

A bibliometric snapshot of Turkish and international publications on oral dietary supplements

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ABSTRACT

Aims: This study aimed to systematically compare Turkish-origin and international publications indexed in PubMed on oral dietary supplements in terms of temporal distribution, methodological characteristics, and research approaches.

Methods: This descriptive bibliometric study analyzed 40 articles indexed in PubMed. Articles were retrieved on December 2, 2025, using the search query (“dietary supplements” OR “oral supplement”) AND (“Turkey” OR “Türkiye”). The first 20 Turkish-origin and 20 international articles, which were sorted by the “best match” option and screened sequentially from the top of the results list and met inclusion criteria were analyzed. Variables including publication year, number of authors, article views, submission-to-acceptance time, study design, and research approach were extracted. Statistical analyses were performed using non-parametric tests and logistic regression, with $p < 0.05$ considered significant.

Results: A total of 40 articles were included. Turkish-origin publications were predominantly published in 2024–2025 (70.0%), whereas international publications were mainly concentrated in 2021–2023 (65.0%) ($p = 0.018$). Quantitative research approaches were more frequent in Turkish-origin studies (65.0%), while qualitative methods predominated in international publications (70.0%) ($p = 0.056$). International articles had significantly higher article views compared to Turkish-origin articles (median: 26.247 vs. 3.272, $p < 0.001$). Logistic regression analysis demonstrated that quantitative research approach was independently associated with Turkish-origin publications (OR: 4.28, 95% CI: 1.09–16.80, $p = 0.037$).

Conclusion: Turkish and international research on oral dietary supplements differ significantly in terms of publication timing and methodological orientation. The recent increase in Turkish-origin studies suggests growing national research activity, whereas international literature reflects earlier engagement and greater methodological diversity. These findings highlight the need for methodological diversification and closer alignment with global research trends to enhance the impact and visibility of future studies.

Keywords: Bibliometric analysis, oral, supplement, Türkiye

INTRODUCTION

Dietary supplements are defined as concentrated sources of nutrients or other substances with nutritional or physiological effects intended to supplement the normal diet.¹ The prevalence of dietary supplement use varies across populations and age groups.² In recent years, dietary supplement use has increased substantially worldwide, reflecting growing interest in preventive health strategies and nutritional support. At the same time, the dietary supplement market and the scientific literature in this field have expanded rapidly, highlighting the rising global interest in nutrition-based health approaches.³ The relationship between diet and health, including systemic and oral health outcomes, has

been increasingly emphasized in the literature, underscoring the importance of nutrition in disease prevention and health promotion.⁴ Among dietary supplement components, vitamins have received particular scientific attention because of their roles in biological regulation and disease prevention. Bibliometric evidence has shown a rapid increase in research concerning vitamins and cancer, reflecting broader scientific interest in the clinical relevance of micronutrients.⁵ Supplement use is particularly common among older adults, many of whom use these products together with prescription medications, which may increase the risk of potential drug–supplement interactions.⁶ This issue is further

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reinforced by recent longitudinal data showing that dietary supplement use may exceed 80% in older populations and contributes substantially to overall medication burden and polypharmacy.⁷ Nationally representative data from the United States have also shown that dietary supplement use increased over time among older adults, while the risk of potential major drug–drug interactions rose in parallel, emphasizing the clinical relevance of monitoring supplement use in real-world settings.⁸ Recent bibliometric studies have identified evolving research hotspots and emerging trends in the field of dietary supplements, demonstrating that scientific interest in this area is dynamic and continuously developing.⁹ In addition, the field has evolved from relatively simple nutrient-focused investigations toward more complex, mechanism-based and interdisciplinary approaches, indicating progressive maturation of the literature.¹⁰ Because of this growing and increasingly diverse body of evidence, reliable biomedical databases are essential for identifying publication trends and comparing research outputs. PubMed is widely recognized as a comprehensive and dependable resource for accessing biomedical literature and supporting evidence-based research.¹¹ Therefore, this study aimed to systematically compare Turkish-origin and international publications indexed in PubMed on oral dietary supplements, with a focus on publication year, research approach, and methodological characteristics.

METHODS

Ethics

Ethical committee approval was not required for this study, as it did not involve human participants, identifiable personal data, human biological material, or animal experiments. The study was conducted in accordance with the relevant ethical principles and publication ethics standards.

Study Design and Data Source

This study was designed as a descriptive bibliometric analysis. A structured literature search was conducted in the PubMed database to identify articles related to oral dietary supplements. PubMed was selected due to its comprehensive coverage of peer-reviewed biomedical literature and its widespread use in academic research.

Search Strategy

The literature search was performed on December 2, 2025, using the following search query: (“dietary supplements” OR “oral supplement”) AND (“Turkey” OR “Türkiye”). No restrictions were applied regarding study design. Articles indexed in PubMed up to the search date were considered. Only articles with accessible abstracts and full texts in English were included.

Study Selection

This study adopted a structured but non-systematic sampling framework to generate a focused and comparative assessment of contemporary research trends. Relevant articles were identified through a predefined search strategy conducted in the PubMed database, and all retrieved records were evaluated in accordance with explicitly determined inclusion criteria. Instead of undertaking a full systematic review, a targeted sampling method was implemented to enhance feasibility while preserving the ability to directly compare

Turkish-origin and international publications. Articles were sorted using the “best match” option and screened sequentially from the top of the results list. This approach may introduce ranking bias due to PubMed’s relevance algorithm. Following eligibility assessment, a total of 40 studies were included, comprising the first 20 Turkish-origin and the first 20 international articles. A fixed sample size ($n=40$) was preferred to enable detailed manual data extraction and facilitate methodological comparison. This sample size was deemed sufficient for exploratory comparative analysis but not for generalization.

Although the study ensured a balanced and manageable dataset, it was not designed as a systematic review; therefore, PRISMA guidelines were not applied. Particular emphasis was placed on maintaining transparency and reproducibility by clearly defining the search strategy, eligibility criteria, and data extraction procedures. All records underwent duplicate screening, and no duplicate entries were detected.

Inclusion and Exclusion Criteria

Articles were included if they focused on oral dietary supplements or had accessible bibliographic and methodological data; articles were excluded if they were not directly related to oral supplements or lacked sufficient methodological or bibliometric data or were conference abstracts, editorials without data, or non-scientific content.

Data Extraction

The following variables, which were extracted from each article, are publication year, number of authors, article views, submission-to-acceptance time, study design (review vs. original research), research approach (quantitative vs. qualitative), country of origin. Data extraction was performed independently and systematically using a standardized data collection form. Article view data were obtained from the respective publisher platforms.

Classification of Variables

Publication years were categorized into three periods: ≤ 2020 , 2021–2023, and 2024–2025. Study designs were grouped as review articles (including narrative and systematic reviews) and original research (including cohort, cross-sectional, retrospective, and randomized/prospective studies). Research approaches were classified as quantitative or qualitative.

Statistical Analysis

All data analyses were performed using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA). Statistical significance was set at $p < 0.05$. Continuous variables were assessed for normality and, as they did not follow a normal distribution, were analyzed using non-parametric methods. Continuous variables are presented as median (minimum–maximum), and comparisons between groups were performed using the Mann–Whitney U test. Categorical variables are presented as frequencies (n) and percentages (%), and comparisons were conducted using Fisher’s exact test. Binary logistic regression analysis was performed to identify factors independently associated with Turkish-origin publications (dependent variable: Turkish=1, international=0). Variables with clinical and methodological relevance were included in univariate models. A parsimonious multivariable model was constructed including selected covariates to minimize overfitting, given the limited sample size. Logistic regression

was performed as an exploratory analysis and results should be interpreted cautiously due to the small sample size. Given the limited number of observations, model stability may be constrained.

RESULTS

A total of 40 articles were included in the analysis, comprising 20 Turkish-origin and 20 international publications. The general characteristics of the included articles by group are presented in **Table 1**. International articles had significantly higher article views compared to Turkish-origin articles (median: 26.247 vs. 3.272, $p<0.001$). Submission-to-acceptance time was also significantly longer in Turkish-origin articles (median: 112 vs. 52 days, $p=0.028$). No statistically significant differences were observed between the two groups in terms of number of authors ($p=0.142$).

Table 1. General characteristics of the included articles by origin

Variable	Turkish (n=20)	International (n=20)	Total (n=40)	p
Number of authors median (min–max)	5 (1–10)	6 (1–27)	6 (1–27)	0.142
Article views median (min–max)	3.272 (1.078–40.000)	26.247 (11.363–110.334)	13.685 (1.078–110.334)	<0.001*
Submission-to-acceptance time (days) median (min–max)	112 (20–753)	52 (11–239)	61 (11–753)	0.028*

* $p<0.05$. Mann-Whitney U test applied for all continuous variables. Min: Minimum, Max: Maximum

The distribution of articles across publication periods is shown in **Table 2**. Articles were classified into three periods: ≤ 2020 , 2021–2023, and 2024–2025. Turkish-origin articles were predominantly published in 2024–2025 (70.0%), whereas international articles were more evenly distributed across 2021–2023 (65.0%). None of the international articles were published in or before 2020, in contrast to 15.0% of Turkish-origin articles.

Table 2. Distribution of articles by publication period

Publication period	Turkish n (%)	International n (%)	Total n (%)	p
≤ 2020	3 (15.0)	0 (0.0)	3 (7.5)	0.018*
2021–2023	3 (15.0)	13 (65.0)	16 (40.0)	
2024–2025	14 (70.0)	7 (35.0)	21 (52.5)	

Fisher's exact test. * $p<0.05$ considered statistically significant

Regarding study design, review articles constituted the most common design overall (70.0%) but were notably more prevalent among international publications (85.0%) than Turkish-origin publications (55.0%). Original research designs—including cohort, cross-sectional, active, and randomized/prospective studies—accounted for 45.0% of Turkish-origin articles compared to 15.0% of international articles ($p=0.082$). In terms of research approach, quantitative methods were more frequently employed in Turkish-origin articles (65.0%) compared to international articles (30.0%), with a borderline significance ($p=0.056$). The distribution of study designs and research approaches is presented in **Table 3**.

To identify factors independently associated with Turkish-origin publications, binary logistic regression analysis was performed (outcome: Turkish origin=1, international=0). In univariate analysis, a quantitative research approach (OR: 4.33, 95% CI: 1.15–16.32, $p=0.030$) and an original research design (OR: 4.64, 95% CI: 1.02–21.00, $p=0.047$) were each

Table 3. Distribution of articles by study design and research approach

Category	Turkish n (%)	International n (%)	Total n (%)	p
Study design				0.082†
Review	11 (55.0)	17 (85.0)	28 (70.0)	
Original research	9 (45.0)	3 (15.0)	12 (30.0)	
Research approach				0.056†
Quantitative	13 (65.0)	6 (30.0)	19 (47.5)	
Qualitative	7 (35.0)	14 (70.0)	21 (52.5)	

†Fisher's exact test. $p<0.05$ considered statistically significant. Original Research encompasses cohort, cross-sectional, retrospective, and randomized/prospective study designs.

significantly associated with Turkish origin. Article views were inversely associated with Turkish origin (OR: 0.85 per 1,000 views, 95% CI: 0.78–0.94, $p<0.001$), consistent with the descriptive findings. Number of authors showed

a non-significant inverse trend (OR: 0.84, 95% CI: 0.69–1.03, $p=0.092$). Publication period was not independently associated with Turkish origin in univariate analysis ($p=0.117$). In the parsimonious multivariable model including publication period and research approach, a quantitative research approach remained independently associated with Turkish origin (OR: 4.28, 95% CI: 1.09–16.80, $p=0.037$), while publication period did not reach significance ($p=0.4148$). The regression analysis results are presented in **Table 4**.

Table 4. Binary logistic regression analysis of factors associated with Turkish-origin publications

Variable	OR	95% CI	p	Model
Univariate analysis				
Recent publication period (2024–2025 vs. others)	2.79	0.77–10.04	0.117	Univariate
Quantitative research approach (vs. qualitative)	4.33	1.15–16.32	0.030*	Univariate
Original research design (vs. review)	4.64	1.02–21.00	0.047*	Univariate
Number of authors (per 1 author increase)	0.84	0.69–1.03	0.092	Univariate
Article views (per 1,000 views increase)	0.85	0.78–0.94	<0.001*	Univariate
Multivariable analysis — model 1 (parsimonious)				
Recent publication period (2024–2025 vs. others)	2.74	0.70–10.74	0.148	Multivariable
Quantitative research approach (vs. qualitative)	4.28	1.09–16.80	0.037*	Multivariable

Dependent variable: Turkish-origin article (1=Turkish, 0=International). OR: Odds ratio, CI: Confidence Interval. * $p<0.05$. Article views entered as continuous variable per 1,000-unit increase; number of authors entered as continuous variable per 1-unit increase. Multivariable model 1 includes publication period and research approach as covariates.

DISCUSSION

Consistent with our findings, dietary supplement use has expanded globally in recent years, driven by increasing

public interest in health promotion, wellness, and preventive strategies.¹ Because the present study was based on PubMed-indexed publications, the choice of database is also relevant, as PubMed is considered a reliable and widely used source for biomedical literature retrieval.¹¹ Within this growing field, recent national data from Türkiye have also shown that dietary supplement use is common in children, indicating that supplement-related behaviors are increasingly relevant across different age groups.² In parallel, bibliometric studies in related areas have demonstrated that scientific output on supplements and micronutrients is rising steadily, with research themes diversifying over time.^{3-5,9,10,12} Consistent with our findings, Turkish-origin publications were concentrated in more recent years, whereas international studies showed a broader temporal distribution. This pattern may reflect a recent increase in academic interest in Türkiye, potentially driven by evolving academic incentive systems, increased indexing of national journals, and growing awareness of nutrition-related research topics.

In line with our results, another important observation from the literature is that dietary supplement use is particularly common in older adults and often occurs in the context of chronic health concerns and regular medication use.^{6-8,13} At the same time, safety considerations have become increasingly important in specific populations such as military personnel, where inappropriate or uninformed supplement use may pose health risks.¹⁴ Similarly, studies conducted in older adults with chronic venous leg ulcers suggest that supplement use is frequent in clinically vulnerable populations, further emphasizing the real-world relevance of this topic.¹⁵ Taken together, these findings support the idea that supplement use is not a marginal behavior, but rather a widespread practice with potential clinical, economic, and public health implications. These findings also support our observations that the clinical value of supplementation remains inconsistent. A major systematic review reported limited and non-uniform evidence for the efficacy and safety of multivitamin and mineral supplementation in the prevention of cancer and chronic disease.¹⁶ This cautious interpretation is important when considering more recent interest in targeted interventions. For example, niacin and NAD⁺-related supplementation have been discussed as potentially relevant for age-related disorders through metabolic and inflammatory pathways.¹⁷ Likewise, omega-3 fatty acids have attracted attention in wound-healing research, including trial designs specifically developed for chronic venous ulcers,¹⁸ and randomized evidence has shown that eicosapentaenoic acid and docosahexaenoic acid supplementation can reduce circulating proinflammatory cytokines in aging adults.¹⁹ Nutritional and pharmacological approaches for sarcopenia have also highlighted the possible role of targeted supplementation in preserving function in older adults,²⁰ while a systematic review and meta-analysis suggested that protein and amino acid supplements may provide benefits in selected acute or chronic conditions, although results remain dependent on patient profile and study context.²¹ Mechanistic reviews of fish oil have further supported the plausibility of such effects by describing anti-inflammatory and pro-resolving actions of fatty acids in tissue biology.²²

Overall, these studies suggest that supplementation may be useful in selected settings, but that benefits are more

convincing when interventions are targeted and biologically justified rather than broadly generalized. In line with our findings, population-based research also reinforces the need for caution in interpretation. National US data have shown that dietary supplement use was very high among older adults in 2011–2014,²³ and other large studies have documented frequent concurrent use of prescription drugs, over-the-counter medications, and dietary supplements in older populations.²⁴ This is clinically relevant because the motivations for supplement use are often not limited to correction of nutritional inadequacy. In nationally representative analyses, adults most reported using supplements to improve or maintain overall health rather than specifically to compensate for poor dietary intake.²⁵ At the population level, trends in the United States further show that overall and micronutrient-containing dietary supplement use continued to increase over time, although product types changed, with increasing use of some single-nutrient products and declining reliance on traditional multivitamin-mineral formulations.²⁶ Importantly, those who use multivitamin-multimineral supplements are often individuals with healthier diets, higher physical activity, lower body-mass index, and more favorable lifestyle characteristics.²⁷ This pattern suggests that observed associations between supplement use and health outcomes may be partly influenced by confounding from underlying health behaviors rather than by supplementation alone.

Consistent with our results, a further issue concerns the actual composition of supplement products. Analyses of multivitamin/mineral products for young children have shown marked heterogeneity in both the number and amount of included micronutrients.²⁸ Although some products contain nutrients of public health interest such as vitamin D, many provide inadequate amounts of calcium or potassium, while others include excessive levels of nutrients such as folic acid, vitamin A, and zinc.²⁸ These findings illustrate a broader problem in supplement research and practice: formulations are not always aligned with true nutritional needs, and both under-correction and overexposure may occur simultaneously. In this context, our findings gain additional importance, because differences between Turkish-origin and international publications are not only temporal but may also reflect broader differences in how supplementation is conceptualized, studied, and translated into practice. From a bibliometric perspective, consistent with our findings, the higher number of article views observed in international publications represents another notable finding. Differences in article views may reflect journal visibility, indexing status, international collaboration networks, and open-access policies rather than scientific quality alone. In addition, higher impact factor journals, broader dissemination strategies, and stronger international research collaborations may contribute to increased visibility and citation potential of international studies.

Overall, consistent with our findings, the literature on oral dietary supplements is expanding rapidly but remains methodologically and conceptually heterogeneous. The recent increase in Turkish-origin publications may reflect growing national interest and research activity, whereas the broader methodological diversity observed in international publications may indicate a more mature and differentiated

evidence base. Future studies should prioritize clearer methodological standardization, stronger alignment between supplement formulations and actual nutrient gaps, and more clinically meaningful outcome measures. Such improvements would help generate evidence that is not only more comparable across regions, but also more useful for guiding safe and effective supplement use.

Limitations

Regarding the limitations of this study, it examines only the top 20 articles from the search results in both samples, which may introduce selection bias due to the use of the “best match” ranking algorithm. The study is also limited to a single database (PubMed), which may not fully represent the global literature. Additionally, the relatively small sample size limits statistical power and may affect the generalizability of the findings. The absence of quality appraisal limits interpretation beyond descriptive trends. Furthermore, bibliometric indicators were restricted to a predefined and limited set of variables, which may not comprehensively capture the overall scientific impact of the publications.

These limitations suggest that more comprehensive studies with larger datasets, multiple databases, and broader analytical parameters are needed to provide more robust and generalizable conclusions.

CONCLUSION

As a result, this study demonstrated significant differences between Turkish and international PubMed-indexed articles on oral supplements with respect to publication year and research approach. Turkish-origin studies were predominantly published in recent years (2024–2025), suggesting a growing national interest and increased research activity in this field. In contrast, international studies were largely concentrated in earlier years (2021–2023), indicating that global academic attention may have emerged at an earlier stage.

Furthermore, the predominance of quantitative methodologies in Turkish studies and qualitative approaches in international publications underscores a clear methodological divergence between national and global research trends. These differences highlight the importance of methodological balance and the potential benefits of integrating diverse research designs to enhance scientific understanding. Overall, these findings may guide future research design and international collaboration strategies.

ETHICAL DECLARATIONS

Ethics Committee Approval

Ethical approval was not required for this study, as it was based exclusively on publicly available data and did not involve human participants or patient-level data.

Informed Consent

This retrospective study used pre-existing anonymized patient data. No additional intervention was performed, and there was no direct patient contact. The study was approved by the ethics committee, and the requirement for written informed consent was waived by the ethics committee.

Peer Review Process

This manuscript was subject to external peer review.

Conflict of Interest

The authors declare no conflicts of interest related to this study.

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Author Contributions

Concept: MSG; Design: MSG, EŞ, EU; Control: MSG, EŞ, EU; Resources: MSG; Materials: MSG; Data Collection and/or Processing: MSG, EŞ, EU; Analysis and/or Interpretation: MSG, EŞ, EU; Literature Review: MSG; Writing the Article: MSG, EŞ, EU; Critical Review: EŞ, EU.

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