

# Bibliometric and Visual Analysis of Palliative Nutrition Research Based on Web of Science

Sevil Alkan<sup>1</sup> , Murat Emre Tokur<sup>2</sup> 

<sup>1</sup> Infectious Disease Department, Canakkale Onsekiz Mart University Faculty of Medicine, Turkey

<sup>2</sup> Department of Chest Diseases, Department of Intensive Care, Ege University Faculty of Medicine, İzmir, Turkey

Received: 2023-06-24 / Accepted: 2023-07-22 / Published Online: 2023-07-23

## Correspondence

Sevil Alkan, MD

**Address:** Canakkale Onsekiz Mart University Faculty of Medicine, Infectious Disease Department, Çanakkale / Turkey

**E-mail:** [sevil3910@gmail.com](mailto:sevil3910@gmail.com)

## ABSTRACT

**Objective:** Nutritional therapy has been shown to reduce the mortality rates of critically ill individuals. In recent years, there has been a significant increase in scholarly curiosity about the growing use of palliative nutrition. In order to determine the global research output on palliative nutrition, this bibliometric analysis was conducted to assess the current status of research trends and research directions.

**Methods:** The bibliometric data of the study was obtained from the online database Web of Science and analyzed and visualized with Excel, the Bibliometrix R package (version 4.1.2), and the bibliometric online application (<https://bibliometric.com/app>) tools.

**Results:** A total of 1067 publications were included in this study. The majority of publications (398,37.30%) and citations (n: 9252) in this discipline have come from the United States. The most frequent publication type detected was article (n: 794). Publications published in 398 different sources (journals/books etc.). The international co-authorship rate was 11.62%. In the last 20 years, the annual number of publications has drastically expanded. The highest number of publications was published in 2020 and 2021 (n: 67, and n: 64 respectively). Australia, France, Canada, Japan, and China stand out as the countries with the highest number of publications in recent years. The terms 'end, care, hydration, nutrition, life, decision-making, artificial nutrition, and palliative care' were the most preferred keywords.

**Conclusion:** Finally, given the number of palliative care patients globally is expected to rise, it is critical to do ongoing research on appropriate nutritional therapy for these patients. As our study shows study gaps and study trends, it can provide insight for future work in this field.

**Keywords:** bibliometric analysis; critical care; intensive care unit; enteral nutrition; parenteral nutrition; palliative; visual analysis.



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

## INTRODUCTION

The World Health Organization (WHO) definition of palliative care is 'comprehensive care provided to patients with medical conditions that do not improve with treatment'. By addressing issues such as pain management, biopsychosocial difficulties, and spiritual requirements, palliative care aims to enhance the life quality for patients and those closest to them [1]. There is a holistic approach in palliative care which includes dietary

counselling, rapid nutrition support, and management of feeding-related problems. These aspects should be tailored to the patient's stage in life and taken into account when making decisions about diet and nutrition. As the population ages and the number of individuals with various life-limiting diseases expands, nutrition management for these patients is becoming harder to manage [2].

Nutritional therapy is an important part of the care of critically ill patients. However, the optimal nutritional strategy is still debated and often causes a challenge in clinical practice. Guidelines from various nations have differing, such as the German Society for Nutritional Medicine (DGEM) [3], the European Society for Enteral and Parenteral Nutrition (ESPEN) [4], the American Society for Enteral and Parenteral Nutrition (ASPEN) [5] and other associations [6]. Furthermore, the wide range of underlying diseases of these patients ought to be considered as a basis for personalized choices made for each patient [7].

More research has revealed that feeding methods can reduce metabolic stress, avoid oxidative cellular damage, and modulate immunological responses [8]. Therefore, over the last 40 years, nutritional research for seriously ill patients has shifted from observational studies to large randomized controlled trials with long-term follow-up studies [9]. Published guidelines on nutrition therapy for critically ill patients have been updated in accordance with the new ESPEN Standard Operating Procedures. This update details risk groups, assessment of nutritional status, how to calculate the amount of energy required, the pathway to follow, and how to adapt to various clinical circumstances. It also recommends best practices for determining the amount and type of carbohydrate, fat, and protein for planning the initiation and continuation of nutritional support. There is a special focus on omega-3 fatty acids and glutamate. This guideline details specific conditions common in intensive care, such as dysphagic individuals, frail patients, multi-trauma patients, abdominal surgery, sepsis, etc., to help health professionals choose the best evidence-based treatment [4].

### Main Points;

- This study is the first bibliometric study on palliative nutrition.
- The United States (n = 400), the United Kingdom (n = 101), Italy (n = 68), the Netherlands (n = 61), and Canada (n = 54) were among the countries with most publications.
- The number of publications from developing countries was limited.
- Germany, the Netherlands, the United States of America, the United Kingdom, and Belgium were the countries with the most multi-country publications.
- The terms of advance care planning, end-of-life, decision-making, and tube feeding were trending topics.

The topic of our research lies on the outer boundaries of three major research areas: geriatrics, intensive care medicine, and nutrition and dietetics. As a result, it is difficult to define the precise boundaries of the study areas and it is difficult to have a solid picture of the changes and activities related to the topic. However, a thorough grasp of research discoveries and specialist emphasis would be advantageous for researchers, physicians, and patients participating in this field. In this investigation, we conducted a bibliometric study to address the aforementioned issues. We aimed to reveal the existing status of research topics and dynamics in the field, as well as the most important topic advances in research focus. Our findings can support the expansion of the scope of palliative nutrition research.

### MATERIALS AND METHODS

A public data repository of an electronic database was employed in the current investigation, which was exempt from ethical approval. The Web of Science electronic database's core collection was selected to search and retrieve the publications.

The search terms were as follows: TS=(Nutritional Sciences OR Nutrition Assessment OR Nutrition Therapy OR Nutrition Policy OR nutrition\* OR diet OR feeding OR dietary OR complementary feeding OR Feeding Methods OR nutritional status OR under nutrition OR food OR food and beverages OR micronutrient\* OR vitamin\* OR macronutrient\* OR carbohydrate\* OR caloric intake OR energy intake) English was chosen as the language of publications.

The time span was selected 1970, 1 January, and 31 April 2023. The first search showed 379,595 results with selected keywords. Since we aimed to search for publications related to palliative care, we narrowed the search with the words 'palliative care' and 'intensive care unit' in the Citation Topics Micro and Citation Topics Macro sections of the search engine. Since the subject of the study is extremely broad and multidisciplinary publications may cause bias, limitations were made with the help of Citation Topics Micro and Citation Topics Macro subheadings. In this field, we focused only on nutrition in palliative care. We reached 1067 results according to the search methodology.

For analysis, the exported data was stored as plain text, tab limited format, and file exported from Excel as "full records and cited references." The files downloaded to the computer by two researchers were checked. As a result of 99% consensus, the files to be analyzed were selected. Data from publications with

inconsistency were excluded.

### Visualization and analysis of data

It was aimed to analyze many bibliometric data such as; the general characteristics of the publications, the journals with the most publications, the institutions/universities with the most publications, and the distribution of the number of publications of these institutions over the years, the most cited and publishing countries and the H indexes of these countries, the most used keywords, the density of keywords over the years, etc.

For this purpose, we used Excel, the Bibliometrix R package (version 4.1.2) [10] and the bibliometric online application (<https://bibliometric.com/app>) for analysis, to create tables and figures.

## RESULTS

According to our search criteria, 1067 documents were included in this bibliometric evaluation. The majority of publications (n: 398, 37.30%) and citations (n: 9252) in this discipline have come from the United States, which has contributed the most. The most frequent publication type detected was an article (n: 794), followed by a review (n: 113), editorial content (n: 61), and a letter (n: 34). Publications related to our study topic were published in 398 different sources (journals/books etc.). 244 publications were published by a single author. The international co-authorship rate was 11.62%. Summary information about the publications included is given in Table 1. There were very few publications between 1983 and 1990. In the last 20 years, the annual number of publications has drastically expanded. The annual growth rate of these publications was 5.34%. The highest number of publications was published in 2020 and 2021 (n: 67, and n: 64 respectively). The volume of publications varied between 2003 and 2022, although they grew overall. In 2023, the number of publications seems to have decreased, but this graphical data may be misleading as this year has not yet been completed. The annual scientific output is displayed by years in Figure 1 and annual citation numbers are displayed by years in Figure 2. These 1067 publications originated from 59 countries. According to the countries that published the most articles throughout the span of time, the number of publications has been shown in Figure 3a. Figure 3a was created with the bibliometric online application (<https://bibliometric.com/app>). Figure 3a shows that Australian and Chinese publications have been on an increasing trend since 2000. American researchers were the first authors to publish on this topic. American publications have been available

since the early 1980s. Canadian publications started in the first half of the 1990s, and Canadian publications have increased tremendously, especially in the last 20 years. Researchers from Japan and France have also published an increasing number of publications since the 2000s. Australia, France, Canada, Japan, and China stand out as the countries with the highest number of publications in recent years. Figure 3b visualizes the number of publications by country of the corresponding authors. The red areas in Figure 3b show the numerical distribution of multi-country collaborative publications (MCP) and the green areas show the numerical distribution of single-country publications (SCP). Germany, the Netherlands, the United States of America, the United Kingdom, and Belgium were the countries with the most multi-country publications. In other words, they were the countries with international collaborations (Figure 3b).

**Table 1.** Main information

Description	Results
<b>Main Information</b>	
Timespan	1983-2023
Sources (Journals, Books, Etc)	398
Documents	1067
Annual Growth Rate %	5.34
Document Average Age	12.2
Average Citations Per Doc	19.62
References	21457
<b>Document Contents</b>	
Keywords Plus	1161
Author's Keywords	1363
Authors	3406
Authors Of Single-Authored Docs	214
<b>Authors Collaboration</b>	
Single-Authored Document	244
Co-Authors Per Document	4.21
International Co-Authorships %	11.62
<b>Document Types</b>	
Article	794
Article; Book Chapter	20
Article; Early Access	9
Article; Proceedings Paper	20
Correction	4
Editorial Material	61
Letter	34
Meeting Abstract	4
Note	3
Proceedings Paper	4
Reprint	1
Review	113

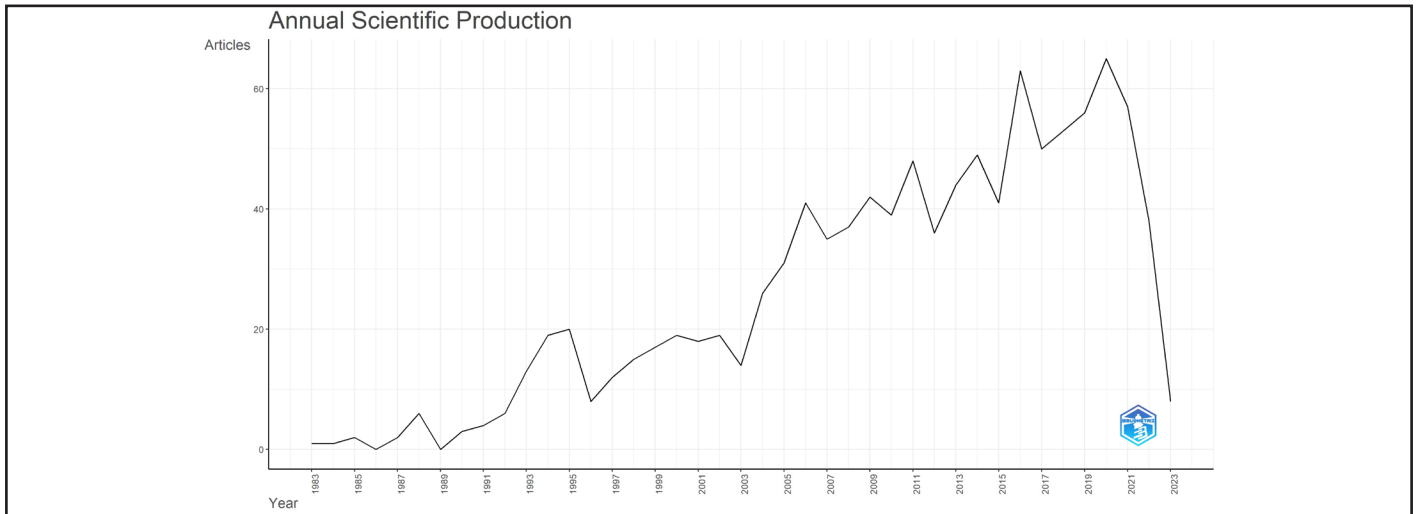


Figure 1. Annual Scientific Production

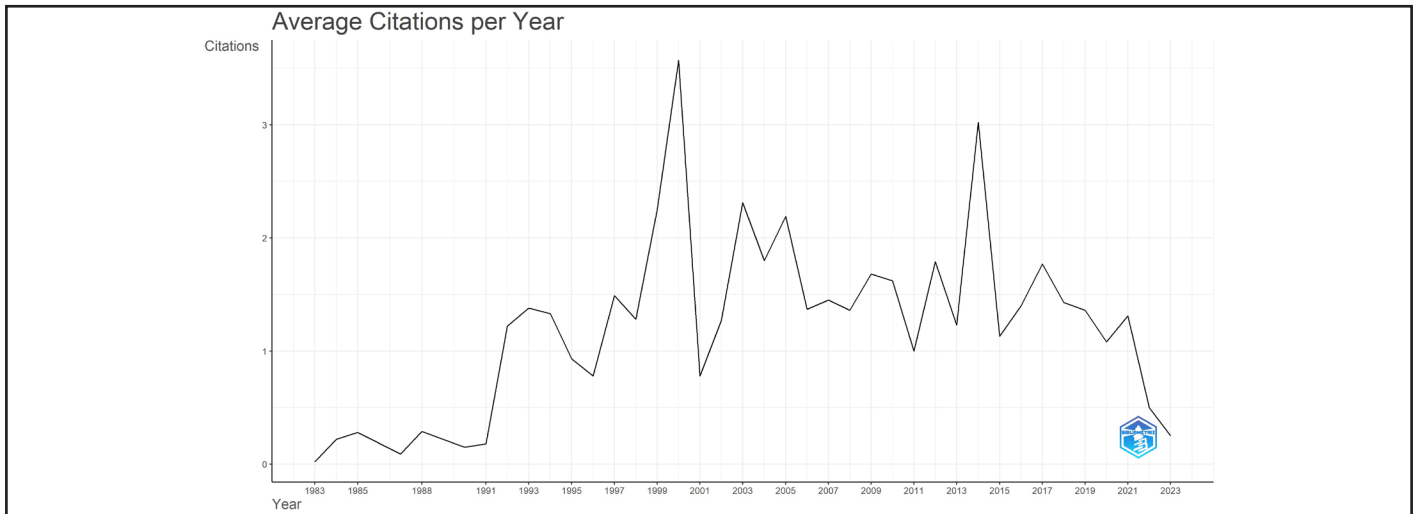


Figure 2. Average Citations Per Year

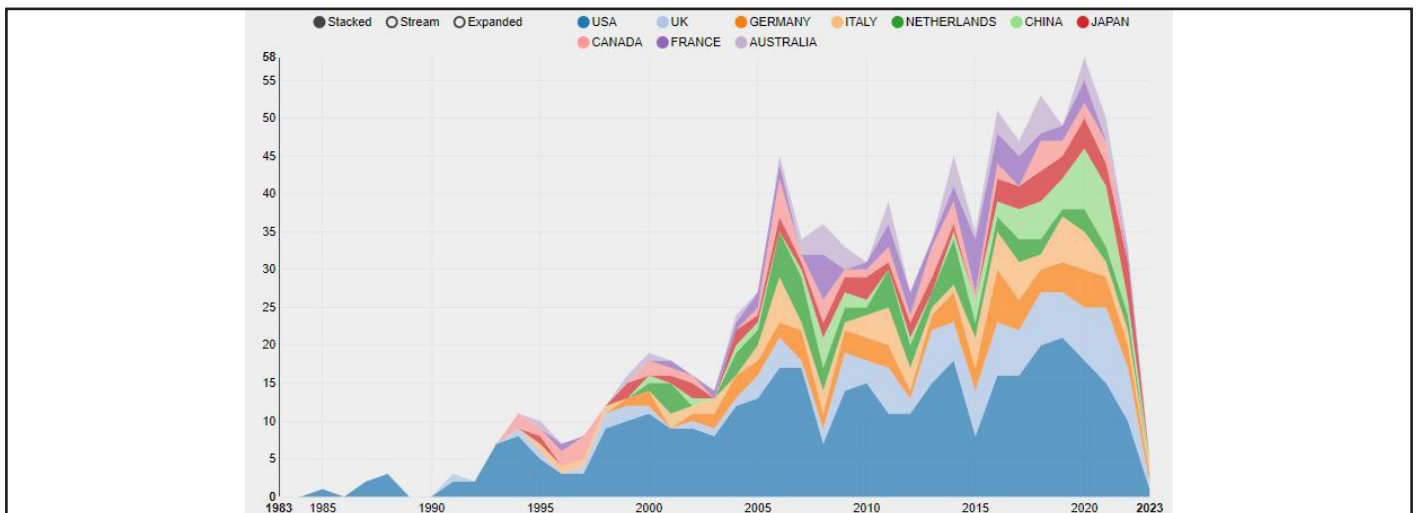
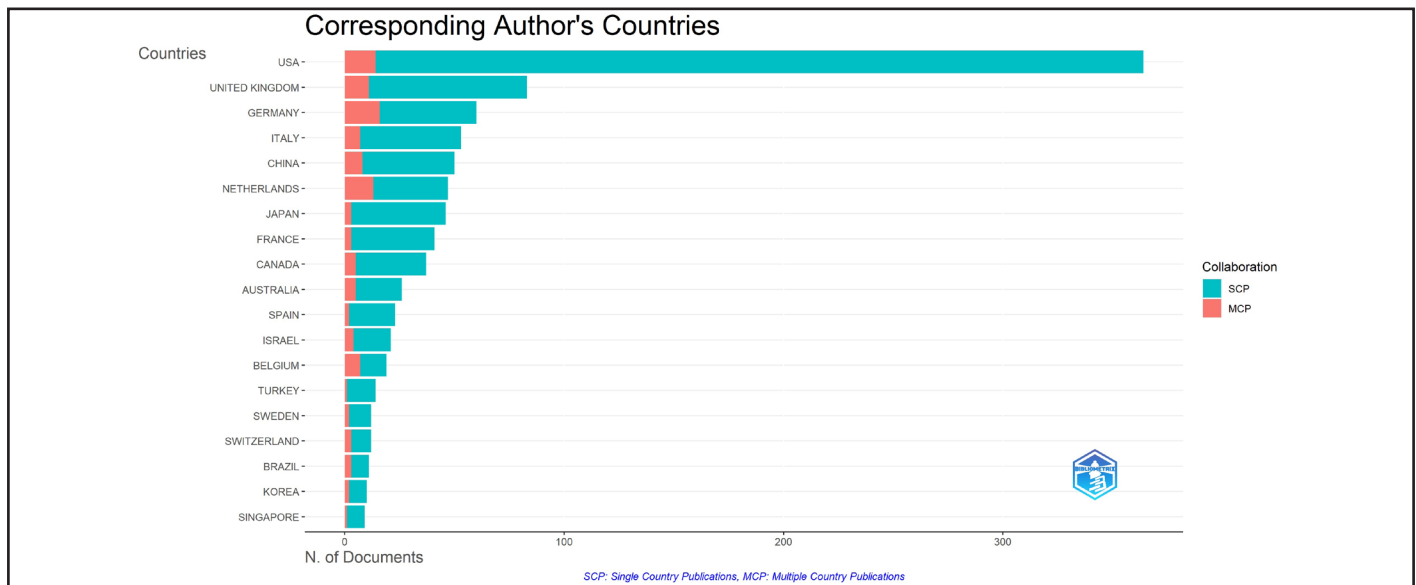


Figure 3 a. Changes in the number of articles by country over the years



**Figure 3 b.** Corresponding Author's Countries

Journal of Pain and Symptom Management, Journal of the American Geriatrics Society, Journal of Medical Ethics, Journal of Palliative Medicine, and Journal of Palliative Medicine were the journals which included the most publications on palliative nutrition. Table 2 summarizes the journals with the highest number of publications on this topic. The Journal of the American Geriatrics Society, the Archives of Internal Medicine, and the Journal of Medical Ethics were the most cited journals. The H index, the total number of publications, and citations of the most influential journals are summarized in Table 3. Figure 4 shows that the top 5 journals with the highest number of publications all started publishing on nutrition in the 1990s, the first publications were published by the Journal of the American Geriatrics Society and there has been a dramatic increase in the number of publications in these journals since the early 2000s.

Table 4 shows the institutions/universities with more than 15 publications on palliative nutrition. According to Table 4, when we look at the countries of the institutions in this list, the majority of them were located in the United States. According to this table, the top 5 most productive institutions were the National Taiwan University (Taiwan), the Vrije Universiteit Amsterdam (the Netherlands), the University of Pennsylvania (the United States), the University of North Carolina (the United States), and Indiana University Bloomington (the United States). Figure 5 shows the production of the most productive institutions over time. The Vrije Universiteit Amsterdam was the first to publish publications on this topic. Publications from other institutions also started to appear in the early 1990s. The number of

publications started to increase rapidly after 2006 (Figure 5).

The United States (n: 400), the United Kingdom (n: 101), Italy (n: 68), the Netherlands (n: 61), and Canada (n: 54) are among the countries with the highest number of publications on palliative nutrition. In Figure 2, the countries of the corresponding authors are analyzed, while Table 5 analyzes the countries of all authors (corresponding and co-authors). The data used in this table were downloaded from the Web of Science database and tabulated. As seen in Table 5, the countries with the highest total number of citations were the United States with 9252 citations, the Netherlands with 2005 citations, and England with 1616 citations. However, in the detailed analysis made with the Biblioshiny program, the Netherlands, where eight publications were published, was the country with the most publications that received citations (n: 50).

According to the analysis with the Biblioshiny program 'end, care, hydration, nutrition, life, decision-making, artificial nutrition, and palliative care' terms were the most preferred keywords among 1363 author keywords. Table 6 shows the occurrence rates of these keywords. Figure 6a visualizes the frequency of the most used keywords on nutrition. Figure 6b visualizes the most frequently preferred keywords by year. According to this, 'advance care planning, end-of-life, decision-making, and tube feeding' topics have been trending in recent years, and the topic of ethics has been trending especially since the early 1990s. Figure 6b was created with the bibliometric online application (<https://bibliometric.com/app>).

**Table 2.** Most relevant journals on nutrition studies

Journals	Number of Publications
Journal of Pain and Symptom Management	39
Journal of the American Geriatrics Society	37
Journal of Medical Ethics	31
Journal of Palliative Medicine	31
Palliative Medicine	28
Supportive Care in Cancer	25
American Journal of Hospice & Palliative Medicine	23
Archives of Internal Medicine	20
Medecine Palliative	17
Nutrition in Clinical Practice	17

**Table 3.** Journals' local impact on nutrition studies

Journals	H_index	Tc	Np
Journal of the American Geriatrics Society	20	1396	37
Archives of Internal Medicine	16	1434	20
Journal of Medical Ethics	16	569	31
Journal of Pain And Symptom Management	16	949	39
Supportive Care in Cancer	14	631	25
Journal of Palliative Medicine	13	825	31
Palliative Medicine	13	1122	28
Bmc Palliative Care	9	188	16
Pediatrics	9	475	10
Jama-Journal of the American Medical Association	8	1575	12

\*TC: total citations, NP: number of publications

**Table 4.** The institutions/universities with more than 15 publications on nutrition

Affiliation	Number of publications
National Taiwan University/Taiwan	27
The Vrije Universiteit Amsterdam/Holland	27
University of Pennsylvania/ The United States	26
The University of North Carolina/ The United States	24
Indiana University Bloomington/ The United States	21
The University of Toronto/ Canada	21
University of Washington/ The United States	19
Harvard University/ The United States	18
Ghent University/ Belgium/Taiwan	18
National Taiwan University Hospital	17
Seirei Mikatahara General Hospital/Japan	17
The University of Chicago/ The United States	17
University of Lausanne/Switzerland	17
The University of Tokyo/Japan	16

**Table 5.** Most cited countries

Country	Number of Publications	Total Citations	Average Article Citations
The Usa	400	9252*	25.40
Netherlands	61	2005	42.70
England	101	1616	19.50
Canada	54	1067	28.80
Italy	68	856	16.20
Japan	51	731	15.90
China	15	608	12.20
Israel	24	588	28.00
Germany	70	534	8.90
Australia	41	419	16.10
Belgium	30	388	20.40
France	46	279	6.80
Spain	33	174	7.60
Austria	12	153	19.10
Switzerland	29	152	12.70
Denmark	8	150	50.00*
Korea	12	145	14.50
Sweden	22	115	9.60

\*Shows the highest numbers

**Table 6.** Most frequent words

Words	Occurrences
End	223
Care	212
Hydration	167
Nutrition	159
Life	138
Decision-Making	126
Artificial Nutrition	114
Palliative Care	110
Death	89
Percutaneous Endoscopic Gastrostomy	74
Attitudes	73
Nursing-Home Residents	73
Survival	70
Physicians	61
Support	56
Cancer	51
Advanced Dementia	50
Of-Life Care	50
Patient	49
Decisions	48
Quality	47
Advance Directives	45
Cancer-Patients	44
Outcomes	44
Preferences	44

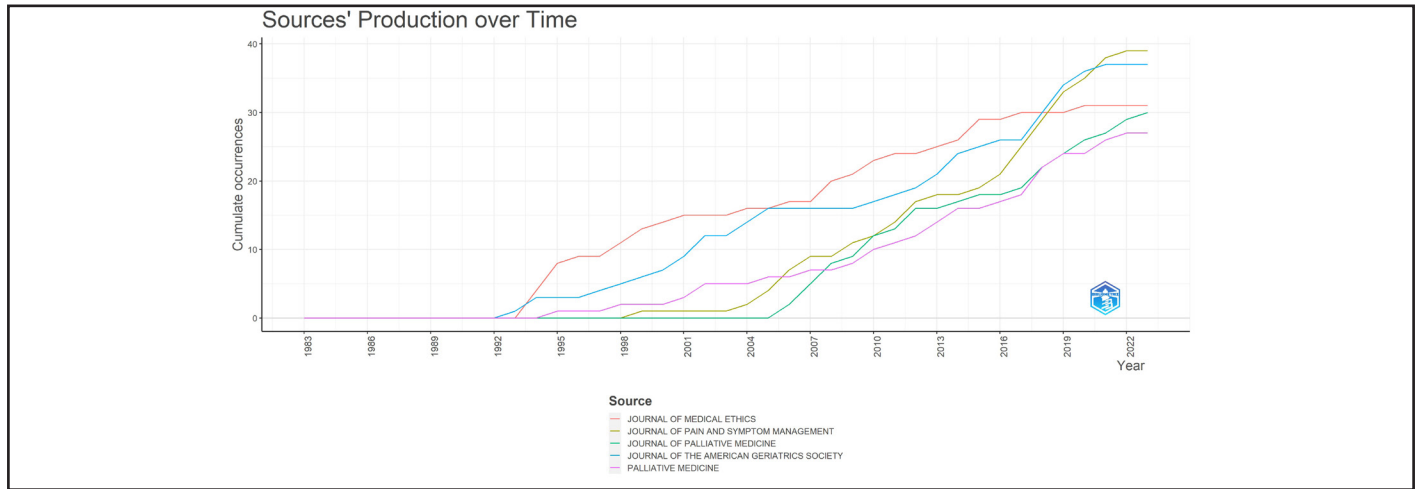


Figure 4. Top Journals' Production over Time

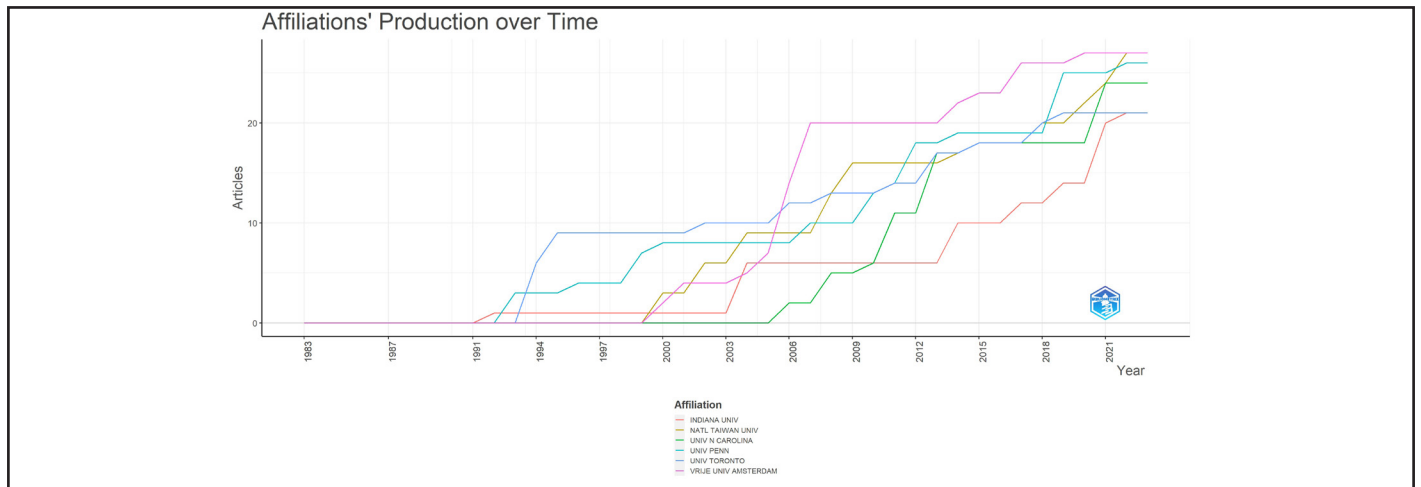


Figure 5. Affiliations' Production over Time

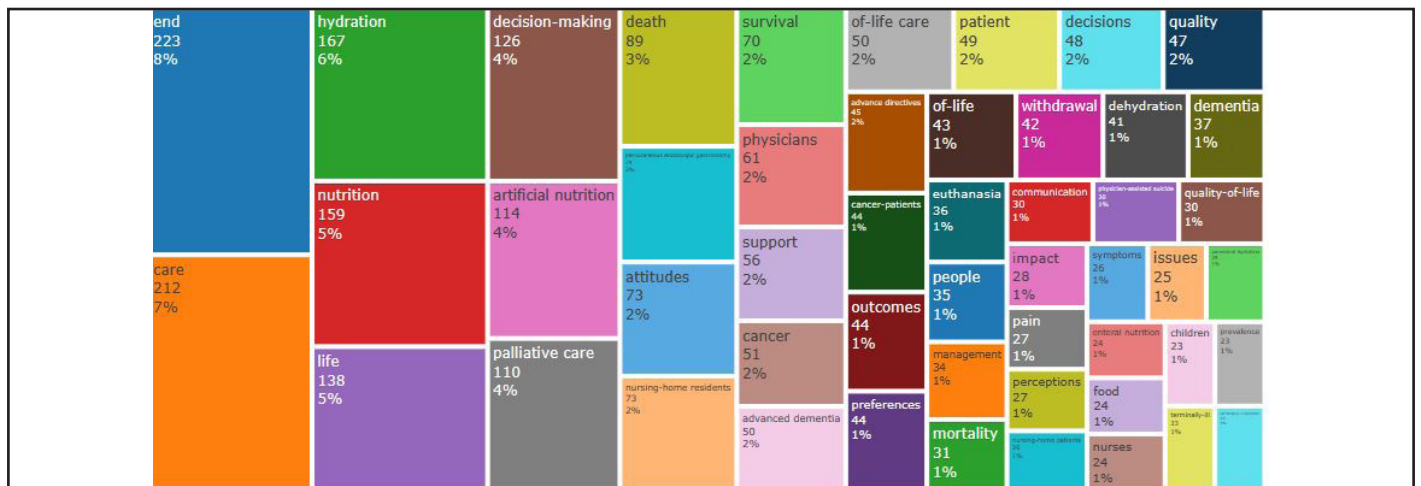
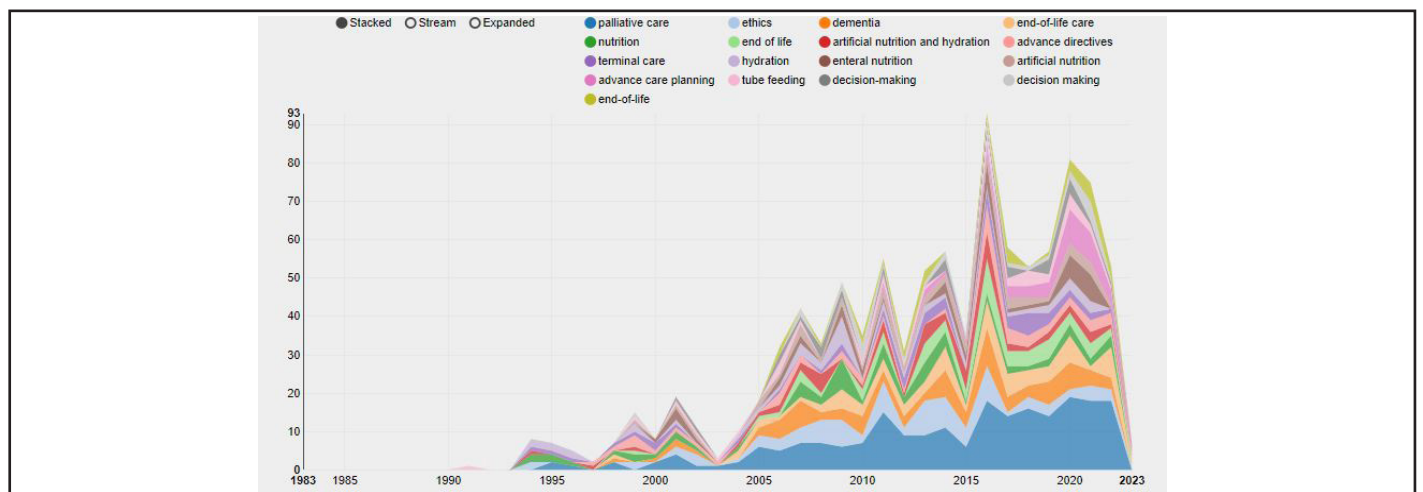


Figure 6a. Tree map



**Figure 6b.** Keywords by years

## DISCUSSION

Bibliometric analysis, one of the most popular mathematical statistics-based methods can evaluate productivity in academia, outline academic frontiers and areas of focus, and project advancement in science trends in the field of study using databases of scientific literature and metrological characteristics. Other methodologies, such as standard reviews, meta-analyses, or experimental studies, are incapable of providing the same level of detail [11]. Furthermore, bibliometric analysis can assess the qualitative and quantitative contributions and collaboration of various countries, journals, institutions, etc. In a variety of medical disciplines, bibliometric evaluations have so far been conducted to give an overview of cross-sectional and longitudinal scientific activity [12-16]. In this study, a specific methodology of combining bibliometric tools was applied to examine the state of research topics in the field of palliative nutrition over time. The analysis revealed not only the most studied clusters of themes but also transnational network connections. We think there is a possibility to further integrate collaboration between organizations active in the field to accelerate research development, knowledge sharing and dissemination, and collaborative fund acquisition. Moreover, using a visualization of keywords in the set of publications (thematic analysis), we explored four main research clusters in the field.

Traditional reviews and meta-analyses have been undertaken in recent years to carefully analyze nutrition research from diverse perspectives. Also, there are some published studies on nutrition [17-20] and nutrition in pediatric intensive care [21]. But no similar study has been published on nutrition in palliative care. Iping et al. [21] searched the Web of Science database too. But differently, they used the VOSviewer application to create

networks. Through the use of bibliometric techniques, Youn et al. [17] examined the global trends in nutrition in cancer research. VOSviewer was also used in this study's visualization analysis. Wang et al. [22] used two tools in their study, CiteSpace, and VOSviewer, to perform bibliometric analysis. In this study, we used two bibliometric tools (Biblioshiny and bibliometric online application). Our study used a novel technique, to chart the evolution of research teams, partnerships, and areas of interest in the fields of palliative care and nutrition over time. Wang et al. [22] used the Web of Science database as in our study, while Youn et al. [17] used the Scopus database.

Youn et al. [17] pointed out that most of the authors were from European countries. The United States ( $n = 400$ ), the United Kingdom ( $n = 101$ ), Italy ( $n = 68$ ), the Netherlands ( $n = 61$ ), and Canada ( $n = 54$ ) were among the countries with the most publications in the current study. We thought that this difference was due to the difference in subject matter between our study and the study of Youn et al. [17].

A recent bibliometric study by Wang et al. [22] examined publications on nutrition in child health. In this study, the top three contributing countries were reported to be the United States, the United Kingdom, and Canada. However, the contribution of developing countries was incredibly small according to this study's results [22]. In this study, there were publications from 59 countries. The United States ( $n=400$ ), the United Kingdom ( $n=101$ ), Italy ( $n=68$ ), the Netherlands ( $n=61$ ), and Canada ( $n=54$ ) were among the countries producing the most publications on palliative nutrition. Similarly, the number of publications from developing countries was limited.



In the study by Wang et al. [22], the number of publications showed a decreasing trend after 2016. The annual number of publications in our study has significantly increased over the last 20 years. These publications grew at a 5.34% yearly rate. The two years with the most publications (n: 67, and n: 64, respectively) were 2020 and 2021. From 2003 to 2022, the number of publications fluctuated, but overall they've increased.

According to Wang's study [22], the United States and the United Kingdom both maintain close relations with 55 other countries. These countries were followed by Canada (n: 54) and Switzerland (n: 53) Australia (n: 53) and Belgium (n: 50). The fact that China has alliances with 48 nations was noteworthy, and they reported that China will lead the way in child nutrition in the future. In our study, Germany, the Netherlands, the United States of America, the United Kingdom, and Belgium were the countries with the most multi-country publications. In other words, they were the countries with international collaborations. In our study, the publications were frequently published in journals dealing with geriatrics and palliative care and pain. Journal of Pain and Symptom Management, Journal of the American Geriatrics Society, Journal of Medical Ethics, Journal of Palliative Medicine, and Journal of Palliative Medicine were the journals with the highest number of publications on palliative nutrition. Journal of the American Geriatrics Society was the highest-cited journal.

We also conducted keyword analysis as in other bibliometric studies [23-28]. With the bibliometric methods we used, we also analyzed keyword preferences over the years in detail. According to our results, 'end, care, hydration, nutrition, life, decision-making, artificial nutrition, and palliative care terms were the most preferred keywords.

### Limitations

There are some limitations to the current research. First, relying solely on English-language literature may have missed important insights from other languages' literature. Publications in other languages might have gone unnoticed because only English publications were taken into consideration. Because a bibliometric study does not address specific research issues, narrow subtopics are not found. This study's data was also acquired from a single database and focused only on publications in line with the study methodology. Additional studies including comparative or content evaluations of data from other databases can be planned.

### CONCLUSION

Overall, the application of modern research technologies enables us to assess and depict broad-scale research trends in the field of nutrition in palliative care, as well as clarify how these results correspond with current publications. The snapshots of the research field can be used to track trends and advances in the network over the next few years. The findings could serve to shape the future research agenda in intensive care nutrition. Citations are another level of bibliometry that is frequently of interest. These might potentially be used to identify certain subjects of interest within the dataset.

**Ethics Statement:** A public data repository of an electronic database was employed in the current investigation, which was exempt from ethical approval.

**Conflict of Interest:** The authors has no conflicts of interest to disclose.

**Funding:** None

**Author Contributions:** The authors contributed equally to the preparation of the manuscript.

### REFERENCES

- [1] Palliative care. World Health Organization (WHO). <https://www.who.int/news-room/fact-sheets/detail/palliative-care>
- [2] Holdaway A (2022) Nutrition in palliative care: issues, perceptions and opportunities to improve care for patients. *Br J Nurs.* 31(21):S20-S27. <https://doi.org/10.12968/bjon.2022.31.21.S20>
- [3] Elke G, Hartl WH, Kreymann KG, Adolph M, Felbinger TW, Graf T, et al (2019) Clinical Nutrition in Critical Care Medicine - Guideline of the German Society for Nutritional Medicine (DGEM). *Clin Nutr ESPEN.* 33:220-275. <https://doi.org/10.1016/j.clnesp.2019.05.002>
- [4] Singer P, Blaser AR, Berger MM, Alhazzani W, Calder PC, Casaer MP, et al (2019) ESPEN guideline on clinical nutrition in the intensive care unit. *Clin Nutr.* 38(1):48-79. <https://doi.org/10.1016/j.clnu.2018.08.037>
- [5] McClave SA, Taylor BE, Martindale RG, Warren MM, Johnson DR, Braunschweig C, et al; Society of Critical

- Care Medicine (2016) American Society for Parenteral and Enteral Nutrition. Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). *JPEN J Parenter Enteral Nutr.* 40(2):159-211. <https://doi.org/10.1177/0148607115621863>
- [6] Mooi NM, Ncama BP (2019) Evidence on nutritional therapy practice guidelines and implementation in adult critically ill patients: A systematic scoping review. *Curationis.* 42(1):e1-e13. <https://doi.org/10.4102/curationis.v42i1.1973>
- [7] Wischmeyer PE (2017) Tailoring nutrition therapy to illness and recovery. *Crit Care.* 21 (Suppl 3):316. <https://doi.org/10.1186/s13054-017-1906-8>
- [8] Jacobs A, Verlinden I, Vanhorebeek I, Van den Berghe G (2019) Early Supplemental Parenteral Nutrition in Critically Ill Children: An Update. *J Clin Med.* 8(6):830. <https://doi.org/10.3390/jcm8060830>
- [9] Iping R, Hulst JM, Joosten KFM (2022) Research developments in pediatric intensive care nutrition: A research intelligence review. *Clin Nutr ESPEN.* 50:1-7. <https://doi.org/10.1016/j.clnesp.2022.06.015>
- [10] Aria M, Cuccurullo C (2017) Bibliometrix: An R-tool for comprehensive science mapping analysis. *J Informetr.* 11(4):959-975. <https://doi.org/10.1016/j.joi.2017.08.007>
- [11] Choudhri AF, Siddiqui A, Khan NR, Cohen HL (2015) Understanding bibliometric parameters and analysis. *Radiographics.* 35(3):736–746. <https://doi.org/10.1148/rg.2015140036>
- [12] Ekici A, Alkan S, Aydemir S, Gurbuz E, Unlu AH (2022) Trends in *Naegleria fowleri* global research: A bibliometric analysis study. *Acta Trop.* 234:106603. <https://doi.org/10.1016/j.actatropica.2022.106603>
- [13] Çelik M, Ceylan MR, Arslan Y, Dinçer NG, Alkan S (2023) Bibliometric analysis of publications on Hepatitis D virus published in 1984–2022. *Cent Asian J Med Hypotheses Ethics.* 4(1):22-33. <https://doi.org/10.47316/cajmhe.2023.4.1.02>
- [14] Bahşi İ, Adanır SS, Kervancıoğlu P, Orhan M, Govsa F (2021) Bibliometric Analysis of Turkey's Research Activity in the Anatomy and Morphology Category from the Web of Science Database. *Eur J Ther.* 27(4):268-280. <https://doi.org/10.5152/eurjther.2021.20108>
- [15] Bahşi A, Zengin O (2023) A Bibliometric Analysis of Turkish Research Activity in the Rheumatology Category of the Web of Science Database. *Eur J Ther.* 27(4):299-310. <https://doi.org/10.5152/eurjther.2021.21020>
- [16] Alkan S, Gökçe ON, Şahinoğlu MS (2022) A Quantitative Study of The Most Influential Articles on Cytomegalovirus in Solid Organ Transplantation. *J Biotechnol and Strategic Health Res.* 6(2):122-130. <https://doi.org/10.34084/bshr.1101983>
- [17] Youn BY, Lee SY, Cho W, Bae KR, Ko SG, Cheon C (2022) Global Trends of Nutrition in Cancer Research: A Bibliometric and Visualized Analysis Study over the Past 10 Years. *Int J Environ Res Public Health.* 19(7):4165. <https://doi.org/10.3390/ijerph19074165>
- [18] Zyoud SH, Shakhshir M, Abushanab AS, Al-Jabi SW, Koni A, Shahwan M, et al (2022) Mapping the global research landscape on nutrition and the gut microbiota: Visualization and bibliometric analysis. *World J Gastroenterol.* 28(25):2981-2993. <https://doi.org/10.3748/wjg.v28.i25.2981>
- [19] Mazzù MF, Baccelloni A, Finistauri P (2022) Uncovering the Effect of European Policy-Making Initiatives in Addressing Nutrition-Related Issues: A Systematic Literature Review and Bibliometric Analysis on Front-of-Pack Labels. *Nutrients.* 14(16):3423. <https://doi.org/10.3390/nu14163423>
- [20] Zyoud SH, Shakhshir M, Abushanab AS, Koni A, Shahwan M, Jairoun AA, Al-Jabi SW (2023) Bibliometric mapping of the landscape and structure of nutrition and depression research: visualization analysis. *J Health Popul Nutr.* 42(1):33. <https://doi.org/10.1186/s41043-023-00378-2>
- [21] Iping R, Hulst JM, Joosten KFM (2022) Research developments in pediatric intensive care nutrition: A research intelligence review. *Clin Nutr ESPEN.* 50:1-7. <https://doi.org/10.1016/j.clnesp.2022.06.015>
- [22] Wang Y, Liu Q, Chen Y, Qian Y, Pan B, Ge L, et al (2021) Global Trends and Future Prospects of Child Nutrition: A Bibliometric Analysis of Highly Cited Papers. *Front Pediatr.* 9:633525. <https://doi.org/10.3389/fped.2021.633525>

- [23] Kuyubaşı SN, Demirkıran ND, Kozlu S, Öner SK, Alkan S (2023) Global Analysis of Chronic Osteomyelitis Publications with a Bibliometric Approach. Cyprus J Med Sci. 8(1):8-12. <https://doi.org/10.4274/cjms.2022.2021-234>
- [24] Bozkurt AS (2023) Bibliometric Analysis of the Published Studies on the Kindling Model between 1980 and 2023 Eur J Ther. 29(2):188-193. <https://doi.org/10.58600/eurjther.20232902-396.y>
- [25] Bulut E, Dokur M, Basar E (2020) The Top 100 Cited Articles on Ocular Trauma: A Bibliometric Analysis. Eur J Ther. 26(4):322-331. <https://doi.org/10.5152/eurjther.2020.19115>
- [26] Erdinc G (2023) Graphene on dentistry: A bibliometric and scientometric analysis. Niger J Clin Pract. 26(1):65-72. [https://doi.org/10.4103/njcp.njcp\\_246\\_22](https://doi.org/10.4103/njcp.njcp_246_22)
- [27] Şahin S, Alkan S (2023) Contribution of Turkey in Heart Transplant Research: A Web of Science Database Search. Exp Clin Transplant. 21(2):150-157. <https://doi.org/10.6002/ect.2022.0291>
- [28] Akar A (2023). A Comprehensive Bibliometric Analysis on Neuronavigation Researches. Eur J Ther. <https://doi.org/10.58600/eurjther1627>

***How to Cite;***

Alkan S, Tokur ME (2023) Bibliometric and Visual Analysis of Palliative Nutrition Research Based on Web of Science. Eur J Ther. 29(3):426-436. <https://doi.org/10.58600/eurjther1672>