

Bibliometric Analysis of Nutritional Nursing for Tumor Patients

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Abstract

Objective: To analyze the research status, hotspots, and trends in nutritional care for cancer patients, providing evidence for future clinical practice and research. **Methods:** Literature on nutritional care for cancer patients published between January 1, 2014, and December 31, 2024, was retrieved from the China National Knowledge Infrastructure (CNKI) database. CiteSpace 6.4.R1 was utilized to visualize and analyze keywords, authors, and institutions in the included studies. **Results:** A total of 919 Chinese articles were included. The annual publication volume in this field showed significant fluctuations, peaking in 2019. Authors and institutions were distributed with limited collaboration. The primary study populations included patients with esophageal cancer, gastric cancer, nasopharyngeal carcinoma, and those undergoing chemoradiotherapy. Key research themes focused on nutritional assessment, therapeutic nutrition interventions, and nutritional support strategies. **Conclusion:** Nutritional care for cancer patients has garnered substantial attention and formed several research hotspots. However, further in-depth studies are required. Future efforts should strengthen collaborations among authors and institutions to advance this field.

Keywords

Cancer Patients, Nutrition, Nursing Care, Visualization Analysis

1. Introduction

In 2022, China recorded a total of 4.8247 million cancer cases and 2.5742 million cancer-related deaths [1]. The incidence and mortality of malignant tumors in China continue to rise. Among hospitalized cancer patients in tertiary Grade A

hospitals, the overall incidence of malnutrition reaches as high as 80% (with mild, moderate, and severe malnutrition accounting for 22%, 32%, and 26%, respectively) [2]. Approximately 10% to 20% of cancer patient deaths can be attributed to malnutrition rather than the malignancy itself [3]. Malnutrition in cancer patients can significantly reduce their quality of life by suppressing immune function and decreasing tolerance to the side effects of anti-tumor treatments. It may also increase medical costs through prolonged hospitalization and greater demand for supportive care, ultimately leading to higher complication rates and mortality [4] [5]. Therefore, paying attention to the nutritional status of cancer patients and implementing effective nutritional care is particularly important. The study by De Felice *et al.* [6] also emphasizes the importance of nutritional care, indicating that it should not be overlooked. Nutritional care refers to the comprehensive process in which nurses conduct accurate nutritional risk screening, thorough nutritional assessment, nutritional diagnosis, and intervention implementation during clinical practice. It involves providing proper dietary guidance and nutritional support to ultimately improve patients' nutritional status and promote their health [7]. Scholars have published extensive literature on nutritional care for cancer patients from various perspectives, though most are traditional review articles lacking intuitive comparative analysis. This study aims to analyze relevant literature on nutritional care for cancer patients from the CNKI database using CiteSpace 6.4.R1 software, in order to identify research hotspots and development trends in this field, thereby providing references for future clinical practice and research.

2. Materials and Methods

2.1. Data Sources

The China National Knowledge Infrastructure (CNKI) database was used as the data source. An advanced search was conducted using the following Chinese search formula: Subject = “nutritional nursing OR nutritional assessment OR nutritional intervention OR nutritional support” AND Subject = “tumor OR neoplasm OR cancer OR carcinoma”. The search period was from January 1, 2014, to December 31, 2024. A total of 1060 documents were preliminarily retrieved, and 919 documents were ultimately included. The search process is illustrated in **Figure 1**.

2.2. Inclusion and Exclusion Criteria

Inclusion criteria: Studies related to nutritional care for cancer patients, mainly including nutritional risk screening, nutritional assessment, nutritional intervention, relevant health education, and other nursing-related content.

Exclusion criteria: 1) Articles published in English; 2) Conference abstracts, scientific and technological achievements, etc.; 3) Literature with unavailable full text or duplicate content.

2.3. Quality Control

All data were extracted independently by two researchers based on the inclusion

and exclusion criteria and subsequently cross-checked. In cases of disagreement, a third researcher was consulted to resolve the issue, ensuring the accuracy and consistency of the data.

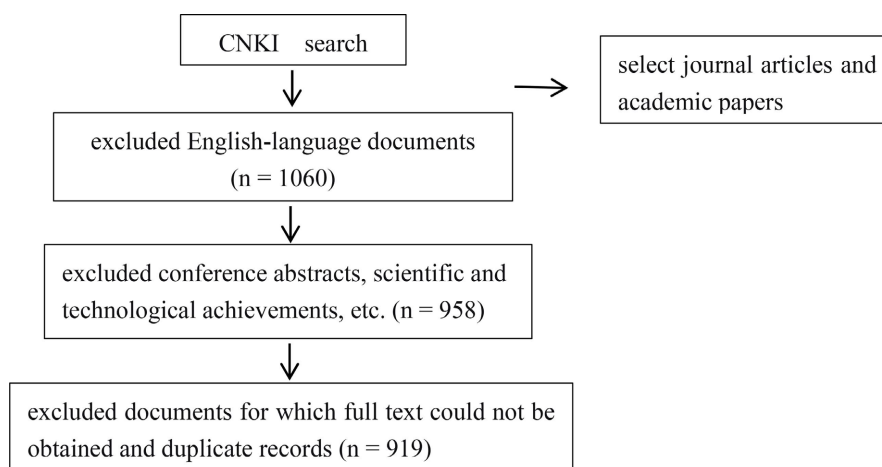


Figure 1. Flow diagram of the literature search process.

2.4. Analysis Methods

In this study, CiteSpace 6.4.R1 software was used for visual analysis of the finally included literature on nutritional care for cancer patients, and Microsoft Excel was applied for statistical analysis of the annual number of publications. Import the literature into the newly created “input” folder in RefWorks format, naming the files as “Download_txt”. Perform format conversion using CiteSpace 6.4.R1 software and save the results in the “output” folder. Then, save the converted “download_txt_converted” files in the “date” folder. Finally, conduct a visual analysis of literature keywords, authors, and institutions using CiteSpace 6.4.R1 software. Refer to relevant literature [8] [9], the import settings analysis is as follows: The time span is set from January 2014 to December 2024, with a time slice of 1 year. The node type is set to “author”/“institution”/“keyword”. The threshold for analysis objects is g-index $k = 25$, with Top N = 50 and Top N% = 10%. The literature pruning methods selected are “Pathfinder” and “pruning the merged networks”. All other settings remain at system defaults.

3. Results

3.1. Annual Publication Volume Statistics and Analysis

This study ultimately included 919 articles. Analysis of the obtained literature revealed significant phased fluctuations in the annual publication volume within the field of nutritional care for cancer patients, as shown in **Figure 2**. From 2014 to 2019, the number of publications showed an upward trend, peaking in 2019 with 125 articles. From 2019 to 2022, a downward trend was observed, while from 2022 to 2024, the publication volume transitioned from stable to an upward trend.

Hospital of Sun Yat-sen University, Gulou Hospital Affiliated to Nanjing University School of Medicine, and the First Affiliated Hospital of Xiamen University, each contributing 4 publications. In addition, 7 institutions each published 3 articles. Although collaborative relationships existed among institutions, the cooperation was loose and fragmented.

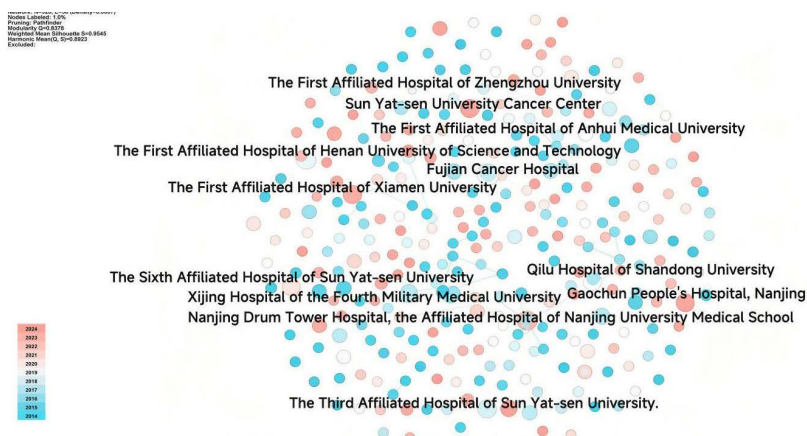


Figure 4. Distribution map of institutions engaged in nutritional care for cancer patients from 2014 to 2024.

3.4. Keyword Co-Occurrence

3.4.1. Analysis of High-Frequency Keywords

High-frequency keywords regarding nutritional care for cancer patients from 2014 to 2024 were extracted using CiteSpace software, as illustrated in **Figure 5**. The keywords were ranked by their occurrence frequency, and the top 20 high-frequency keywords are presented in **Table 1**. High-frequency keywords with key node (betweenness centrality) > 0.10 included: esophageal cancer, nursing, enteral nutrition, quality of life, nutritional support, radiotherapy, chemotherapy, complications, nasopharyngeal carcinoma, nutritional care, and dietary care.

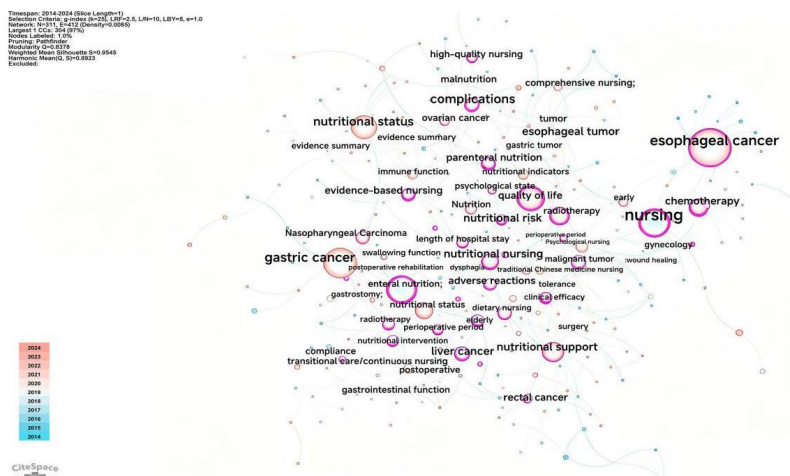


Figure 5. Co-occurrence map of high-frequency keywords for nutritional care in cancer patients from 2014 to 2024.

Table 1. High-frequency keywords of nutritional care for cancer patients from 2014 to 2024 (Top 20).

No.	Keyword	Frequency	Centrality	No.	Keyword	Frequency	Centrality
1	Esophageal Cancer	276	0.12	11	Nursing Intervention	56	0.05
2	Gastric Cancer	220	0.09	12	Complications	43	0.23
3	Nursing	151	0.26	13	Nasopharyngeal Cancer	40	0.12
4	Nutritional Status	150	0.10	14	Psychological Nursing	35	0.05
5	Enteral Nutrition	130	0.26	15	Gastrointestinal Function	31	0.02
6	Quality of Life	110	0.25	16	Immune Function	31	0.09
7	Nutritional Support	81	0.14	17	Nutritional Nursing	30	0.28
8	Radiotherapy	75	0.25	18	Dietary Nursing	29	0.19
9	Chemotherapy	69	0.24	19	Nutritional Indicators	27	0.10
10	Nutritional State	62	0.08	20	Postoperative	25	0.07

3.4.2. Keyword Cluster Analysis

In this study, $Q = 0.8387 (>0.30)$ and $S = 0.9545 (>0.70)$, which met the clustering criteria. A total of 311 nodes and 412 connections were identified, with a network density of 0.0085, as shown in **Figure 6**. Sixteen clusters were generated, including: #0 Complications, #1 Nutritional Support, #2 Nursing Intervention, #3 Radiation Therapy, #4 Radiotherapy, #5 Enteral Nutrition, #6 Tumor, #7 Enhanced Recovery After Surgery (ERAS), #8 Nursing, #9 Depression, #10 Liver Cancer, #11 Malignant Tumor, #12 Nursing Effect, #13 Esophageal Cancer, #14 Rectal Cancer, #15 Nutritional Status.

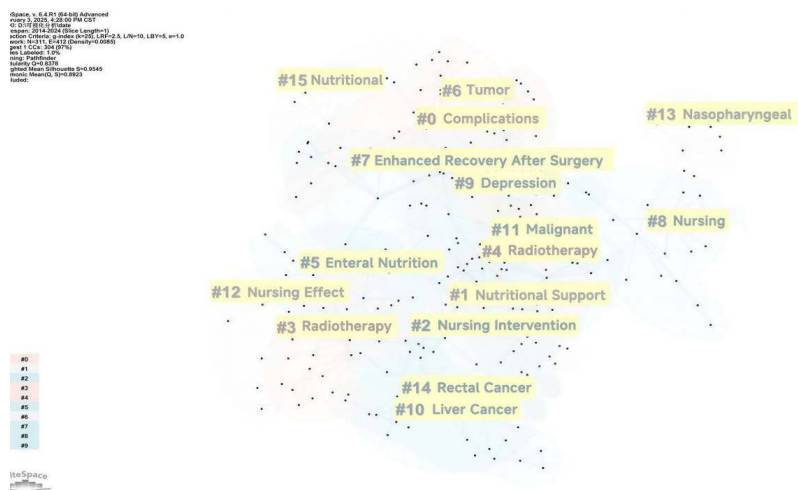


Figure 6. Cluster analysis map of keywords for nutritional care in cancer patients from 2014 to 2024.

3.4.3. Keyword Burst Analysis

After conducting keyword burst analysis on nutritional care for cancer patients, 17 burst terms with high frequency changes were identified. The main research contents can be divided into three stages: The first stage (2014-2016) mainly focused

on nursing care, enteral nutrition, and parenteral nutrition in cancer patients. The second stage (2017-2019) emphasized surgery, rehabilitation effects, and malnutrition. The third stage (2020-2024) concentrated on survival quality, gastrointestinal function, nutritional indexes, nasopharyngeal carcinoma, nutritional status, immune function, and quality of life. The results are shown in **Figure 7**.

Top 17 Keywords with the Strongest Citation Bursts

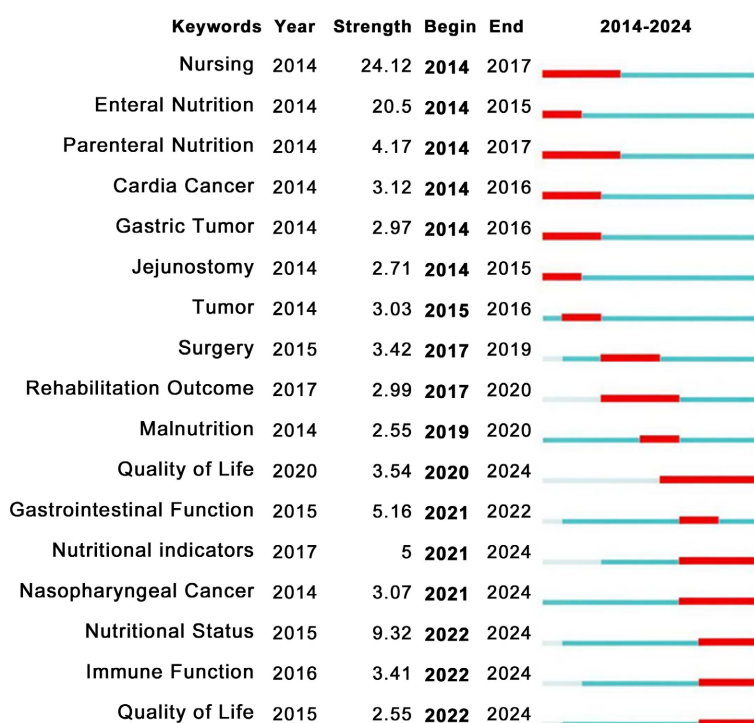


Figure 7. Keywords with strong burst strength in nutritional care for cancer patients from 2014 to 2024.

4. Discussion

4.1. Research Status of Nutritional Care for Cancer Patients

As shown in **Figure 1**, the number of publications increased significantly year by year from 2015 to 2019 and peaked in 2019. The possible reasons are as follows: According to the 2019 estimates of the World Health Organization, cancer is the first or second leading cause of human death [10]. Malnutrition can increase the risk of death in patients with malignant tumors, which has raised clinical attention. Malnutrition is a common complication in patients with malignant tumors. With social development, nutritional care has evolved from basic dietary support to a multidisciplinary integrated therapeutic strategy. Its close association with treatment and rehabilitation has encouraged more scholars to conduct relevant research. The number of publications decreased slightly from 2019 to 2024, which may be attributed to: Relatively mature theories and practical systems have been formed for basic nutritional assessment and routine interventions, making it sig-

nificantly more difficult to achieve breakthrough research. The internationalization of nursing research has strengthened, and more achievements have been published in authoritative international journals. A total of 291 authors were included, with scattered distribution and mostly single-center studies. There were 328 publishing institutions, most of which were specialized cancer hospitals and affiliated hospitals, with obvious advantages in concentrated clinical and scientific research resources. In summary, a systematic research framework has been established for nutritional care in cancer patients. However, it is necessary to break through the existing development bottleneck through multi-center cooperation and innovative methodologies.

4.2. Research Hotspots of Nutritional Care for Cancer Patients

A comprehensive analysis of high-frequency keywords, keyword clustering maps, and keyword burst detection reveals that the key populations focused on in the field of nutritional care for cancer patients in the past decade mainly include patients with esophageal cancer, gastric cancer, those undergoing radiotherapy and chemotherapy, and patients with nasopharyngeal carcinoma. The research contents mainly cover the following aspects.

4.2.1. Nutritional Assessment Is the Foundation of Nutritional Care for Cancer Patients

Nutritional screening and assessment are the prerequisites for nutritional therapy. Only after conducting a nutritional assessment for cancer patients can we better formulate treatment plans and implement effective nutritional nursing interventions for them. A study has shown [11] that among hospitalized patients with malignant tumors, 88.44% are at nutritional risk, and the overall prevalence of malnutrition reaches 89.44%, indicating a rather unfavorable nutritional status. However, due to the diversity of screening and assessment tools and the lack of a specific assessment tool for a given type of tumor, the reported incidence of malnutrition varies across studies. The commonly used nutritional assessment methods in clinical practice include three major categories: scale-based assessments, physical examinations, and laboratory tests [12] [13]. The Nutritional Risk Screening 2002 (NRS 2002) and the Patient-Generated Subjective Global Assessment (PG-SGA) are the most widely used nutritional screening and assessment tools for tumor patients [8] [14] [15]. In the analysis of high-frequency keyword bursts, “nutritional indicators” and “nutritional status” are both components of nutritional assessment, which corresponds to the multidimensional assessment system in clinical practice—physical examinations measure parameters such as height, weight, mid-arm circumference, and triceps skinfold thickness [13], while laboratory tests focus on biochemical indicators such as albumin and hemoglobin [13]. Currently, the question of how to select appropriate nutritional screening and assessment tools has gained attention. A study by Li Wen *et al.* [16] showed that both NRS 2002 and PG-SGA can be used for preoperative nutritional risk assessment in patients with gastrointestinal malignant tumors, but each has its own advantages

and disadvantages. Further research indicates that nutritional care based on PG-SGA and the Mini Nutritional Assessment Short-Form (MNA-SF) risk assessment can significantly improve nutritional indicators and clinical outcomes in elderly patients with esophageal cancer and diabetes [17]. Relevant guidelines point out [18] that nutritional risk screening and assessment should be performed in tumor patients before and after surgery, during radiotherapy and chemotherapy, and at each follow-up visit. Therefore, in the nursing process, nutritional assessment should not be performed only at the time of hospital admission; it should be repeated regularly during the course of anti-tumor therapy to monitor the efficacy of nutritional therapy and adjust the nutritional treatment plan when necessary [14].

4.2.2. Nutritional Therapy as the Core of Nutritional Care for Cancer Patients

Oncology nutritional therapy should serve as first-line therapy and basic therapy, and should be integrated throughout the entire course of tumor treatment [19]. It follows the five-step principle: first, nutritional dietary education and guidance; followed in sequence by oral nutritional supplementation, total enteral nutrition, partial enteral nutrition plus partial parenteral nutrition, and total parenteral nutrition. If the next step fails to meet 60% of the target energy requirement for 3 - 5 days, the previous step should be adopted [5] [20]. According to high-frequency keywords and keyword analysis, “dietary nutrition” education, “enteral nutrition”, and “parenteral nutrition” are all nutritional therapy modalities for tumor patients. Nutritional education is a nutritional therapy that all tumor patients must routinely receive [21]. With the continuous development of medicine and technology, nutritional education is no longer limited to traditional oral teaching methods. Researchers such as Zhang Li *et al.* [22] found that nutrition education based on the “Internet+” approach not only improved the nutritional knowledge, attitude, and practice levels of patients with gastrointestinal tumors but also enhanced their nutritional status. Enteral nutrition nursing can effectively improve postoperative nursing outcomes and nutritional indicators in tumor patients, while also benefiting the recovery of immune function and improving patients’ quality of life [23]-[25]. For some tumor patients, not only in-hospital but also out-of-hospital continuity of care for enteral nutrition has gradually attracted attention. Some scholars have developed a home enteral nutrition health education program for postoperative esophageal cancer patients, providing a reference for clinical medical staff to standardize health education efforts [26]. Nutritional therapy is an important means of achieving the goals of oncology nutritional nursing. Therefore, medical staff should integrate appropriate nutritional therapy modalities with nutritional nursing to improve patients’ quality of life, reduce complications, and thereby increase satisfaction with nursing care.

4.2.3. Nutritional Care Improves Clinical Outcomes in Cancer Patients

In the current field of oncology treatment, nutritional nursing has been widely

applied to patients with various cancer types. Researchers have employed multiple approaches to carry out nutritional nursing for different tumor patients, achieving remarkable results. High-frequency keywords and burst terms such as “rehabilitation effect”, “quality of survival”, “quality of life”, “immune function”, and “complications” all reflect the clinical value of nutritional nursing. Studies have shown that developing a comprehensive nutritional management program for esophageal cancer patients during the perioperative period based on the theory of timing, and applying it to these patients, can provide more precise nutritional interventions for patients at different stages of the perioperative period, optimize their nutritional status, promote rapid postoperative recovery, reduce the incidence of complications, and improve patients’ quality of life [27]. This finding is consistent with results from related studies [28] [29]. This effect is also evident in patients undergoing radiotherapy and chemotherapy. Research by Yang Xiaocui *et al.* [30] indicates that comprehensive nutritional nursing management can specifically improve the nutritional status of nasopharyngeal carcinoma patients during radiotherapy and simultaneously enhance their quality of life. However, one study found [7] that the nutritional nursing competence of clinical nurses in tertiary general hospitals and specialized cancer hospitals is insufficient. Therefore, in clinical practice, oncology nurses should pay attention to patients’ nutritional nursing, continuously improve their own nutritional nursing competence, strengthen relevant theoretical learning, provide patients with higher-quality nutritional nursing, and alleviate the caregiving burden on patients’ families.

5. Conclusion

In summary, with the transformation of nursing models, nutritional care has become one of the key components of nursing for cancer patients. Effective nutritional care can improve the nutritional status of cancer patients, enhance treatment tolerance, reduce the incidence of adverse events and mortality, and improve their quality of life both physically and psychologically, which plays a vital role in the rehabilitation of cancer patients. In this study, CiteSpace 6.4.R1 was used to analyze relevant literature on nutritional interventions for cancer patients in the field of nursing, which intuitively revealed the current development trends, research status, and research hotspots in this field. With the evolution of nursing models, the important role of nutritional care in oncology will become increasingly prominent. Future efforts should strengthen attention to research hotspots in this field, promote collaboration among cross-institutional and cross-regional research teams, enhance multi-center studies, and leverage intelligent tools such as nursing robots and digital wearable technologies to further refine and standardize comprehensive nutritional management for tumor patients. However, this study has certain limitations. The retrieval was limited to a single database, focusing only on CNKI, without considering research and developments from international sources. Additionally, the records in this database may contain ambiguous information regarding authors or institutions. Future research will expand the da-

tabase sample scope for retrieval and conduct more in-depth studies to provide a reference for research on tumor nutritional nursing.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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