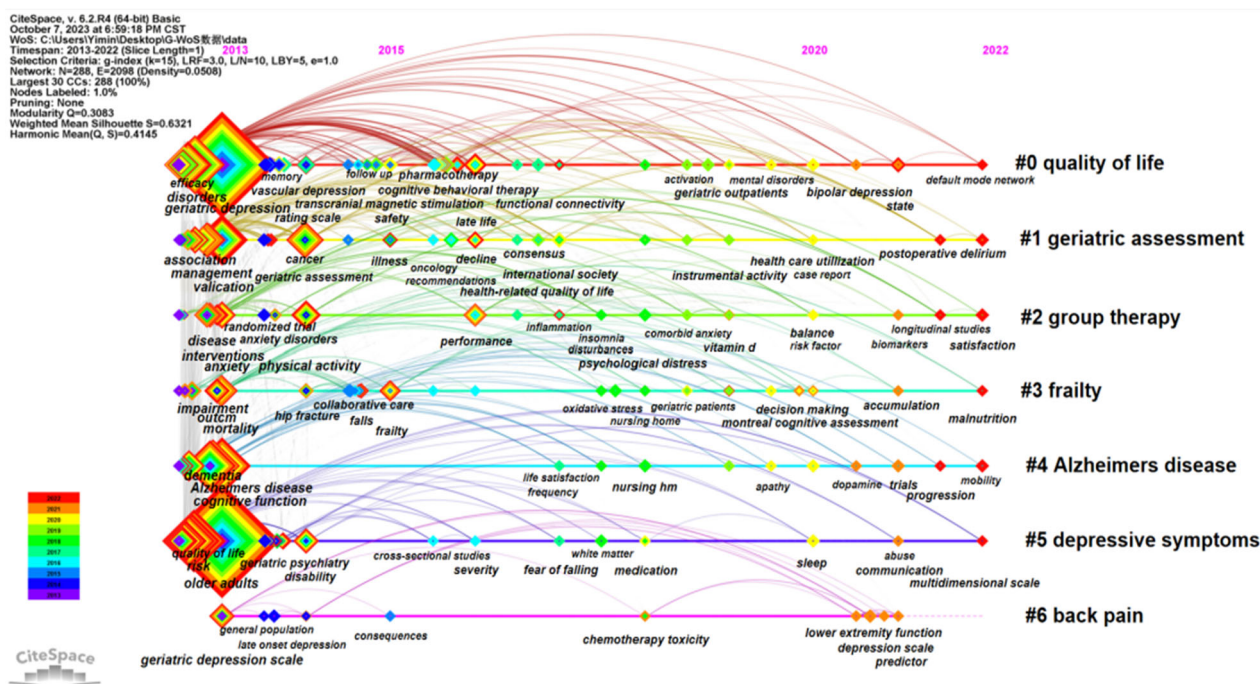


Fig 4. A timeline view of keywords in WoS on the treatment of geriatric depression.
(Photo Credit: Original)

3.2. Analysis of keywords emergence map

In CNKI and WoS databases, keyword emergence maps were obtained, as shown in Fig.5 and Fig.6, respectively. The keyword "relevant factors" is the strongest emergent strength in CNKI about TCM treatment of GD in the last 20 years, with a value of 3.08. In recent years, the focus has been on exploring comprehensive interventions, pathogenesis, and the elderly. The keyword "predictors" is the strongest emergent word in the English literature with a value of 5.35. In contrast to the focus of the domestic literature, the foreign literature in recent years has focused more on international society, health-related quality of life, vascular depression, frailty, and morality.

Top 10 Keywords with the Strongest Citation Bursts

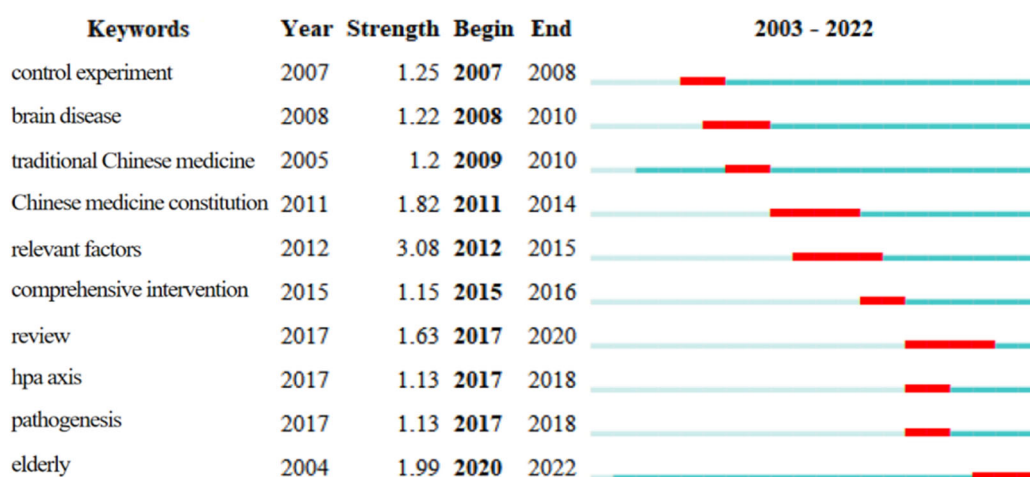


Fig 5. Keyword bursts in CNKI on the treatment of geriatric depression.
(Photo Credit: Original)

Top 10 Keywords with the Strongest Citation Bursts

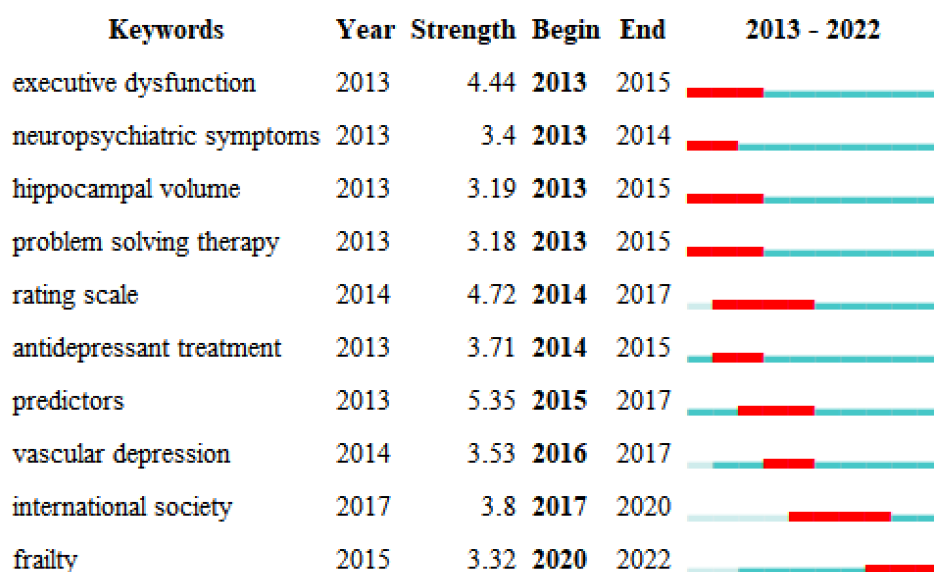


Fig 6. Keyword bursts in WoS on the treatment of geriatric depression.
(Photo Credit: Original)

4. Discussion

According to keyword co-occurrence and cluster analysis, the following topics are the focus of current geriatric depression research: (1) evaluation of geriatric depression, encompassing older adult demographics, depression scales, predictors, risk, and risk factors, among other things; (2) psychosocial evaluation, encompassing quality of life, later life, anxiety disorders, depressive disorder, and other things; (3) vulnerability, including various dysfunctions (e.g., executive dysfunction, cognitive dysfunction), cancer (e.g., colorectal cancer, breast cancer), heart failure, diabetes; (4) interventions, including treatment response, follow up, clinical trials, validity, physical activity, etc.; (5) prevalence and lethality assessment, including mortality, survival, and meta-analysis.

Most data show that the current global understanding of the pathogenic mechanisms and interventions for GD remains inadequate and treatment lags [9]. In contrast to younger depressed patients, older patients can be depressed based on the suffering associated with a large number of underlying diseases, i.e., co-morbid geriatric depression. In turn, depression accelerates the underlying disease in elderly patients, thus creating a vicious cycle. The significant heterogeneity is also reflected in the differences between younger people, as well as in older individuals with different underlying diseases and different levels of depression. This leads to the complexity of the course and treatment of GD. Moreover, the evolution of the intervention process has gone from early first-line treatment with SSRI antidepressants, to a combination of medication and psychosocial therapy, to medication, psychotherapy, and physical therapy (including exercise therapy, electroconvulsive therapy, etc.) [2, 10]. It is certain that the intervention of GD tends to be an interdisciplinary and combined therapeutic approach.

China's research on elderly depression is relatively weak in terms of research power and scale when compared to research conducted in most developed countries. However, TCM has been shown to be effective in treating elderly depression. Geriatric depression falls under the umbrella term "depressed syndrome" in traditional Chinese medicine. Its pathology is typified by depression and stagnation of qi, which results in symptoms of blood, heart, and spleen deficit, qi deficiency, etc. The elderly, however, tend to be physically weak, distended qi disorders, and an increase in underlying diseases, which makes them prone to depression. A meta-analysis found that the proportion of elderly depressive symptoms with heart-spleen deficiency reached 77.8%, and that TCM internal medicine treatment for GD has fewer adverse reactions and toxic side effects and has a multi-component, multi-target, multi-pathway antidepressant effect [11]. Acupuncture therapy in Chinese medicine, on the other hand, achieves the effects of unblocking meridians and collaterals, harmonizing yin and yang, and tranquilizing the mind through the direct stimulation of human acupoints. It is now known that acupuncture therapy is less painful than electroconvulsive therapy and less expensive than repetitive transcranial magnetic stimulation, even though no research has compared the two treatments [12]. In conclusion, dialectical treatment is fundamental of cognitive disease in TCM, and TCM treatment is characterized by internal and external co-treatment, interventions that can be flexibly matched, safe, and low cost.

5. Future Directions

From now on, firstly, families, communities, and medical institutions need to pay more attention to the diagnosis, treatment, and care of geriatric depression. Secondly, we need to increase investment in research based on the medical characteristics and social environment of our countries to expand the scope of research and improve patients' adherence to treatment. Thirdly, cooperation between countries should be strengthened, such as combining TCM techniques (e.g., internal administration of Chinese herbs, acupuncture treatment, Tai Chi exercises, etc.) with Western medicines pharmacological, psychological, and physical therapy. Fourthly, by carrying out scientific popularization, we protect patients' self-esteem, improve their cognitive ability to face the underlying disease and the depressive disorder caused by the underlying disease and reduce hypochondriasis.

6. Conclusions

Geriatric depression is a significant issue for global public health. Patients are more vulnerable and run a higher risk of morbidity and death when organic disorders and depression in the face of advanced age coexist. Improving family companionship, social participation, social support, and medical rehabilitation systems to reduce patients' cognitive impairment is extremely challenging. Exploring treatment options and interventions that are more acceptable to older patients remains a goal that countries seek to work towards.

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