

Global trends in nutrition and gastric cancer: A bibliometric analysis study

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Abstract

Background: Nutrition in the management of gastric cancer has a big role to play. Recent research has shown that nutritional therapies, counseling, and various interventions positively impact the quality of life of gastric cancer patients.

Purpose: To identify the global research output for nutrition in gastric cancer research, a bibliometric analysis during the past 5 years was conducted to evaluate the current status of trends, gaps, and research directions as no bibliometric studies have been conducted regarding nutrition and gastric cancer so far.

Material & Methods: Total of 276 articles were chosen from pubmed for this bibliometric study from a set of 2044 articles.

Results: The number of publications has grown from 2019 to 2020. However, there was a decline in the number of publications from year 2021 onwards. The majority of the authors' affiliations were from the United States. It has been identified that authors have majorly used "middle-aged, "male" and "female" as keywords after "humans". The *Nutrients* journal was the most popular among the authors as the journal published 21 articles related to the topic. Providing evidence-based nutritional solutions for various nutrition and gastric cancer research interventions.

Conclusions : Since it is presumed that stomach cancer is still the most aggressive cancer and still the fourth leading cause of cancer deaths globally. Hence, it is vital to generate research findings concluding some effective nutrition therapies for gastric cancer patients.

Keywords: nutritional management; nutritional status; malnutrition; bibliometric; nutritional risk

Introduction

According to the World Cancer Research Fund (1), stomach cancer continues to rank among the top 5 most frequent malignancies globally. A study on the etiology and prevention of gastric cancer by Cheng et al., (2016) found that the likelihood of developing stomach cancer is strongly dependent on diet and h. Pylori infection (2). Gastric cancer is more behaviorally affected than other malignancies (3). Research on the global trends in gastric cancer incidence and key variables in the pathogenesis of gastric cancer was carried out by Balakrishnan

et al. (2017). According to the study, although the incidence of gastric cancer has significantly decreased in people, it is still the world's leading cause of death.

The decline is majorly seen due to a decrease in the frequency of infection caused by H.Pylori. However, the dietary changes were also studied and there were changes in the food preservation and availability of food items. Choosing fresh and seasonal intake of vegetables and fruits rather than processed and preservative food items was associated with a decrease in the occurrence of the number of gastric cancer cases (4). It has been observed that new cases of stomach cancer are on a decline worldwide yet on a global scale it continues to be one of the leading causes of death because of its spread. In India, stomach cancer is prevalent in the northeastern and southern regions (5).

Nutritional management and support in individuals affected with stomach cancer plays an important role. The primary goal is to improve the nutritional status of gastric cancer patients. The goal can be performed with oral nutrition, enteral nutrition (EN), and parenteral nutrition (PN). After gastrectomy (complete/ partial), it is recommended that the patient should have small and frequent meals. Complex carbohydrates should be included with a high amount of protein. (6). The effect of treatment of cancer on nutritional status is well known. On the other hand, individuals with gastric cancer are more likely to experience a decline in their nutritional status. Malnutrition is common in patients suffering from gastric cancer (7). Thus, nutritional assessment is carried out at the time of diagnosis, during and after the treatment to detect malnutrition and patients at nutritional risk. Late diagnosis may hamper the weight gain of the individual (8). The clinical benefits and guidelines of nutritional therapy, specifically cancer treatments, were not widely known in the past due to a lack of evidence-based research. On the other hand, excellent work is being done to encourage cancer patients to eat well (9).

Objective: For patients with gastric cancer, there is not enough evidence to support dietary interventions, according to medical professionals. Thus, bibliometric analysis was used to look at the global trend of nutrition in gastric cancer research. Over the past five years, a bibliometric study was conducted because no research has been done to look for global trends in the relationship between nutrition and gastric cancer. In addition to being extremely useful for determining the overall pattern of the research, this bibliometric analysis is necessary for assessing gaps, trends, and research directions in the field of interest. The goal of the study was to perform a bibliometric analysis to assess the global research productivity of nutrition and gastric cancer from 2019 to 2024 to support future research priorities. The dimensions that the analysis followed were:

- (1) Number of publications/years
- (2) Authors
- (3) Affiliations
- (4) Author keywords
- (5) Sources and number of articles
- (6) Collaboration among countries

Materials and methods

Using statistical techniques to examine patterns in gastric cancer and nutritional requirements, bibliometric analysis tools have been used to track changes in the fields of nutrition and gastric cancer over the previous five years.

For the bibliometric analysis, the data from pubmed has been identified. Pubmed is amongst the most widely accessible resources in the world that delivers a public search interface. The database was recovered on 08 February 2024 to conduct analysis. The preliminary search term used was "Nutrition and Gastric Cancer". The study period identified is from 2019- 2024. A total of 2044 articles were identified with the primary search "Nutrition and Gastric Cancer". The articles were further restricted to those which were 1) free to access (n=1223) 2) Records screened for Human studies (n=727) 3) the research papers in the English language included (n=720) 4) the age group was considered as middle age group since the occurrence of gastric cancer is rising amongst middle age group individuals (n= 276). A final of 276 articles were considered for the bibliometric analysis (Figure 1).

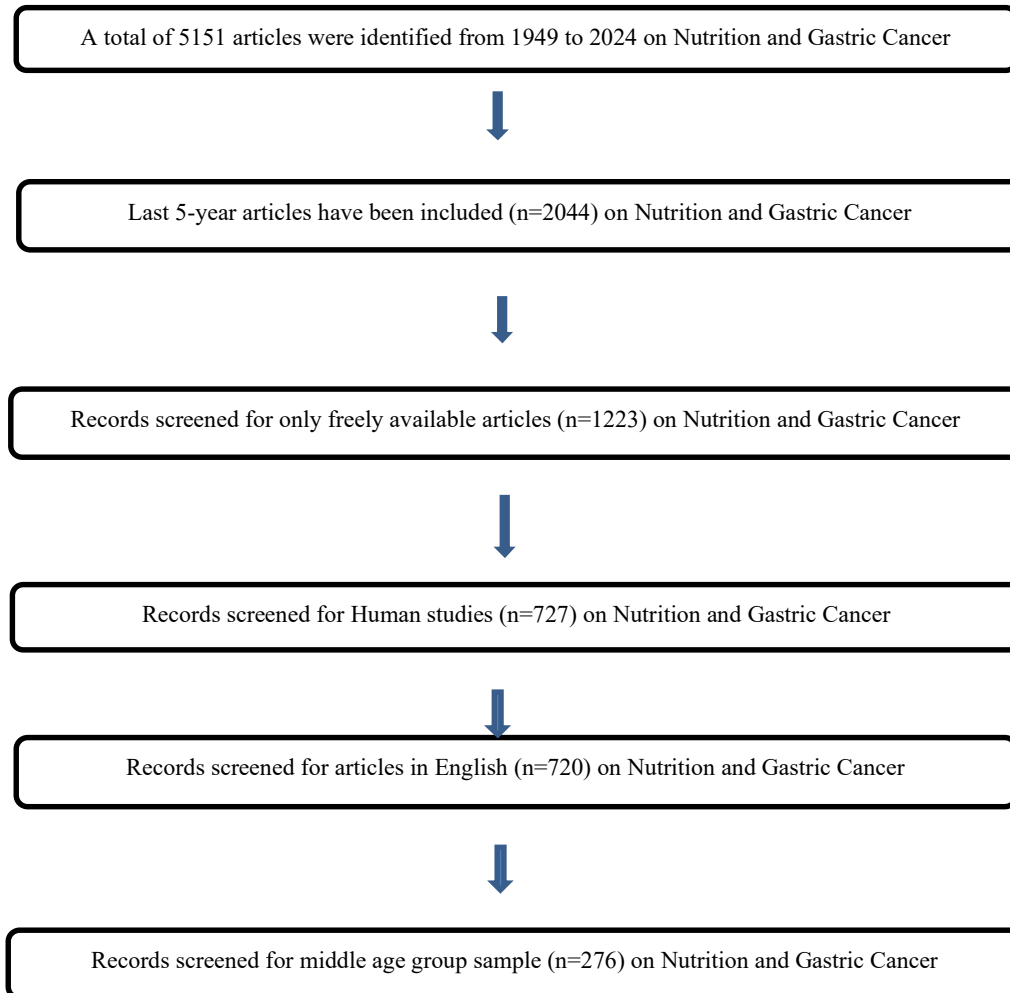


Figure 1: Flow diagram for bibliometric analysis

Results and discussion

The data has been analysed in the biblioshiny app in the biblioshiny package. These packages are used in the R language environment. The graphs from the app were created and downloaded in Microsoft Excel 2020.

a. Publications in nutrition and gastric cancer

As shown in the Figure 2, the number of articles significantly increased from 2019 to 2020. However, from 2021 onwards the research on nutrition and gastric cancer is decreasing. 82 articles out of 276 have been studied in the year 2020. In 2023, there have only been twenty-five articles published.

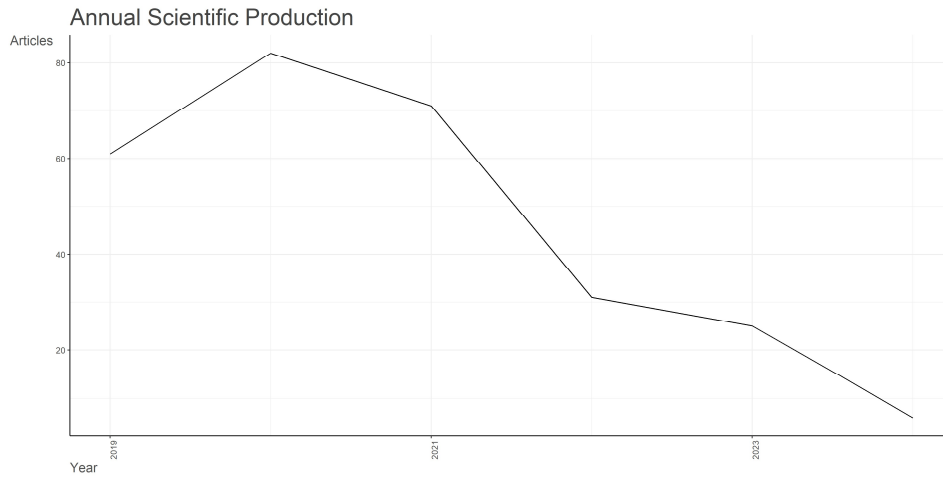


Figure 2: Number of publications in nutrition and gastric cancer, 2019-2024

b. Authors, Author Keywords and Affiliations

i. Authors:

As mentioned in the Figure 3, Taylor PR, Wang X, and Wang Y has contributed most of the articles (8 articles) out of 276. The second highest number of articles (7 articles) has been contributed by 7 authors including Camargo MC, Liu Y, Palli D, Shah SC, Song M, Wang H, and Zhang Y.

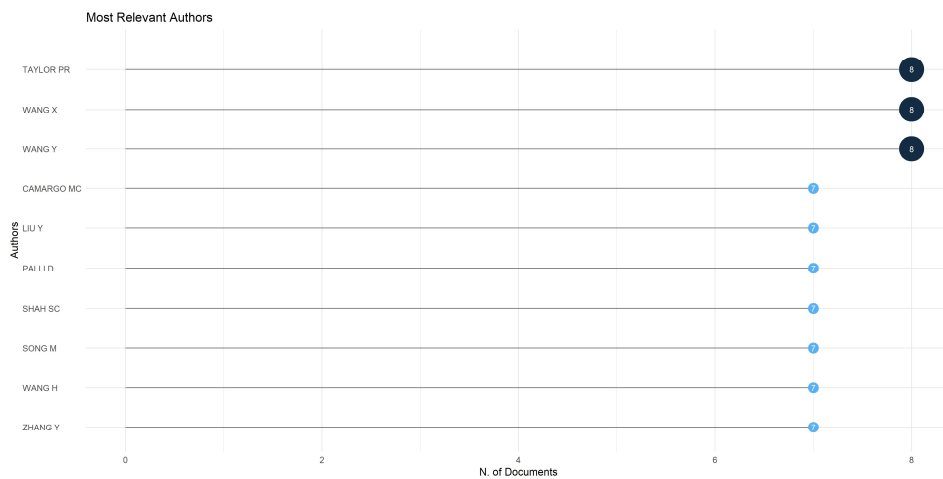


Figure 3: Top 10 most productive authors

ii. Most frequent words:

Out of 1407 words, the top 10 words have been mentioned in Table 1. The term that appear the most frequently is Humans (276), second highest was Middle-aged (233) followed by Male (231) and Female (222). It has been observed that retrospective studies have been done to analyze the effect of nutrition on gastric cancer patients.

Table 1: Author Keywords

S. No.	Words	Occurrences
1	Humans	276
2	Middle-aged	233
3	Male	231
4	Female	222
5	Aged	201
6	Adult	121
7	Retrospective studies	89
8	Risk factors	68
9	Prognosis	62
10	Aged 80 and over	48

A word cloud was made to find more relevant keywords besides the top 10 keywords that the authors mentioned to illustrate the impact of their keywords. The font size indicates how frequently the event occurs. Nutritional status, prospective studies, treatment outcomes, and case-control studies are additional keywords in addition to the top ten (Figure 4).

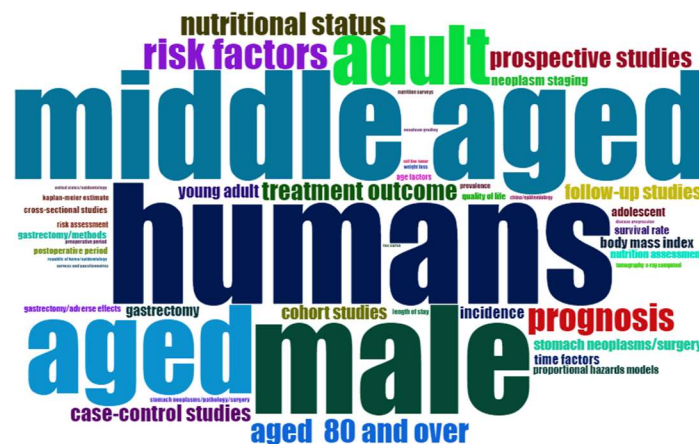


Figure 4: Word cloud analysis of Nutrition and Cancer, 2019-2024

iii. Author Affiliations:

Concerning the author affiliations as mentioned in Table 2, the majority of articles were published by “Vanderbilt University Medical Center” (99 articles) in the US, followed by the “National Cancer Institute” (57 articles) from the US and “Peking University Cancer Hospital and Institute” (53 articles) from China.

Table 2: Top 10 affiliations of the authors

S. No.	Affiliation	Articles
1	“Vanderbilt University Medical Center”	99
2	“National Cancer Institute”	57
3	“Peking University Cancer Hospital and Institute”	53
4	“Chan School of Public Health”	49
5	“Capital Medical University”	46
6	“Chinese Academy of Medical Sciences and Peking Union Medical College”	46
7	“Tottori University Faculty of Medicine”	45
8	“Sun Yat-Sen University”	44
9	“Fujian Medical University”	42
10	“Fujian Medical University Union Hospital”	38

c. Sources and Number of Articles:

As presented in Table 3, out of 138 entries, the top 10 sources were identified out of which Nutrients got the highest number of articles (21), followed by PLOS One (17). In addition, Medicine has 14 articles and the International Journal of Cancer has 10 articles.

Table 3: Sources and Articles

S. No.	Sources	Articles
1	Nutrients	21
2	PLOS One	17
3	Medicine	14
4	International Journal of Cancer	10
5	BMC Cancer	9
6	Cancer Medicine	6
7	Asian Journal of Surgery	5
8	BMJ Case Reports	5
9	Gastroenterology	5
10	Cancer Epidemiology, Biomarkers & Prevention	5

d. Country Collaboration

The corresponding authors from China have contributed the greatest number of articles (68), as Table 4 illustrates. Japan's corresponding authors (35 articles) were ranked second.

Table 4: Top 10 corresponding authors' countries

S. No.	Country	Articles
1	China	68
2	Japan	35
3	Korea	24
4	USA	19
5	Sweden	7
6	Poland	4
7	Netherlands	5
8	Australia	4
9	Turkey	4
10	Brazil	4

e. Collaborative Map:

The below world map indicates the collaboration network amongst the countries. The red line indicates the extent of collaboration between the authors and the blue color indicates the number of publications across countries.

Country Collaboration Map

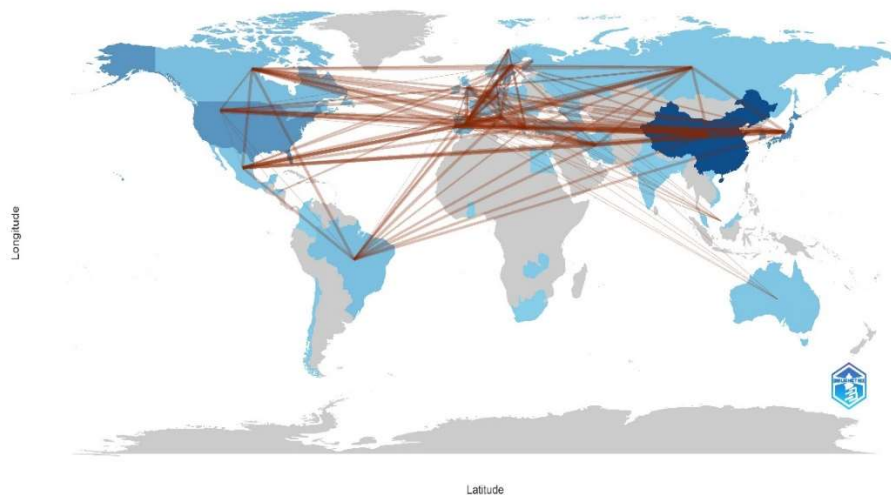


Figure 5: Collaboration World-map

There are important conclusions to take into account from this bibliometric analysis on the relationship between diet and gastric cancer. To begin with, there were more publications in 2020 than there were in 2019. It has been noted that approximately 82 articles have been published in 2019-2020. After 2021 there has been a decline in the number of published articles. Only 25 articles have been reported in the year 2023. This may be due to a result of a drop in gastric cancer rates globally. Nevertheless, there is a need for publications and research in the field of gastric cancer and nutrition, particularly in nations with high incidence and death rates (10).

The maximum number of articles published by Wang X, Wang Y, and Taylor PR. It was surprising to see that most of the top authors had affiliations primarily in the United States. This may be linked to first-rate healthcare facilities and one of the top locations for the treatment of stomach cancer (11). Given that traditional medicine is more commonly practiced in Asian nations like China, Japan, and Korea, hence the results are oddly seen. This may be because patients with gastric cancer use traditional medicines instead of nutrition in Asian countries (12).

Concerning the author keywords, “middle-aged”, and “male” followed by “female” were the highest after the “humans” keywords. This may be because gastric cancer is more common in the general population. It has been observed that gastric cancer incidence is majorly seen in the middle-aged male population (13, 15). Retrospective studies are also frequently used in gastric oncology research because they have a long history of use in surgical oncology and enable researchers to assess outcomes in a real-world setting at a lower cost than prospective trials (14).

As depicted in Table No. 4, the maximum number of corresponding authors are from China, and Japan followed by Korea. This is a higher number of gastric cancer cases in Asian countries. In particular, 60% were observed in Eastern Asia, and 43.9% in China alone (10). This research has certain restrictions. First, it's possible that important insights from literature in other languages were overlooked when relying solely on the English language. A few significant articles published in other languages might have gone unnoticed if one was limited to English publications.

Discussion

Bibliometric analysis does not identify narrow areas within the topic because it does not address particular research questions. Despite its limitations, bibliometric analysis can be used to identify gaps in the relevant research area of existing knowledge as well as future research directions with more extensive exploratory research questions that aim to map keywords. Therefore, with the abundance of literature containing the essential components, this bibliometric analysis contributed to a better understanding of nutrition and gastric cancer research. The worldwide trend of research on nutrition and gastric cancer has steadily declined, as per this bibliometric and visually represented analysis of the field. The death rates from gastric cancer cases have not decreased, though, and more research is needed to develop more effective treatments that lower the risk of death from the disease. Retrospective studies involving middle-aged males and females should be conducted as mentioned in the word cloud analysis using the author's keywords to establish better results in real-world settings. Global recognition was given to research collaboration. Since only one type of cancer was covered, more research on the subject should yield a wealth of knowledge about various nutritional therapies and interventions for patients with gastric cancer. The study's findings have shed light on the subject, offered potential avenues for future investigation, and offered evidence-based advice to healthcare providers regarding the management of gastric cancer. Researchers and professionals involved in the fields of nutrition and gastric cancer will benefit from this research.

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Declaration of interest

The authors declare no conflicts of interest.

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Ethical consideration

Not applicable

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