

# Visual Analysis of the Current Situation of Elderly Care for Empty-Nest Seniors in Rural China Based on CiteSpace

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**Abstract:** *Objective:* To analyze the hotspots and trends in the current state of care for rural empty-nest elderly in China over the past two decades, providing insights for future research on this topic. *Methods:* Chinese literature related to the care of rural empty-nest elderly was retrieved from the China National Knowledge Infrastructure (CNKI) database, covering the period from January 2005 to December 2024. Citespace software was employed to generate visualizations of publication volume, author collaboration patterns, keyword co-occurrence, clustering, and emergent themes. *Results:* A total of 808 articles were included. Publication volume exhibited a trend of “slow growth—rapid surge—gradual decline”, with room for improvement in author collaboration. Co-occurrence and clustering maps revealed that research hotspots primarily revolved around issues such as care provision, security, services, and influencing factors for rural empty-nest elderly. *Conclusion:* Research on elderly care for rural empty-nest elderly in China has transitioned from foundational conceptual studies to a stage of substantive development. Establishing a three-dimensional network integrating “care strategy innovation, technology empowerment, and policy coordination” is key to addressing

**Keywords:** Rural areas; Empty-nest seniors; Current state of elderly care; Visual analysis

**Online publication:** Apr 7, 2026

## 1. Introduction

Due to the accelerated pace of urbanization, uneven socioeconomic development between urban and rural areas, and the combined effects of large-scale population migration, China’s aging population is increasingly exhibiting a pronounced urban-rural inversion, with rural areas now surpassing urban areas in aging severity, a trend whose gravity continues to intensify<sup>[1]</sup>. Statistics indicate that by 2024, China’s population aged 60 and above will reach 310 million, accounting for 22% of the total population. Among them, 84 million reside in rural areas, where the aging rate is significantly higher than in urban areas<sup>[2]</sup>. While urban elderly care systems were established earlier and are relatively well-developed, rural areas lag significantly in related infrastructure development, making their

elderly care challenges more complex and formidable <sup>[3]</sup>. To systematically grasp research trends in China's rural empty-nest elderly care landscape, this study employs CiteSpace visualization software to comprehensively review and analyze relevant literature. The aim is to clarify research hotspots, frontiers, and development trends, thereby providing reference for subsequent academic exploration and policy formulation.

## **2. Data and methods**

### **2.1. Data sources and screening**

Data for this study were sourced from the China National Knowledge Infrastructure (CNKI) database, retrieved from January 2005 to December 2024. The Chinese search terms were: “rural empty-nest elderly OR rural homebound elderly OR rural empty-nest seniors” AND “elder care OR current state of elder care”.

#### **2.1.1. Inclusion criteria**

- (1) Literature related to the current state of elder care for rural empty-nest elderly;
- (2) Resource types, journals and theses

#### **2.1.2. Exclusion criteria**

- (1) Duplicate literature
- (2) Incomplete literature
- (3) Conference papers, call for papers, reports, and similar materials;
- (4) Literature inconsistent with the research topic.

#### **2.1.3. Processing data source**

Following inclusion and exclusion criteria, the themes, abstracts, and keywords of retrieved literature were reviewed. Data were imported into Citespace software for deduplication, yielding 808 valid articles.

## **2.2. Research methods**

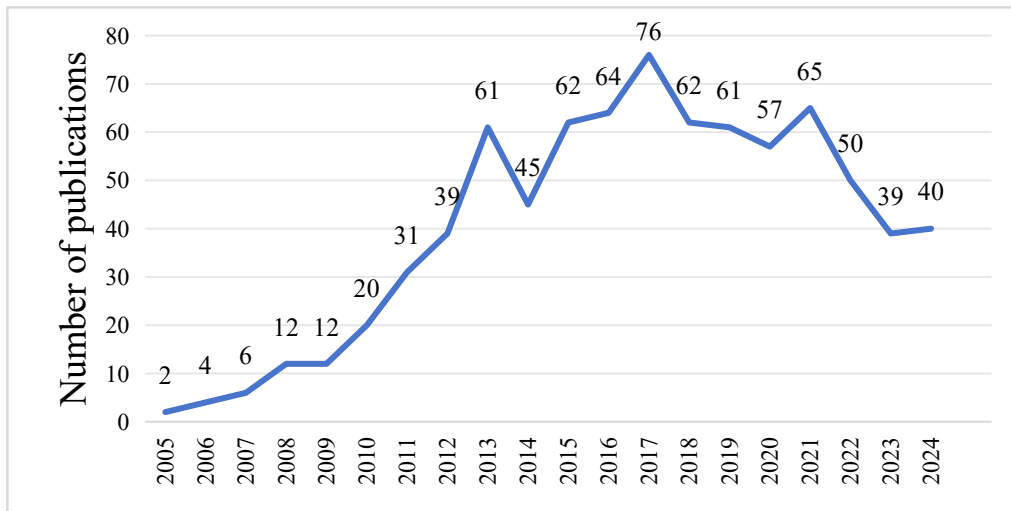
This study employs the knowledge mapping software Citespace to extract key information, research hotspots, and emerging trends regarding the current state of elderly care for empty-nest seniors in China. This is achieved by analyzing literature volume, author collaboration patterns, keyword co-occurrence, clustering, and emergent themes.

## **3. Results**

### **3.1. Distribution of publications**

Through effective retrieval, 808 documents were obtained, including 501 journal articles and 307 master's/doctoral theses. A line chart was plotted based on publication dates (see **Figure 1**). The chart indicates that from 2005 to 2009, the number of publications on elderly care for empty-nest seniors grew slowly, reflecting an exploratory phase. This was largely because the social phenomena of rural population aging and household emptying had not yet fully manifested, with academic research sensitivity and alignment with societal needs still in their infancy <sup>[4]</sup>. From 2010 to 2017, publication volume experienced explosive growth, surging from 20 to a peak of 76 papers,

the fastest and most concentrated growth period. During this phase, urban migration intensified as rural laborers migrated en masse to cities, causing a sharp rise in empty-nest elderly populations and bringing eldercare issues to the forefront. From 2018 to 2024, publication volume gradually declined. This shift reflects dynamic adjustments in research focus rather than diminished importance of elderly care issues. It likely stems from substantial prior research accumulation, prompting some scholars to pivot toward more specialized domains such as smart elderly care in rural areas and age-friendly renovations.



**Figure 1.** Annual publication volume chart on research into the current state of elderly care for empty-nest seniors in rural China.

### 3.2. Distribution of author collaboration networks in the literature

Collaboration primarily occurs within institutions, but links between authors are relatively dispersed, indicating that communication and cooperation among scholars still require further enhancement <sup>[5]</sup>. According to Price’s theory, an author becomes a core contributor in this field upon publishing  $m$  papers. Using the formula  $m = 0.749(\eta_{\max})^{1/2}$ , where  $\eta_{\max}$  represents the maximum publication volume of authors, and the highest publication volume in this study being 7 papers,  $m$  is calculated as 1.9 <sup>[6]</sup>. Thus, authors with  $> 2$  publications are considered core contributors in this field. Statistics reveal 38 core authors in this field. Among them, author Bi Hongxia has the highest publication count (7 papers), followed by scholar Nie Zhiping (5 papers). This indicates a relatively small number of highly productive authors in this field.

### 3.3. Co-occurrence map of document keywords

Using keywords as nodes in Citespace analysis, this study obtained a co-occurrence map of keywords related to the current state of elderly care for rural empty-nest seniors in China, as shown in **Figure 2**.

**Figure 2** presents the keyword analysis results in a “dendrogram” format: the size of each dendrogram corresponds to the keyword’s frequency of occurrence; the color transition from inner to outer rings reflects temporal shifts in keyword activity; and the thickness of a dendrogram within a specific time interval is proportional to the keyword’s frequency during that period. As can be seen from **Figure 2**, keywords such as “rural empty-nest elderly”, “empty-nest elderly”, “rural areas”, “old-age security”, “elderly care issues”, “elderly care services”, and “mutual-aid elderly care” occupy important positions in the research literature. These keywords are not only the absolute core of the literature collection, but also establish extensive connections with directions such

as “home-based care”, “elderly care models”, “spiritual support”, “countermeasures”, and “influencing factors”, forming a complex network structure. This indicates that the research field on the current situation of elderly care for rural empty-nest elderly in China is continuously becoming more comprehensive and mature.

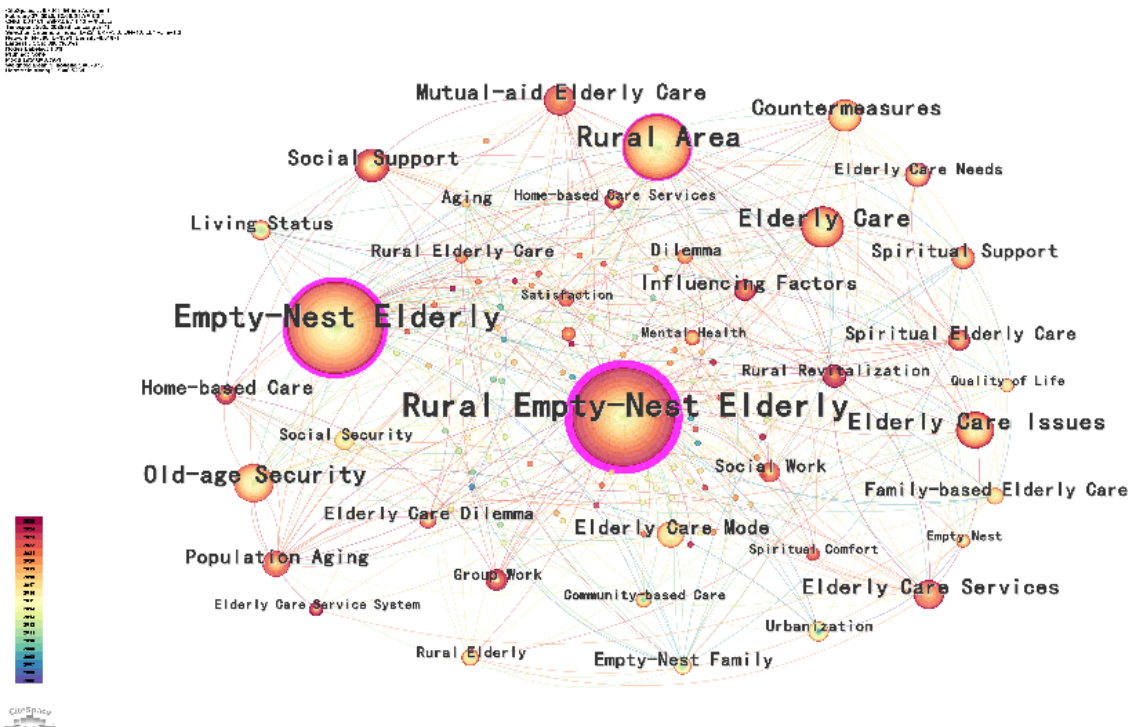


Figure 2. Co-occurrence map of keywords in research on the current state of elderly care for empty-nest seniors in rural China.

### 3.4. Keyword clustering map of literature

Using CiteSpace to perform keyword clustering analysis on relevant literature, hierarchical clustering was applied based on keyword similarity levels [7]. This aims to reveal the intrinsic connections among thematic keywords in studies concerning the current state of elderly care for rural empty-nest seniors, as detailed in Figure 3.

As shown in Figure 3, this study formed 11 keyword clusters numbered #0 to #10. Research in this field has developed a multidimensional, multi-tiered framework centered on the core theme of rural empty-nest seniors (#0). Studies focus not only on the empty-nest senior population itself, examining the fundamental challenges of home-based care practices and rural eldercare (#1), but also delve into the limitations of family-based eldercare models and the actual living conditions of seniors (#2). Concurrently, they actively explore mutual-aid eldercare as a novel model suited to rural contexts, emphasizing the crucial role of social support in addressing aging (#3). At the micro level, research examines how key factors like mental health and satisfaction impact care quality (#4), extending into spiritual care to prioritize emotional fulfillment and quality-of-life enhancement for the elderly (#5). Practically, studies explore care service system development and social work interventions within rural revitalization contexts (#6), directly addressing diverse care challenges arising from urbanization-driven empty-nest households (#7). Within the macro context, research positions rural eldercare within the broader trend of population aging, exploring countermeasures like community-based care (#8). It simultaneously addresses top-level design and foundational safeguards, focusing on establishing and refining eldercare security systems (#9). Additionally, it examines pathways to enhance the livability of rural eldercare environments from a living

conditions perspective (#10). Collectively, this forms a comprehensive research framework spanning core groups to diverse models, and from micro-level needs to macro-level systems.

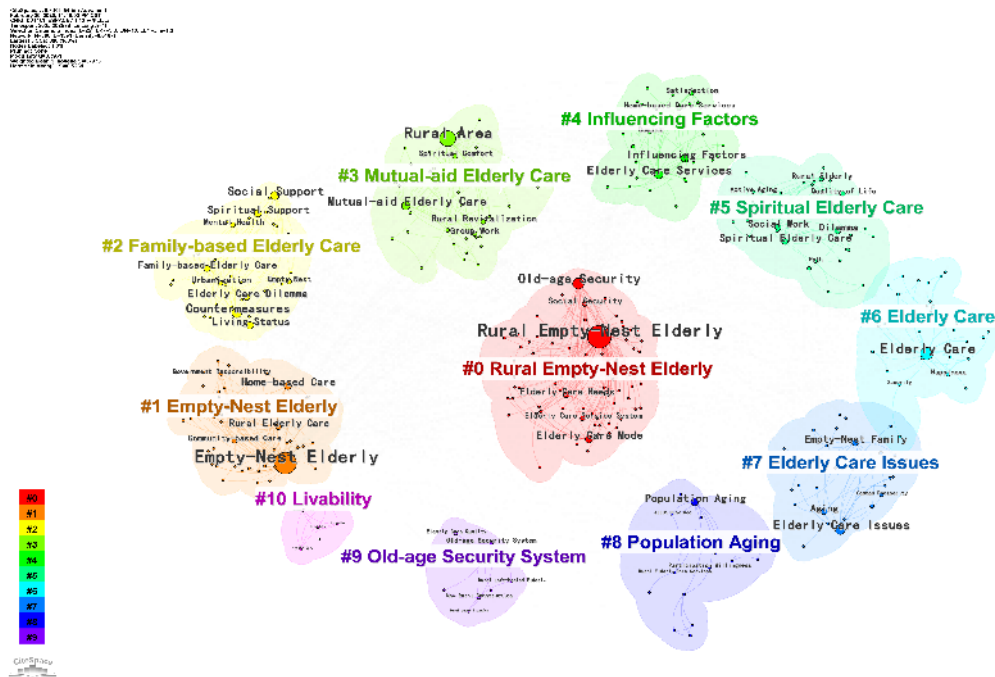


Figure 3. Keyword clustering map of research on the current state of elderly care for empty-nest seniors in rural China.

### 3.5. Keyword burst analysis of literature

Burst terms refer to keywords whose frequency of occurrence rises significantly within a specific time period. By analyzing their burst strength and dynamic changes, this study can depict the evolutionary trajectory of research frontiers, thereby providing a basis for predicting future research directions [8]. Among the burst terms, the most long-lasting hotspots include Influencing Factors, Mutual-aid Elderly Care, Elderly Care Services, and Spiritual Support, which have remained in a high-impact burst phase since 2019, representing the current and future research trends.

## 4. Discussion

### 4.1. Insights from research hotspots on the current state of elderly care for rural empty-nesters

#### 4.1.1. Expanding the scope of needs: holistic coverage from material security to mental well-being

As physical functions decline with age and economic security becomes insufficient, empty-nesters increasingly rely on intergenerational financial support from their children. Intergenerational financial support from children is a critical factor in safeguarding the quality of life for empty-nest seniors, effectively helping them mitigate poverty risks stemming from insufficient income or health issues. Therefore, it is essential to encourage children to strengthen their financial care for the elderly. When necessary, government agencies may clarify children’s intergenerational support obligations through legal regulations and institutional frameworks [9]. In recent years, China’s rural pension insurance system has been rapidly expanded and gradually popularized, with the basic pension level steadily increasing. This has effectively improved the economic security of empty-nest seniors.

Additionally, the children and society should pay attention to the emotional needs of rural empty-nest seniors. Due to their children working away from home, these seniors live alone and receive less care and companionship from their children. This can easily lead to feelings of isolation and disconnection from society, thereby affecting their mental health. Research indicates<sup>[10]</sup> that feelings of isolation are inversely proportional to the self-care capabilities of rural empty-nest seniors. Prolonged exposure to isolation stemming from loneliness and helplessness often diminishes their confidence in managing daily challenges. Therefore, strengthening rural infrastructure and organizing diverse cultural, educational, and recreational activities, such as establishing senior associations and interest clubs, which is crucial. Teaching seniors to use smartphones and social media platforms, while integrating resources from village doctors, volunteers, and their children, enables them to initiate health consultations and request daily assistance with simple mobile commands. This approach breaks their emotional isolation, enhances their sense of social belonging, and ensures more rural empty-nest seniors can enjoy a high-quality later life.

#### **4.1.2. Diversified elderly care strategies: from single-subject to multi-subject collaborative model innovation**

Family-based care remains the dominant model in China's rural areas, centered on adult children providing financial support and daily care for their elderly parents. However, this traditional approach faces severe challenges due to rural industrial restructuring, significant labor outflow, and shifting family structures, rendering it unsuitable for all rural regions. Consequently, new models of eldercare are emerging, such as social eldercare, self-reliant eldercare, and mutual-aid eldercare, to overcome the limitations of a single-model approach<sup>[10]</sup>. Social eldercare leverages the participation of governments, markets, and social organizations to fill professional gaps in family-based care. Elderly care enterprises are integrating rural ecological advantages, with some regions exploring distinctive models like "retirement tourism" and "wellness agriculture". These initiatives drive upgrades in rural eldercare facilities while boosting employment and income. Self-reliant care centers on the capabilities of the elderly themselves, enabling autonomous care by activating the labor value and self-reliance of rural empty-nest seniors. For instance, younger seniors in relatively good health can engage in small-scale farming and animal husbandry using rural land resources, generating income while maintaining physical fitness. Mutual aid eldercare, as an emerging model, demonstrates value across economic support, medical assistance, daily care, and emotional comfort. Typical practices include the "time bank" model, where younger seniors provide services like shopping, medical accompaniment, and companionship to older seniors. Accumulated "service time" is deposited into accounts, to be redeemed for equivalent care services when needed in the future. This approach activates local human resources and effectively alleviates the challenges of "shortage of professionals and high operational costs" in rural elderly care services. Addressing the care dilemmas of rural empty-nest seniors requires collaborative efforts among stakeholders, government support, resource integration, and precise matching. Cultivating local elderly care talent is essential to ensure that diverse care strategies truly take root in rural realities.

## **5. Conclusion**

This study employed CiteSpace software to analyze the current state of elderly care for rural empty-nest seniors. Research over the past two decades has shifted from foundational conceptual studies to a phase focused on developing substantive frameworks. Establishing a three-dimensional network integrating "care strategy innovation—technological empowerment—policy coordination" is key to addressing the challenges of elderly

care for rural empty-nest seniors. This analysis was limited to CNKI data, and future research will incorporate additional databases to provide comprehensive insights into the current landscape of rural empty-nest elderly care.

## Disclosure statement

The authors declare no conflict of interest.

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