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· 防治实践 ·

2014—2024年头颈部肿瘤患者营养研究热点

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【摘要】目的 了解头颈部肿瘤患者2014—2024年营养研究的现状、国际合作情况、研究热点及发展趋势,并预测未来的研究方向。**方法** 检索Web of Science核心合集数据库,提取2014年1月至2024年3月收录的头颈部肿瘤患者的营养研究,文献类型为论著,语言为英文,采用CiteSpace6.1 R6软件进行文献计量分析,将结果进行可视化,形成科学知识图谱。**结果** 共检索出1 528篇文献,年发文量呈线性增长。发文量最多的国家为美国,最多的机构为昆士兰大学,作者及机构间的合作较为紧密。被引频次最高的文献为营养相关的指南,影响力最高的文章主要涉及实施经皮内窥镜胃造瘘术。关键词分析显示,生活质量、放化疗和体重下降是关注度最高的关键词。关键词聚类分析共形成17个聚类,主要分为5大类,分别为头颈部肿瘤、治疗、结局效果、干预方式和康复。身体成分、肠内营养、术后加速康复为持续的研究热点。关键词突现发现,加速康复依旧是近两年的研究重点,指标和模型是新出现的主题词。**结论** 近10年关于头颈部肿瘤患者营养研究相关文献的发文量逐年上升。研究热点主要集中在放化疗期间的生活质量和体重下降、身体成分评估的内容及应用前景、不同方式的营养支持干预及肠内营养管饲途径、加速康复外科的围手术期营养管理等。加速康复理念下术前营养干预的潜在临床价值、构建新型营养指标是未来研究的方向。

【关键词】 头颈部肿瘤; 营养; 加速康复外科; 肠内营养; 营养指标; 可视化; 研究热点; 研究趋势; 文献计量分析

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Research hotspots in nutrition for patients with head and neck cancer from 2014 to 2024 WANG Shuai, LIU Manfeng, AN Na, WANG Dikan, HUANG Qiuyu, LIN Zhumei. Department of Oral and Maxillofacial Surgery, Hospital of Stomatology, Sun Yat-sen University & Guangdong Provincial Key Laboratory of Stomatology & Guangdong Provincial Clinical Research Center of Oral Diseases, Guangzhou 510055, China
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【Abstract】Objective To understand the current status, international cooperation, research hotspots, and development trends of nutritional studies on patients with head and neck cancer from 2014 to 2024, and to predict future research trends. **Methods** The Web of Science Core Collection database was searched to retrieve nutritional studies on patients with head and neck cancer from January 2014 to March 2024. The type of studies were “articles,” the language was English, CiteSpace 6.1 R6 software was used to conduct the bibliometric analysis, and the results were visualized to form a scientific knowledge map. **Results** A total of 1 528 documents were retrieved, with a linear increase in the number of annual publications. The country with the highest number of publications was the United States, and the institution with the highest number of publications was the University of Queensland, with closer collaboration between au-



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thors and institutions. The most frequently cited publication was a set of nutrition guidelines, and the highest-impact articles were mainly concerned with performing percutaneous endoscopic gastrostomy. Keyword analysis showed that quality of life, radiotherapy, and weight loss were the keywords of highest interest. The keyword cluster analysis resulted in 17 clusters, which were divided into five main categories: head and neck cancer, treatment, outcome results, intervention modalities, and rehabilitation. Body composition, enteral nutrition, and accelerated postoperative rehabilitation were persistent research hotspots. Keyword highlighting revealed that “enhanced recovery after surgery” has been the focus of research in the last two years, with “index” and “model” emerging as theme words. **Conclusion** The number of publications in the literature related to nutrition for patients with head and neck cancer has increased annually over the past 10 years. The research hotspots mainly focus on the quality of life and weight loss during radiotherapy, the content and application prospect of body composition assessment, different modes of nutritional support interventions and enteral nutritional tube feeding routes, and perioperative nutritional management in enhanced recovery after surgery. The potential clinical value of preoperative nutritional intervention under the concept of enhanced recovery and the construction of new types of nutritional index are the trends of future research.

【Key words】 head and neck cancer; nutrition; enhanced recovery after surgery; enteral nutrition; nutritional index; visualized analysis; research hotspots; research trend; bibliometrics

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【Competing interests】 The authors declare no competing interests.

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2021年,国际癌症研究机构显示头颈部肿瘤(head and neck cancer, HNC)是全球第七大肿瘤,年新增84万例^[1]。HNC患者在治疗过程中面临着各种营养问题,其中营养不良发生率约30%~50%^[2]。营养不良可增加患者的术后并发症,对临床结局和生活质量造成不良影响^[3]。研究表明通过营养干预可以有效提高HNC患者的5年生存率^[4]。因此,了解目前HNC营养的研究热点及未来的发展趋势,可为改善患者临床结局提供参考。本研究采用CiteSpace6.1 R6软件,应用文献计量学分析方法,分析Web of Science核心合集数据库(Web of Science Core Collection, WOSCC)近十年发表的文献,对HNC患者营养研究的相关文献进行梳理统计和可视化分析,了解相关领域文献分布特征、研究热点及未来研究方向,以期今后的研究提供参考。

1 资料与方法

1.1 数据来源及检索方法

从WOSCC数据库提取发表年份为2014年1月1日至2024年3月29日的数据,采用高级检索功能,检索策略如下:(Topic Search=“head and neck cancer*” OR Topic Search=“mouth cancer*” OR Topic Search=“oral cancer*” OR Topic Search=“head and neck neoplasm*” OR Topic Search=“mouth neoplasm*” OR Topic Search=“oral neoplasm*” OR Top-

ic Search=“HNC”) AND (Topic Search=“nutri*” OR Topic Search=“feed*”); Publication years=“2014~2024”; Document types=(“Article” OR “Review Article”); Languages=English。

1.2 文献纳入与排除标准

纳入标准:有关HNC患者营养相关的文献;研究对象为人类。

排除标准:文献类型为会议、专利、成果、报纸、图书等;重复发表;研究数据不全。

1.3 文献提取

将WOSCC数据库来源的数据进行数据清洗与整理。过滤原始文献后,共1 528篇文献符合纳入排除标准,导出相关文献的标题、作者信息、关键词、参考文献、期刊名等信息。

1.4 文献计量分析及数据可视化分析

将文献导入CiteSpace6.1 R6软件,对预处理的文献进行可视化分析。设置时间跨度为2014—2024年,时间切片设置为1年,频次阈值根据需要进行设定,从文献年度发文量、发文作者及机构、发文国家/地区、引文分析、关键词共现、关键词聚类及关键词突现等方面,以科学知识图谱展示研究结果,并结合本专业知识对图谱进行分析。

2 结果

2.1 文献年度发文量

2014年1月至2024年3月HNC患者营养研究

的相关文献共1 528篇。将发表文献数量按照发表年份进行统计,详见图1。近十年来,HNC患者营养研究的文献数量呈逐年增长趋势,2014—2018年之间,年发文量均为100篇左右,波动不明

显,研究处于起步阶段;2019—2021年之间,年发文量快速增多,研究处于增长阶段;2021—2023年之间,年发文量均>200篇,处于高峰。

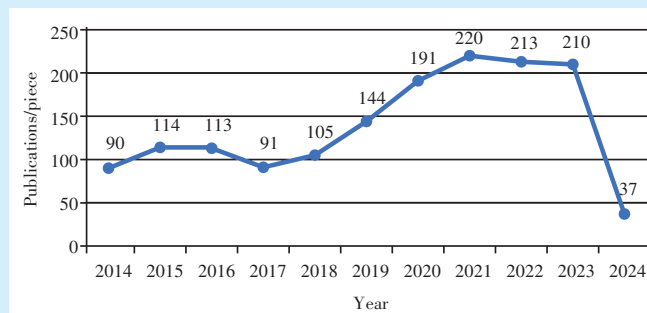


Figure 1 Annual volume of publications focusing on nutrition for patients with head and neck cancer from 2014 to 2024

图1 2014—2024年头颈部肿瘤患者营养研究相关文献年度发文量

2.2 发文机构分布

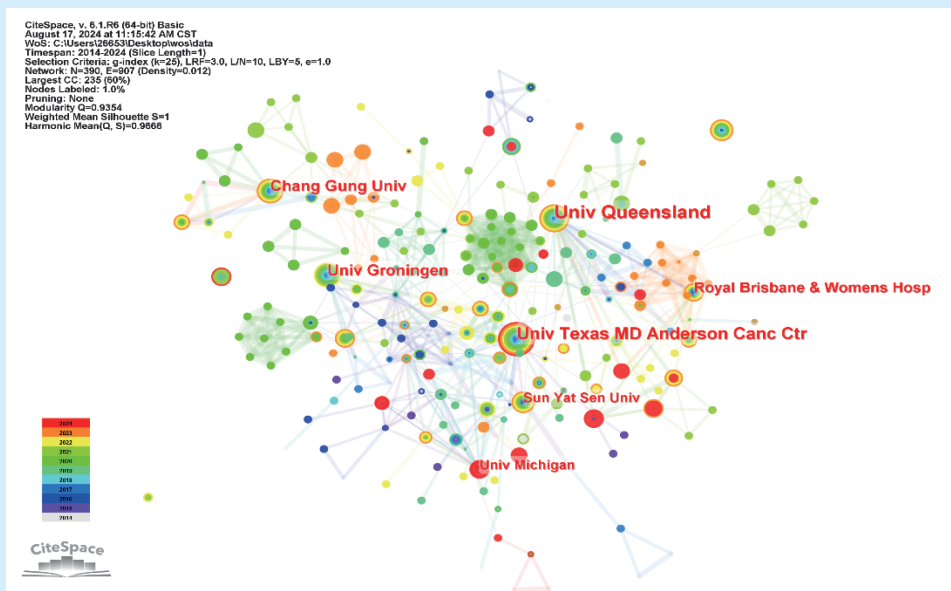
2014年1月至2024年3月HNC患者营养研究的相关文献发文量 ≥ 20 篇的发文机构分布情况见图2,显示共7所,各机构间存在合作关系。共形成390个节点、907条连线。来自390所机构,以昆士兰大学发文量最多,共发表64篇;得克萨斯大学安德森癌症中心发表44篇,排在第2位;其中我国中山大学排名第七位,共发表22篇。排名前10机构总发文量约占19.1%(292/1 528)。

2.3 发文国家/地区分布

发文国家/地区分布来自74个国家/地区,发文量排名前5的国家/地区分别为美国(401篇)、中国(141篇)、澳大利亚(123篇)、日本(121篇)、英国(103篇)。排名前5的国家/地区总发文量约占58.2%(889/1 528)。中介中心性最高的国家是美国(0.28)。

2.4 作者分布

2014年1月至2024年3月HNC患者营养研究



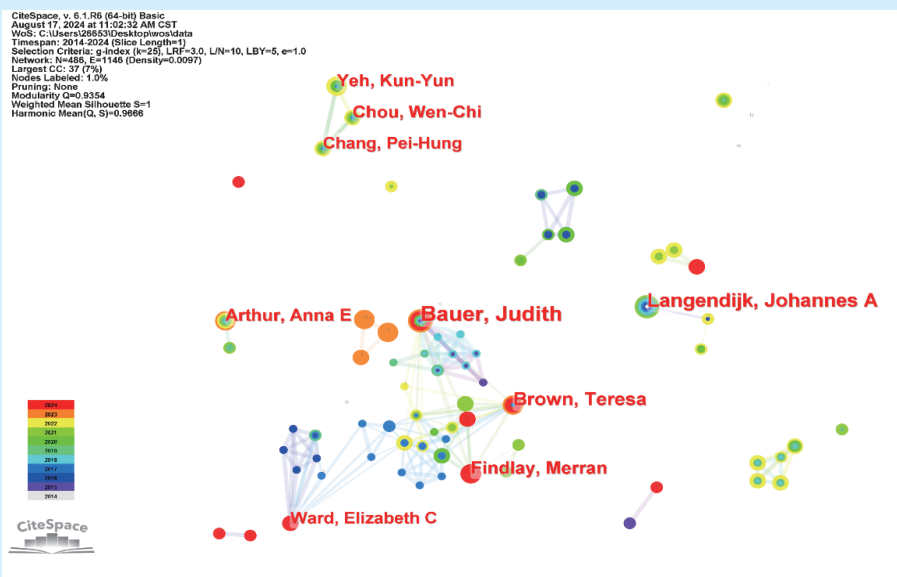
Each node represents an institution. The diameter of each node is positively correlated with the academic output density of the associated institution. The thickness of the lines is positively correlated with the intensity of cross-institutional cooperation. The color of the line indicates the year of the first collaboration

Figure 2 Distribution of institutions with an annual publication volume of ≥ 20 articles on nutrition research for patients with head and neck cancer from 2014 to 2024

图2 2014—2024年头颈部肿瘤患者营养研究相关文献年度发文量 ≥ 20 篇的机构分布

的相关文献发文量 ≥ 10 篇的作者分布情况见图3,显示共9人,共形成486个节点、1 146条连线。共

486位作者,发文量排名前3的作者依次是:Bauer(22篇)、Langendijk(16篇)和Brown(15篇)。



Each node represents an author. The diameter of each node is positively correlated with the academic output density of the corresponding author. The thickness of the lines is positively correlated with the intensity of cross-institutional cooperation. The color of the line indicates the year of the first collaboration.

Figure 3 Distribution of authors with an annual publication volume of ≥ 10 articles on nutrition research for patients with head and neck cancer from 2014 to 2024

图3 2014—2024年头颈部肿瘤患者营养研究相关文献年度发文量 ≥ 10 篇的作者分布

2.5 引文分析

HNC患者近十年营养研究的排名前10位被参考文献具体信息见表1,主要观点为HNC患者的营养评估、诊断、不同干预方式及其效果和营养指南。节点中心性 > 0.1 时,代表该文献是非常重要、有影响力的文献。近十年节点中心性 > 0.1 的文献有两篇,作者分别为Brown和Baschnagel,研究方向均为实施经皮内窥镜胃造瘘术(percutaneous endoscopic gastrostomy, PEG)的影响效果。

2.6 关键词分析

2.6.1 关键词的词频与共现分析 关键词共现分析可反映该领域的研究热点与发展现状。图4显示了出现次数排名前25的关键词。以出现频次 ≥ 100 为标准,确定高频主题词共20个,排名及顺序详见表2。

2.6.2 关键词聚类分析 本研究使用对数似然率算法(log-likelihood rate, LLR)进行聚类,以1年为切片生成关键词聚类网络图,详见图5。结果显示聚类模块值(modularity Q值)为0.900 7 > 0.3 ,表示聚类结构式显著,聚类是有效的。聚类平均轮廓值(mean silhouette S值)为0.946 9 > 0.7 ,说明聚类结果较好,高效且令人信服。关键词聚类分析共

形成17个聚类,本研究将其归纳为五大主题:头颈部肿瘤(oral cancer、head and neck cancer、squamous cell carcinoma、laryngeal cancer、oropharyngeal cancer);治疗(chemoradiotherapy、intensity modulated radiotherapy、therapy);结局效果(malnutrition、body composition、sodium bicarbonate、weight loss、general health);干预方式(enteral nutrition);康复(rehabilitation、enhanced recovery after surgery)。

2.6.3 关键词突现 突现词是指某些关键词在一段时间内出现频次突然增加,可根据引用突现最强的关键词来预测研究前沿。突现强度排名前25关键词详见表3。早期的研究热点集中在预防性经皮内窥镜胃造瘘术和吞咽障碍。中期的研究热点集中在肌肉减少症、骨骼肌和经口机器人手术。最新的研究集中在指标(index)和加速康复(enhanced recovery)。

3 讨论

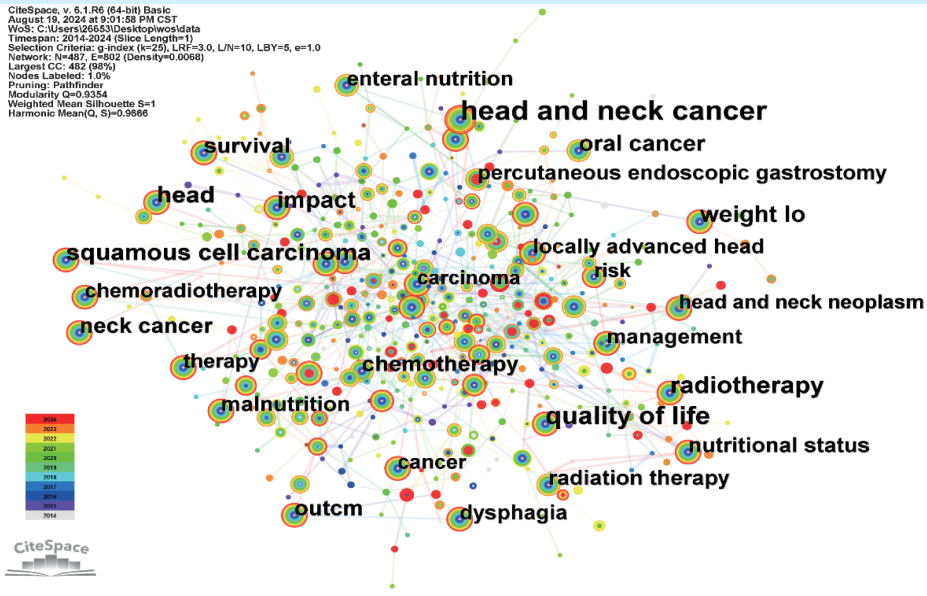
3.1 研究概况

WOSCC数据库独特的“引文索引”功能,可以说明历史文献对当前文献的影响及文献之间的相关性。因此,本研究通过文献计量学方法,对

表 1 2014—2024 年头颈部肿瘤患者营养研究相关文献被引频次前 10 位

Table 1 Top 10 most cited publications on nutrition research for patients with head and neck cancer from 2014 to 2024

Rank	Author	Year	Journal	Center node	Citation frequency	Key ideas
1	Arends J	2017	Clinical Nutrition	0.1	85	The European Society for Clinical Nutrition and Metabolism developed nutritional guidelines for cancer patients that address nutritional needs during surgery, radiation, and chemotherapy, providing recommendations for nutritional assessment, nutritional therapy, and exercise training
2	Talwar B	2016	Journal of Laryngology and Otology	0.04	46	Multidisciplinary nutritional guidelines for patients with head and neck cancer developed in England mainly provide clinical recommendations for nutritional support and nutritional interventions
3	Crowder SL	2018	Journal of Cancer Survivorship	0.06	36	Symptoms of nutritional deficiencies can have long-term effects on head and neck cancer survivors after chemotherapy, including weight loss, decreased intake, and reduced quality of life
4	Silander E	2012	Head & Neck	0.05	30	Percutaneous endoscopic gastrostomy significantly prolonged the duration of enteral nutrition use, reduced malnutrition, and improved quality of life at 6 months
5	Cederholm T	2019	Journal of Cachexia, Sarcopenia and Muscle	0.02	29	Development of malnutrition diagnostic criteria for the Global Leadership Initiative on Malnutrition
6	Langius JAE	2013	Clinical Nutrition	0.05	29	Individualized dietary counseling may improve nutritional status and quality of life in patients with head and neck cancer. The effectiveness of oral nutritional supplements is unclear
7	Wendrich AW	2017	Oral Oncology	0.01	29	Low skeletal muscle mass is an independent risk factor for dose-limiting toxicity of chemotherapy in patients with head and neck cancer
8	Citak E	2019	Supportive Care in Cancer	0.05	28	Trajectory of nutritional status during radiotherapy in patients with head and neck cancer and its impact on quality of life
9	Gorenc M	2015	Reports of Practical Oncology and Radiotherapy	0.06	28	Pathogenesis, diagnosis, and treatment of malnutrition and cachexia in head and neck cancer radiotherapy patients; advantages and disadvantages of different nutritional interventions and their impact
10	Muscaritoli M	2021	Clinical Nutrition	0.01	28	Clinical Practice Nutrition Guidelines for Cancer Patients developed by the European Society for Clinical Nutrition and Metabolism



Each node represents a keyword, and the node diameter reflects the normalized frequency of the keyword after a set threshold (g -index = 25)

Figure 4 Cluster of keywords in the literature on nutrition research for patients with head and neck cancer from 2014 to 2024

图 4 2014—2024 年头颈部肿瘤患者营养研究相关文献的关键词共现图谱

WOSCC 数据库收录的 HNC 患者近十年的营养研究进行文献计量分析,不仅展示了当前的研究现状,还深入分析不同国家/地区、机构、作者之间的合作关系,以及参考文献的共被引情况。通过对关键词的分析,识别出该领域的主要研究热点及

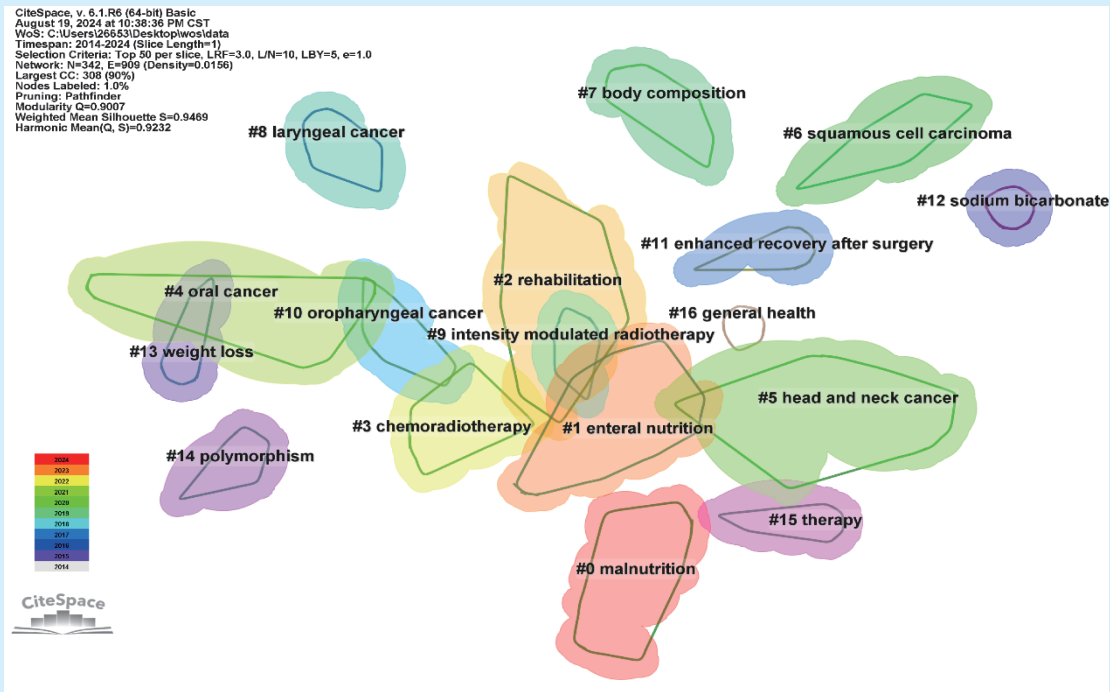
发展趋势,并为未来的研究方向提供参考及预测。

本研究结果显示近十年 HNC 患者的营养相关研究正稳步发展,整体呈上升趋势。其中 2019 年开始发文量迅速增加,一项Ⅲ期临床试验首次验证了免疫营养制剂对生存期的改善作用,可以提

表2 2014—2024年头颈部肿瘤患者营养研究相关文献中高频主题词前20位

Rank	Count	Key words
1	647	Head and neck cancer
2	350	Quality of life
3	277	Radiotherapy
4	240	Head
5	219	Squamous cell carcinoma
6	193	Weight loss
7	186	Impact
8	162	Oral cancer
9	156	Chemotherapy
10	155	Outcome
11	153	Neck cancer
12	147	Survival
13	133	Radiation therapy
14	129	Malnutrition
15	124	Nutritional status
16	108	Enteral nutrition
17	107	Percutaneous endoscopic gastrostomy
18	107	Locally advanced head
19	106	Management
20	104	Dysphagia

高依从性高的 HNC 辅助化疗患者的长期生存率^[5]。引起更多的专家对营养领域的关注。良好的营养状态可能会提高 HNC 患者的抗肿瘤耐受性^[6-7]。在治疗 6 个月时仍保持良好营养状态的癌症患者,其免疫治疗的成功率更高^[8]。营养治疗与免疫治疗的协同作用被逐渐深入研究。本研究结果显示各国之间存在合作关系,但未显示出国家间特别紧密的合作关系。美国的发文量及中心度显著高于其他国家,占全部文献的 26.2%,说明美国在该领域具有更高的影响力和认可度。莫纳什大学的 Bauer Judith 教授,是近十年发文量最高的作者,研究类型主要以营养支持的质性研究、循证实践等为主^[9]。我国发文量最多的机构为中山大学,主要研究方向为鼻咽癌放疗患者的营养管理^[10-11]。我国发文量最多的作者为路潜教授,研究方向为 HNC 放化疗期间的营养管理^[12]。本研究的引文分析显示,被引频次最高的文献为欧洲和英国制定的营养指南。影响力最高的 2 篇文献均为实施 PEG 的效果,主要观点为早期实施 PEG 可以取得良好效果,并对后续研究产生深远影响^[13-14]。



The log-likelihood ratio is used for topic extraction. Each cluster consists of a collection of keywords with significantly related co-occurrence frequency, and the most representative keywords are extracted, forming a total of 17 cluster labels. The clustered color coverage area is positively correlated with the number of keywords contained. The smaller the cluster number is, the more keywords the cluster contains that are relevant to the topic

Figure 5 Analysis of co-occurring keywords in the literature on nutrition research for patients with head and neck cancer from 2014 to 2024

图5 2014—2024年头颈部肿瘤患者营养研究相关文献的关键词聚类图谱

表3 2014—2024年头颈部肿瘤患者营养研究相关文献中突现强度关键词前25位

Table 3 Top 25 keywords with the strongest citation bursts in the literature on nutrition research for neck cancer patients from 2014 to 2024

Keywords	Year	Strength	Begin	End	2014 – 2024
Prophylactic gastrostomy	2014	4.92	2014	2017	
Swallowing dysfunction	2014	4.44	2014	2015	
Oncology	2014	4.11	2014	2016	
Headandneck cancer	2014	3.37	2014	2016	
Advanced head	2014	3.36	2014	2018	
Percutaneous endoscopic gastrostomy	2014	3.22	2014	2018	
Chemoradiation	2014	2.94	2014	2017	
Concurrent chemotherapy	2015	4.31	2015	2016	
Laryngeal cancer	2015	3.64	2015	2018	
Neck cancer patient	2015	3.52	2015	2018	
Intensity modulated radiotherapy	2014	3.54	2016	2017	
Tube feeding	2016	3.09	2016	2019	
Disease	2017	3.34	2017	2019	
Invasion	2018	3.19	2018	2019	
Sarcopenia	2016	3.48	2020	2022	
Postoperative complication	2020	3.15	2020	2022	
Skeletal muscle	2020	2.95	2020	2021	
Transoral robotic surgery	2021	3.34	2021	2022	
Criteria	2021	3.34	2021	2022	
Index	2021	3.21	2021	2024	
Enhanced recovery	2017	3.03	2022	2024	
Model	2017	2.99	2022	2024	
Mechanism	2015	2.94	2022	2024	

3.2 研究热点

对关键词的共现分析发现,生活质量、放化疗、体重下降是关注度最高的关键词,提示HNC患者营养研究的核心主题集中在放化疗期间的的生活质量和体重下降。由于头颈部解剖的复杂性,治疗及康复是一个漫长的医疗过程,涉及手术、放化疗及康复治疗等多种治疗方案。临床治疗不仅仅只关注生存率,治疗后的生活质量一直是考虑的重点^[15]。目前大部分研究认为营养干预对生活质量具有积极影响^[16-17]。因此,应在治疗轨迹的不同时期评估营养状况^[18]。

本研究根据关键词聚类分析结果,将其归纳为五大主题,分别为:头颈部肿瘤、治疗、结局效果、干预方式和康复,反映了近10年该领域的研究热点。重点介绍以下3类:

3.2.1 结局效果 高频主题词包括营养不良、身体成分、碳酸氢钠、体重下降和总体健康。除了体重下降率和体重指数之外,身体成分评估应该成为HNC患者营养评估的一部分,并且应在整个治疗

过程中的不同时间点进行测量^[19]。同时身体成分评估在HNC患者中是具有临床意义的预后评估工具之一^[20]。目前的身体成分评估技术主要包括:测量皮褶厚度,生化参数,生物电阻抗分析(bio-electrical impedance analysis, BIA),计算机断层扫描(computed tomography, CT),磁共振(magnetic resonance, MRI)和双能X线吸收测定法(dual-energy x-ray absorptiometry, DEXA)等。这些评估技术可以量性的评估营养指标,主要包括去脂体重、骨骼肌、脂肪量、体脂率等。在免疫检查点抑制剂治疗的HNC患者中,低骨骼肌指数对总生存期和无进展生存期有负面影响^[21]。在临床实践中,可根据测量握力的测量方法,判断可能存在肌肉减少症,并建议进行肌肉减少症的管理^[22]。一篇Meta分析发现,经CT诊断为肌少症的HNC患者,其生存率较低且治疗毒性较大^[23]。经身体成分评估测量的量性营养指标,可以对HNC患者的预后发挥一定预测作用,但尚需更可靠的证据来进一步验证,这也是未来的研究趋势之一。

3.2.2 干预方式 高频主题词包括肠内营养。开展肠内营养可以提高生活质量、营养不良和降低并发症等^[24]。肠内营养干预应遵循营养干预的五阶梯治疗原则,依次为营养教育、口服营养补充、完全肠内营养、部分肠外营养和全肠外营养。当不能满足60%目标能量需求3~5 d时,应晋级更高的阶梯^[25]。欧洲临床营养与代谢协会的最新指南推荐HNC患者放疗期间应主要通过个体化的营养咨询和/或使用口服营养补充剂确保充足的营养摄入^[26]。中国成人患者肠外肠内营养临床应用指南(2023版)推荐营养风险高的患者,在肠内营养治疗48~72 h后,营养摄入无法达到目标能量及蛋白质需要量的60%时,应采取建议给予补充性肠外营养^[27]。

Meta分析显示通过管饲开展肠内营养,可以取得更好的效果^[28]。肠内营养的管饲途径主要包括鼻胃管、鼻肠管和PEG等途径,不同途径的选择也逐渐达成一致。《中国成年患者营养治疗通路指南》对不同的喂养途径的适应症及相关注意事项提出指导意见^[29]。鼻胃管是开展短期(<4周)肠内营养的首选方式,而鼻肠管常用于有高风险、胃肠动力学紊乱或吞咽困难的患者。同时韩国制定的指南建议吞咽困难且至少需要管饲4周的患者可考虑PEG^[30]。中国专家共识建议预计口腔内1~2个月不能有效进食的较大口咽癌手术患者,尤其是术后需接受放疗的患者,建议术前行PEG^[31]。

3.2.3 康复 高频主题词包括康复和术后加速康复。反映了加速康复外科的重要性,其主要内容包括术前和术后早期营养支持等相关内容。入院24 h内开展营养筛查,术前针对营养不良的患者进行个性化营养干预。术后早期进食是加速康复外科的重要内容,Meta分析表明加速康复外科可以降低HNC患者的住院时间、再入院率和伤口并发症^[32]。因术后预计进食量不足的HNC患者(<目标量的60%超过7 d),欧洲临床营养与代谢协会的指南建议术后24 h内进行肠内营养治疗^[33]。

3.3 研究趋势

结合关键词突现发现,2017年开始出现“enhanced recovery”为主题词的研究,并延续至今,“加速康复理念”依旧是近两年的研究重点。围手术期的营养管理是加速康复外科的重要一环,主要研究包括术前营养支持、术后早期肠内营养等相

关内容^[34]。术后24 h内早期恢复肠内营养,并给予足够的热量和蛋白质,在临床上已形成共识,并被纳入指南^[35-36]。越来越多的研究开始关注术前营养的临床价值,特别是术前预康复,通过早期开展多模式的营养干预策略,来实现最佳疗效^[37]。后续研究者仍可以在加速康复理念下,从不同的营养干预措施出发,来验证术前营养干预的潜在临床价值,不断推动这一领域的发展。

最新出现的“index”和“model”等主题词,提示营养相关的指标是未来的研究趋势,目前研究人员的视野逐渐转向营养指标对预后效果的早期预测,特别是基于大数据模型来构建新型的营养指标。相关的营养评估指标可在HNC患者起到预测作用^[38-39]。例如预后营养指数(prognostic nutritional index, PNI)是术后并发症的显著独立预测因素,术前通过评估营养状况可预测术后的临床结局^[40]。老年营养风险指数(the geriatric nutritional risk index, GNRI)是有效的、便利性的预测因子,可作为一种具有成本效益的生物标志物,用于预后评估和个体化治疗计划^[7,41]。相比于这些传统的营养指标,通过大数据模型来构建动态、多维度的新型营养指标,实现临床效果预测的个性化与精准化,是未来的研究方向之一。

综上所述,本研究对近10年HNC患者营养相关研究的热点及趋势分析。目前的研究热点主要集中在放化疗期间的生活质量和体重下降、身体成分评估的内容及应用前景、不同方式的营养支持干预及肠内营养管饲途径、加速康复外科的围手术期营养管理等。加速康复理念下术前营养干预的潜在临床价值,构建新型营养指标是未来研究的趋势。通过文献计量分析,有助于提升临床医护人员认识HNC患者营养领域研究现状,可为HNC患者的营养管理提供了参考和借鉴。但本研究仍存在一定的局限性,首先仅纳入英文文献,其次仅纳入核心数据的相关文献,部分在线数据库的论文未被纳入,对部分中国学者的贡献有所遗漏,可能对结果产生一定偏倚。

【Author contributions】 Wang S conceptualized the research, analyzed the data, Visualized and wrote the article. Liu MF, An N, WANG DK designed the research study and revised the article. Huang QY, Lin ZM designed the research study and revised the article, supervised and administrated the project. All authors read and approved the final manuscript as submitted.

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