

## SYSTEMATIC REVIEW OPEN ACCESS

# Identifying Trends in the Most Cited Nursing Articles: Research Topics, Author Gender Representation and Characteristics Correlated With Citation Counts

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## ABSTRACT

**Aim:** To assess the top 1000 cited nursing articles in terms of their impact, conceptual and social characteristics.**Design:** Bibliometric literature review design.**Methods:** A bibliometric analysis on the 1000 most cited nursing articles in English, focusing on assessing their impact and prevalent terms, keywords, co-occurrence networks and topic trends. Non-parametric statistical tests were used.**Data Sources:** Web of Science Core Collection (accessed 14 February 2024).**Results:** The 1000 most cited articles were exported from 201,310 eligible articles.

The most cited articles received a total of 319,643 citations. The Journal of Advanced Nursing and the International Journal of Nursing Studies were the most cited journals. Literature reviews accounted for 21% of the most cited articles, compared to only 7% of all eligible articles. Most first authors were female, 63%. The data showed an increase in female first authorship among the most cited articles over time. This may reflect a shift towards greater gender equity in nursing research. Shorter article titles and fewer article pages were associated with more citations.

**Conclusion:** Methodological and conceptual articles received the most citations, likely due to their broad applicability (e.g., across disciplines) and enduring relevance. There was a statistically significant correlation between article brevity and citation count, but the relationship should be viewed with caution given the small effect size.**Implications for the Profession:** Bibliometrics is important for evidence-based practice because it helps nurses evaluate journals, articles and research topics. Since citation counts do not always indicate research quality, nurses and nursing students would benefit from training in bibliometrics to enhance their critical thinking in this area.**Impact:** Top-cited nursing articles indicate influential research topics and methods. They also influence authors' academic career opportunities, allowing assessment of research equity in terms of dominant countries and author gender representation.**Reporting Method:** The Preferred Reporting Items for Bibliometric Analysis (PRIBA) guidelines.**Patient or Public Contribution:** No Patient or Public Contribution.

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## Summary

- What does this paper contribute to the wider global clinical community?
  - Methodological and conceptual articles received the most citations, likely due to their broad applicability (e.g., across disciplines) and enduring relevance.
  - Most first authors were female, 63%, and the data showed an increase in female first authorship among the most cited articles over time.
  - Bibliometrics is important for evidence-based practice because it helps nurses evaluate journals, articles and research topics.

## 1 | Introduction

Bibliometrics, employing statistical and thematic analysis, tracks research trends within specific fields, such as nursing (Donthu et al. 2021). The increasing number of bibliometric studies in nursing research is likely due to the growing interest in evidence-based nursing and the utilisation of various bibliometric measures to support nurses in their practice, enabling them to understand the impact of published works (Haddad 2017). Additionally, the rising acceptance of alternative and mixed research methods in nursing, along with the increasing availability of digitally archived research articles and user-friendly bibliometric tools, may contribute to this trend (Kantek, Yesilbas, and Aytur Ozen 2023).

There are two basic approaches to bibliometric analysis: performance analysis and science mapping. Performance analysis focuses on quantifying metrics related to the impact and influence of an article or journal. The most used metric to measure performance is the number of citations an article receives. The Journal Impact Factor, JIF, is an index calculated by the average number of citations received per article published in that journal over a specified period of time, often two years (Clarivate 2024b).

Science mapping explores the conceptual, intellectual, methodological and social structures within a scientific field, including dominant research topics, commonly used methodological approaches and institute and author attributes (Donthu et al. 2021). To evaluate the scientific field, citation analysis is a prominent tool to assess the academic impact of these aspects, such as to better understand which study attributes are influential, to decipher potential differences between countries, and they are also used when assessing the performance of specific institutes and authors (Hernández-González et al. 2022).

As with all indicators, citations have their advantages and disadvantages. It is important to recognise that the number of citations does not automatically equate to the quality of the research or the importance of the author (Aksnes, Langfeldt, and Wouters 2019). While citations are a valuable measure of impact, it is important to understand the biases in citation practices, such as language, where English is the dominant language in most scientific fields and publications in other languages tend to receive fewer citations (Di Bitetti

and Ferreras 2017). Similarly, there is a regional or geographic bias, where researchers from the same country or region of the world tend to cite each other more often (Skopec et al. 2020). This may not always be a bias, however, as there may be natural explanations if authors wish to compare their findings longitudinally within the same setting or compare findings with countries with similar health systems.

At the same time, citations is a straightforward metric, and highly cited articles have historically shown the potential to spark changes in clinical practice, provoke controversy and prompt further scientific inquiry into a certain research area (Adams and Gurney 2018; Nicoll et al. 2018). Highly cited articles in a scientific field reveal something about the field itself, such as the methods commonly used or prevailing topics. Publications and citations can also play roles in specific nursing scholars' career paths. For instance, while gender disparities in nurses scientific careers can be attributed to various complex factors (Card et al. 2023), publications and citations often emerge as pivotal common mediators (Ioannidis et al. 2023).

Previous bibliometric performance studies in nursing have typically focused on specific topics or certain journals (Chang et al. 2021; Giménez-Espert and Prado-Gascó 2019). In contrast, science mapping in nursing has mainly concentrated on specific areas such as nurse-student education, sub-nursing disciplines like geriatric nursing, disease-specific nursing topics, nursing research in certain regions or countries or broader societal topics such as sustainability (Chang et al. 2021; Çiçek Korkmaz and Altuntaş 2022; Dardas et al. 2019; Ghamgosar, Zarghani, and Nemat-Anaraki 2021; Holmberg 2024; Luque-Alcaraz et al. 2022).

However, a comprehensive global study combining performance analysis and science mapping, while focusing on specific bibliometric indicators such as citations in nursing, is lacking. This study aims to assess the top 1000 cited nursing articles in terms of their impact, conceptual and social characteristics. Performance evaluations will assess various factors that influence citation counts, and science mapping methods will outline the different features of articles by identifying common research themes, subjects and thematic developments. The results intend to provide a comprehensive overview of influential nursing research in terms of topical trends, characteristics and other attributes.

## 2 | Methods

### 2.1 | Study Design

This study employed a bibliometric design, using bibliographic metadata to analyse publication trends and patterns. The study followed the Preferred Reporting Items for Bibliometric Analysis (PRIBA) guidelines proposed by Koo and Lin (2023). The primary focus of this study was citations, which included in-text references represented by abbreviated author and publication year information (e.g., APA referencing style) or sequential numbering (e.g., Vancouver style). These citations corresponded to a reference list containing comprehensive source information (Haddad 2017).

2.2 | Source of Bibliometric Data and Search Strategy

Searches were conducted on 14 February 2024, using the Web of Science Core Collection from Clarivate Analytics. This database was chosen because it is an extensive interdisciplinary bibliographic repository known for its reliability and trustworthy metadata, with minimal database errors and duplicate records (Birkle et al. 2020). The search strategy used ‘nursing’ as the Web of Science subject category. All ‘source publications’, such as research journals or books, indexed in Web of Science are assigned at least one subject category. Thus, if a research journal is classified under ‘nursing’, then all articles within that journal are automatically categorised accordingly. The search string that was used appeared as follows: ‘WC=(Nursing)’ (WC= Web of Science Category). The search was refined by selecting article and literature review as document types, published only in English.

In Web of Science, the document type ‘article’ represents research reports on original works that are considered citable. These include research papers, short communications of research results, technical notes and case reports (presented like full papers) that have been published in a journal or conference. Articles typically include an author’s abstract, graphs, tables and lists of cited references. Also, conceptual articles that focus on the development of new theories, models or frameworks generally fall under this document type because, despite their theoretical nature, they contribute original research or ideas such as empirical studies.

Literature reviews are defined as surveys of previously published research, and a review may summarise published studies and draw some conclusions but does not present new information on the topic. All types of reviews are included in the definition, such as literature reviews, mini-reviews and systematic reviews. Technically, an article is assigned to this document type if it is listed in the Review section of a journal and/or has Review of Literature in the title (Clarivate 2024a). If an article is not assigned a review by the journal, but review, systematic review, or mini-review appears in the title, it must also appear elsewhere in the article (Abstract/Summary or Introduction) in order to be assigned the Review document type.

The searches and refinements are outlined according to the Scientific procedures and rationales for systematic literature reviews (SPAR-4-SLR) protocol (Paul et al. 2021). See Table 1.

Of 323,915 records indexed as a record belonging to the nursing category in Web of Science, 205,310 were articles and literature reviews. Of these, 201,310 were in English. These were arranged based on citation count, and the top 1000 articles were selected on the day of the search. Their metadata was exported, including parameters such as total number of citations, journal name, publication year, authors (all stated authors), total number of authors, geographical location (country based on authors’ address fields), institute (e.g., higher education institute, research center, university hospital), document type (article or review), article titles, number of article pages and abstract.

TABLE 1 | The SPAR-4-SLR protocol. As recommended by Paul et al. (2021).

Identification
<i>Domain:</i> Nursing research. Focused on the most cited articles
<i>Research question:</i> Research performance, Intellectual and social structure
<i>Source type:</i> Research journals
<i>Source quality:</i> Web of Science
Acquisition
<i>Search mechanism and material acquisition:</i> Web of Science Core Collection
<i>Search period:</i> February 14, 2024
<i>Search keywords:</i> Not applicable. Using ‘Nursing’ as the Web of Science Core Collection Subject Category. Filtering to the top 1000 most highly cited articles at the day of the search
<i>Total number of articles returned from the search:</i> 323,915
Organisation
<i>Organising codes:</i> Article titles, article publication year, article citations (global and local), article references, article abstracts, author names and affiliations, author keywords and KeyWords Plus, journal titles, regions (countries)
Purification
<i>Article type excluded</i> (and total number for each type of exclusion): Editorial material, <i>n</i> = 46,313, Meeting abstract, <i>n</i> = 33,822, Book review, <i>n</i> = 13,844, Letter, <i>n</i> = 12,971, News item = 6239, Other = 9416
<i>Article type included</i> (and total number of articles included): 201,310 (Article, <i>n</i> = 186,232, Review Article, <i>n</i> = 15,078)
Evaluation
<i>Analysis method:</i> Bibliometric and research thematic analyses. Descriptive and comparative statistics, mostly using non-parametric approaches
<i>Agenda proposal method:</i> Thematic (implications and future research)
Reporting
<i>Reporting conventions:</i> Figures (networks and graphs), tables and words (descriptions and narratives)
<i>Limitations:</i> Only publications in English included

2.3 | Data Analysis

Before the main analyses, data quality was ensured by detecting duplicates, standardising author and institute names and identifying other data errors. Following these checks, bibliographic and thematic analyses were conducted to quantify bibliographic indicators such as citation frequencies and patterns, prolific authors, journals and countries.

Word frequencies were calculated based on author keywords to create word clouds, and research areas and their connections were determined using co-occurrences of author keywords. Topic trends were assessed evaluating the most frequently used author keywords for each year. Together, these analyses

revealed patterns by measuring the association strengths of terms included in the articles providing an overview of the sample's conceptual structure.

At the intersection of healthcare and community engagement, nursing has the potential to contribute to multiple sustainable development goals (SDGs), particularly those focused on health (SDG 3), gender equality (SDG 5) and reducing inequalities (SDG 10). In addition, as the largest group of health professionals globally, nurses have the potential to influence policy and advocate for climate action (SDG 13) (Fields et al. 2021). The most cited articles often serve to define the core of what is considered important in the field, setting priorities for future research and practice. If these influential articles address the SDGs, it would have signalled a shift towards more sustainable and globally focused nursing practice, which is essential to addressing the complex health challenges of the 21st century. To understand if and how the articles were aligned with sustainability aspects, the Sustainable Development Goals (SDGs) research area schema, which is inherent in the Web of Science database, was used. This schema assigns relevant micro citation topics and associated publications to one or more of the 16 SDGs (excluding SDG17, Partnerships for the Goals) (Wang, Kang, and Mu 2023). Thus, each article could be mapped to one or more of the SDGs.

For evaluating gender equality, the gender of the first author was determined using NamSor, an application designed to accommodate different languages and socio-cultural contexts (Ioannidis et al. 2023). Science-Metrix, on behalf of Elsevier and the European Commission, found NamSor to be the most accurate tool for estimating diverse international names, leading to its adoption in all European Commission-sponsored SheFigures studies (Science-Metrix 2018). The 'Genderize Name Geo' function was used, which considers the author's first and last name, as well as their associated city, as specified in the address field of the article. This provided an estimate of the most likely gender of the first author (female or male), calibrated on a scale of 0 to 1, with values closer to 1 indicating greater accuracy in estimating the correct gender. The median calibrated probability value was 0.995, and the interquartile range values were  $Q1=0.796$ ,  $Q2=0.995$  and  $Q3=0.999$ . This indicates that very few names were considered difficult to estimate or gender neutral.

All bibliometric analyses were performed using bibliometrix, an analytical software package in R (Aria and Cuccurullo 2017). Citation frequencies were not normally distributed (e.g.,  $\min/\max$  citations/article = 151/11,037, interquartile range = 177.0, skewness = 12.1, kurtosis = 181.5). Therefore, non-parametric tests (e.g., Mann-Whitney  $U$  test, Spearman's  $r_s$ , chi-square test,  $X^2$ ) were used to identify statistically significant relationships or distributions by comparing the number or distribution of citations between article or author attributes.

### 3 | Results

Out of the 201,310 articles and literature reviews identified in English, the 1000 most cited publications were exported. Among these, 792 (79%) were articles, and 208 (21%) were review articles. This proportion can be contrasted with the significantly smaller percentage of literature reviews in the broader corpus

of all eligible nursing articles ( $n=201,310$ ), comprising 186,232 (93%) journal articles and 15,078 (7%) literature reviews.

The included articles spanned from 1970 to 2021 and were published across 92 different journals. The three journals with the highest number of published articles were the *Journal of Advanced Nursing* ( $n=208$ ), *International Journal of Nursing Studies* ( $n=100$ ) and *Nursing Research* ( $n=83$ ). Collectively, the 1000 articles garnered 319,643 citations (excluding self-citations). The average number of citations per publication was 319.64 (with a range from 151 to 11,037). See Figure 1.

The oldest study, Marston (1970), titled 'Compliance with medical regimens: A review of the literature', amassed 280 citations. The most recent study by Saragih et al. (2021), titled 'Global prevalence of mental health problems among healthcare workers during the Covid-19 pandemic: A systematic review and meta-analysis', gathered 168 citations in the *International Journal of Nursing Studies*.

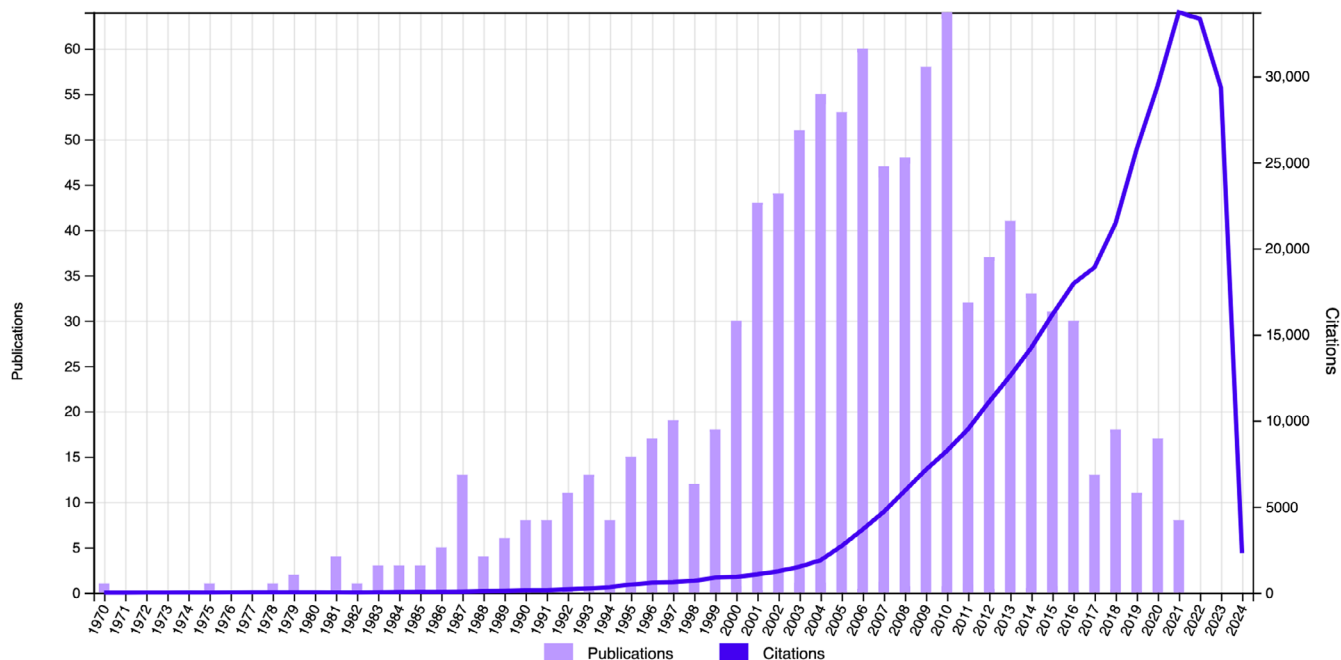
The top-cited article (11,037 citations) was Graneheim and Lundman's (2004) 'Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness'. Following closely, Elo and Kyngäs' (2008) 'The qualitative content analysis process' accrued 10,754 citations. Sandelowski's (2000) 'Whatever ever happened to qualitative description?' were the third most cited, with 7016 citations. Whittemore and Knafl's (2005) 'The integrative review: updated methodology' was the fourth most cited article, with 4260 citations. Vaismoradi, Turunen, and Bondas's (2013) 'Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study' was the fifth most cited, with 4054 citations. All these five top-cited articles addressed methodology, with four focusing on qualitative methods, particularly content analysis, and one on literature reviews. However, in the sample, there were no statistically significant difference in citation counts between journal articles and literature reviews (Mann Whitney  $U=84,567.5$ ,  $p=0.553$ ).

Only 244 articles (24%) provided information about their open access (OA) status. The most common OA alternative was Green submitted, accepted, or published ( $n=178$ , 18%), followed by Free to read ( $n=87$ , 9%), and Gold/Gold Hybrid ( $n=45$ , 5%). There was no significant relationship between an article's open access status (regardless of OA alternative) and its citation count (M-W  $U=77,191.0$ ,  $p=0.163$ ).

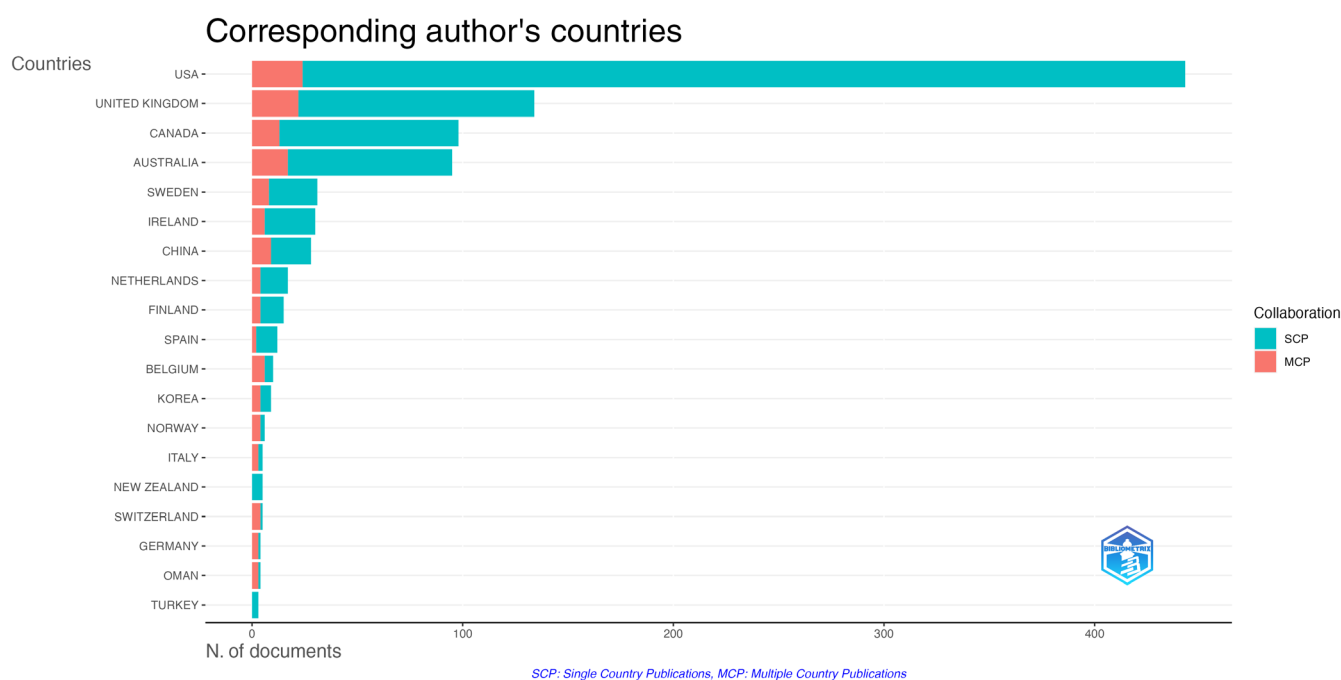
In terms of article title length and number of pages, there was a statistically significant but correlation with citation count. Longer titles were associated with less citations ( $r_s=-0.158$ ,  $p\leq 0.001$ , CI 95%:  $-0.219$ ,  $-0.095$ ). Similarly, articles with more pages tended to have fewer citations, although this correlation was weak ( $r_s=-0.094$ ,  $p=0.003$ , CI 95%:  $-0.157$ ,  $-0.031$ ).

#### 3.1 | Authors and Bibliometric Analysis of the Co-Authorship

A total of 2601 authors contributed to the 1000 most cited articles, with 226 (23%) articles was authored by a single individual. On average, each article had 3 co-authors.



**FIGURE 1** | Number of articles published per year that ranked among the 1000 most cited articles as of February 2024. All articles were published between 1970 and 2021.



**FIGURE 2** | Most prolific countries based on the corresponding authors' affiliations. Single-country publications (SCP) refer to intra-country collaboration. Multiple-country publications (MCP) refer to inter-country collaboration.

The most prolific authors and their affiliations were concentrated in North America. The top three authors in terms of article contributions were Heather K. Spence Laschinger ( $n=16$ ), Margarete Sandelowski ( $n=16$ ) and Linda H. Aiken ( $n=14$ ), all based in the US and Canada. Similarly, the most prolific higher education institutions were in North America: The University of Pennsylvania ( $n=61$ ) and the University of North Carolina ( $n=56$ ) in the US and the University of Western Ontario ( $n=50$ ) in Canada. The countries most frequently associated

as affiliated country were the United States ( $n=491$ ), United Kingdom ( $n=138$ ), Canada ( $n=117$ ), Australia ( $n=113$ ) and Sweden ( $n=40$ ) (Figure 2).

International co-authorship accounted for 14.5% of all included articles. The most common collaborations were between the USA and Canada ( $n=20$ ), the UK and Australia ( $n=13$ ) and the USA and Australia ( $n=12$ ). Interestingly, the number of references in the articles did not significantly correlate with their



citation counts ( $r_s = -0.051$ ,  $p = 0.105$ , CI 95%:  $-0.115$ ,  $0.013$ ), despite potential implications for author collaborations and networks.

Of all first authors, 627 (63%) were identified as female and 370 (37%) as male. Three authors could not be assigned a gender because they referred to organisations (e.g., International Council of Nurses). The distribution of citations appeared to be similar regardless of first author gender, indicating no significant difference in citation counts between first author gender groups (M-W  $U = 111,681.5$ ,  $p = 0.326$ ).

However, the proportion of articles with female first authors increased significantly over time ( $X^2 = 54.95$ ,  $df = 2$ ,  $p \leq 0.001$ ). When publication years were divided into three equally sized groups, the proportion of female first authors increased from 48% in the first group (1970–2003) to 75% in the most recent group (2011–2021), as shown in Table 2.

### 3.2 | Research Areas and Topics

To gain insights into the conceptual structure of the sample, prevalent topics, research areas, their connections and thematic evolution were analysed.

Initially, a descriptive analysis was conducted based on word and term frequencies in author keywords. A word cloud was generated using the 100 most frequent words (Figure 3). The size of each word in the figure corresponds to its frequency as a keyword. Notably, terms such as ‘systematic review’ (45 occurrences), ‘burnout’ (40 occurrences), ‘qualitative research’ (36 occurrences), ‘stress’ (31 occurrences), ‘literature review’ (30 occurrences), ‘research’ (26 occurrences), ‘job satisfaction’ (25 occurrences), ‘depression’ (21 occurrences), ‘concept analysis’ (19 occurrences), ‘evidence-based practice’ (19 occurrences) and ‘meta-analysis’ (19 occurrences) emerged as the most frequent.

Network clusters were also generated to assess research areas, and their connections based on co-occurrences of author keywords. The size of the nodes (circles) corresponds to the frequency of connections (Figure 4), resulting in three clusters.

The first cluster (green) primarily addressed research methodologies and practices within nursing. It encompassed terms like qualitative research, literature review, evidence-based practice,

methodology and nursing research. These terms seemed to be directed towards cancer and patient safety, indicating a focus on these healthcare issues concerning nursing methodology.

The second cluster (red) focused on various aspects of nurses’ well-being, particularly in their work environment, including terms such as burnout, stress, retention, job satisfaction, depression, coping mechanisms and resilience. It also touched on broader healthcare issues like mental health, social support and the impact of global events such as COVID-19. In this cluster, terms like nursing students and education also suggested a link to nursing training and development, likely associated with clinical work placements. Notably, systematic review and meta-analysis were common in this cluster, indicating evidence and evidence formation research in these areas.

The third cluster (blue), the smallest, comprised only four nodes. It addressed aspects related to patients’ quality of life, transition, chronic illness and self-management, highlighting a focus on enhancing patients’ well-being and empowering them to manage chronic conditions. This cluster was the most isolated, with few ties to the green methodological cluster, notably including terms like phenomenology, systematic and cancer (specifically related to quality of life).

To analyse topical trends over the past 20 years among the most highly cited articles in our sample (2001–2021), the most frequent author keywords for each year were compiled (Figure 5). In the early years (approximately 2000–2005), research focused primarily on qualitative analysis, concept exploration, tool development, fatigue and evaluation. In addition, social support emerged as a significant area of investigation within these studies.

Subsequently (approximately 2006–2014), there has been a notable transition to diverse research methodologies and topics. Meta-analyses, literature reviews and systematic reviews gained prominence, reflecting a comprehensive approach to synthesising the existing literature. Burnout and depression emerged as critical areas of research, underscoring the importance of mental health in the health professions. In addition, education and self-management were explored as fundamental aspects of health care.

In more recent years (around 2015–2020), the focus broadened to include broader health and well-being concerns. Resilience and anxiety became topics of interest, shedding light on psychological resilience and mental health challenges. In addition, obesity

**TABLE 2** | Proportion of articles with female or male first authors compared across three publication year periods.

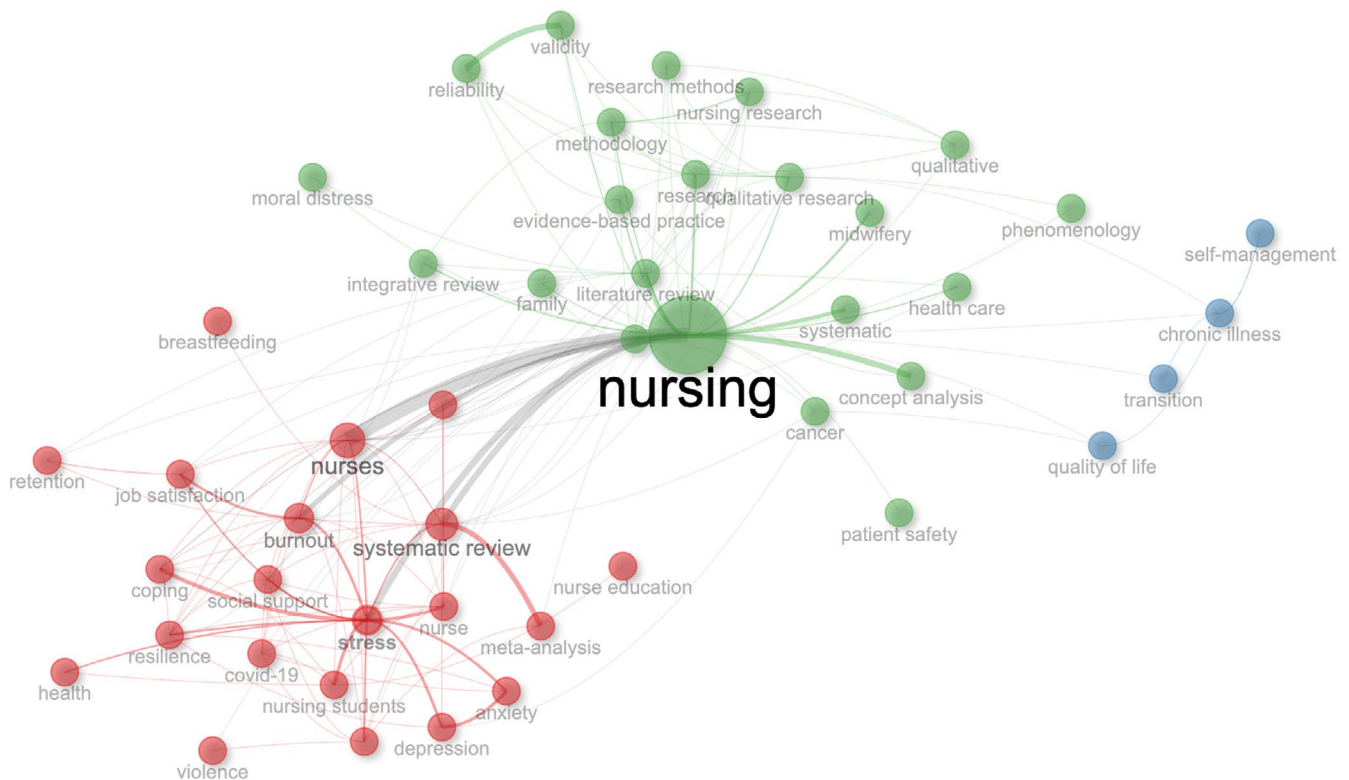
Publication year periods <sup>a</sup>	1970–2003		2004–2010		2011–2021		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Female first author	164	47.7	262	68.2	201	74.7	627	62.9
Male first author	180	52.3	122	31.8	68	25.3	370	37.1
Total	344	100	384	100	269	100	997	100

Note:  $X^2 = 54.95$ ,  $df = 2$ ,  $p \leq 0.001$ .

<sup>a</sup>The three time periods were chosen based on having a relatively equal number of publications in their yearly intervals. However, the proximity in publication years was also taken into account. As most publications in the whole sample were published from 2004 onwards. This is why there is a somewhat substantial difference in the number of publications between period 2 and 3. But modifications with these two intervals did not change the pattern.



**FIGURE 3** | Most prolific countries based on the corresponding authors' affiliations. Single-country publications (SCP) refer to intra-country collaboration. Multiple-country publications (MCP) refer to inter-country collaboration.

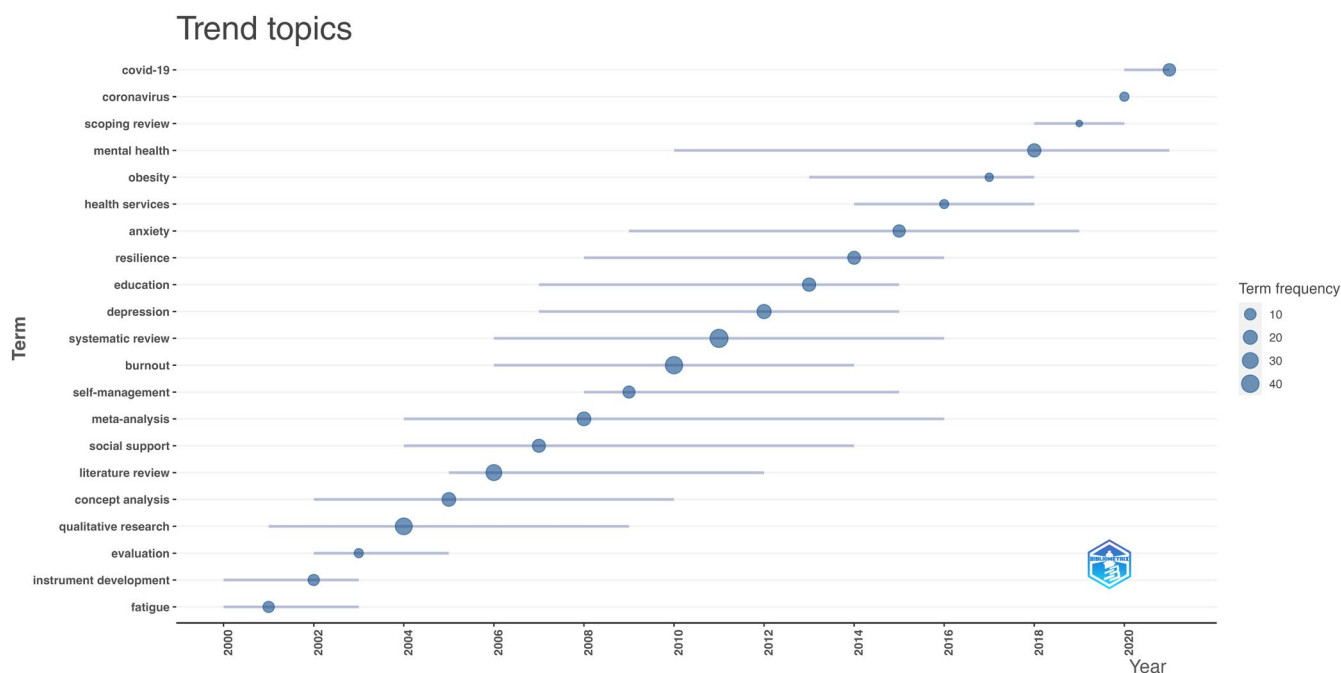


**FIGURE 4** | Displays the co-occurrence map of author keywords into three clusters, based on 50 nodes, and with a word co-occurrence rate set to two.

and health services were examined to address growing public health concerns. The emergence of scoping reviews as a research method also meant a renewed focus on methodology. Finally, the global pandemic naturally led to increased research attention on coronaviruses and Covid-19 studies from 2020 onwards.

To map the articles to the Sustainability Development Goals (SDGs), the SDGs research area schema was used, inherent in Web of Science. Each journal could be classified under

multiple SDGs. Most included articles focused on SDG3 (Good Health and Well-being,  $n = 878$ , 88%), SDG4 (Quality Education,  $n = 311$ , 31%) and SDG5 (Gender Equality,  $n = 99$ , 10%). Fewer articles addressed SDGs such as SDG2 (Zero Hunger,  $n = 10$ , 1%), SDG9 (Industry, Innovation and Infrastructure,  $n = 10$ , 1%), SDG16 (Peace, Justice and Strong Institutions,  $n = 7$ , 0.7%), SDG11 (Sustainable Cities and Communities,  $n = 4$ , 0.4%), SDG1 (No Poverty,  $n = 1$ , 0.1%) and SDG6 (Clean Water and Sanitation,  $n = 1$ , 0.1%).



**FIGURE 5** | Illustration of the trend topics based on author keywords between 20years (2001–2021). The minimum word frequency was set to two and number of words per year to one.

Notably, SDG7 (Affordable and Clean Energy), SDG8 (Decent Work and Economic Growth), SDG10 (Reduced Inequalities), SDG12 (Responsible Consumption and Production), SDG13 (Climate Action), SDG14 (Life Below Water) and SDG15 (Life on Land) were absent from the material.

## 4 | Discussion

The study assessed the top 1000 cited nursing articles from the Web of Science database to examine their impact, conceptual and social characteristics.

Notably, the top five cited articles all centered on methodology, with four focusing on qualitative methods, specifically qualitative content analysis. The analysis of article topics and content features highlighted a predominance of terms related to methodology. This was evident using different analytical methods, including word clouds and co-occurrence clusters. This underscores the enduring significance of qualitative approaches in healthcare research, which transcend specific disciplines or nursing specialties (Holmberg 2024). Methodological and conceptual articles often have potential for wider applicability beyond a specific discipline or topic. The most common author keywords were ‘systematic review’, ‘qualitative research’, ‘literature review’, ‘concept analysis’ and ‘meta-analysis’. In addition, ‘review’ was the most common single word in article titles, often accompanied by ‘systematic’. This is consistent with previous research showing that review articles tend to receive more citations than original research articles (Peidu 2020). While there was no statistical difference in citation counts between literature reviews and articles in this sample, overrepresentation of literature reviews among these top-cited articles compared to the larger corpus of eligible articles.

Among the most cited article topic trends, early studies focused on fatigue as a common symptom, as well as burnout and depression, indicating a focus on mental health. Around this time, research highlighted fatigue as a pervasive problem among nurses, often due to long hours and shift work and fatigue was found to contribute to decreased cognitive function, impaired decision making and increased likelihood of errors in patient care (Garrett 2008). Various instruments were also developed to assess and evaluate these aspects, which explains the prevalence of these terms at the time. More recently, highly cited articles have focused on organisational aspects such as health services and common public health issues such as anxiety, not least nursing students’ anxiety in clinical settings (Cornine 2020) and nurses’ strategies and roles in obesity management (Fruh 2017).

Geographically, North America, particularly the United States, dominates in terms of research output, author affiliations and collaborations, findings that are consistent with broader studies of nursing research (Wang et al. 2022). Journals such as the *Journal of Advanced Nursing* and the *International Journal of Nursing Studies* stand out for their prolific output and high citation rates, consistent with previous findings (Giménez-Espert and Prado-Gascó 2019). These journals have different approaches to publication. The *International Journal of Nursing Studies* had only 155 citations in 2022 but accumulated 16,189 citations with a total of 82 articles, resulting in the highest impact factor among nursing journals at 8.1. In contrast, the *Journal of Advanced Nursing* had 366 citable articles and the highest total number of citations among nursing journals that year, with 23,672 citations. Thus, its impact factor was a bit lower at 3.8 (Table S1. Journal Citation Report data from Clarivate 2024b).

Aligning the research with the United Nations Sustainable Development Goals (SDGs), it primarily aligned with the



presumed key areas associated with nursing. Specifically, SDG3, Good Health and Well-being, which underscores nurses' crucial role in healthcare delivery. The second and third most common goals were SDG4 and SDG5, emphasises Quality Education, highlighting the importance of nursing education, as well as the importance of gender equality. As the largest professional group within the healthcare sector, nurses substantially contribute to national and global health targets, advancing the SDGs (World Health Organization 2020, 2023).

Nursing is dominated by women, who make up about 77% of the workforce (Kharazmi, Bordbar, and Bordbar 2023). Therefore, it seems reasonable that female first authorship has now increased to reach 75% of the most cited articles in the most recent period (2011–2021). These findings are consistent with research that has focused on the most cited researchers and specific articles across scientific disciplines. They found that about 69% of the most cited authors in nursing were women (Ioannidis et al. 2023). Like this study, they also observed a general trend towards more female first authors over time. Therefore, it is important to continuously implement strategies that enhance the credibility of the nursing profession and ensure equal career opportunities for both male and female nurses (Kharazmi, Bordbar, and Bordbar 2023).

The study revealed a slight but statistically significant negative correlation between article title length and citation counts, implying that shorter titles may attract more views and citations. Still, while these findings were statistically significant the effect sizes of correlations were weak and may not necessarily be of practical significance. Recent studies have examined factors that influence citation rates in nursing research. Social media presence, international collaboration and open access publishing have been found to positively influence citation rates (Tang et al. 2023). The use of research-specific forums such as ResearchGate and journal impact factors also contribute to increased citations (Tang et al. 2023). To increase citations, authors are advised to use ethical approaches to promote their work, as citations play a significant role in research evaluation and funding allocation (Watson, McKenna, and Thompson 2019). Overall, nursing research has a wide geographical reach and dissemination across disciplines, indicating its impact both within and outside the profession (Nicoll et al. 2018).

Relying solely on citation counts has its limitations, as they do not necessarily reflect research quality or importance. Therefore, it is important for nurses and nursing students to receive training in bibliometrics as part of evidence-based practice, enabling them to think more critically about this metric. Relying solely on citation counts has its limitations, as they do not necessarily reflect the quality or importance of the research. Therefore, it is important for nurses and nursing students to receive training in bibliometrics as part of evidence-based practice to enable them to think more critically about this metric. While citations should not be the sole measure of importance and quality, they do serve as indicators of academic scholarship when evaluated in a balanced manner' (Davidson et al. 2014). Additionally, large-scale studies have shown a positive association between citation counts and overall research quality in nursing (Thelwall et al. 2023). However, as noted earlier, the likelihood of being

cited is not solely dependent on research quality; it can also be influenced by positive study outcomes and the perceived authority of the authors, leading to citation biases (Urlings et al. 2021).

## 4.1 | Strengths and Limitations

This study has certain strengths and limitations that warrant attention. The utilisation of the Web of Science database, which contains pivotal research with high-quality metadata, provides integrated analytical tools for generating comprehensive insights (Gusenbauer 2022; Gusenbauer and Haddaway 2020). For instance, the database's Sustainable Development Goals (SDGs) research schema facilitated the identification of nursing articles focusing on sustainability and its different aspects. However, using a more specialised search engine like Medline or CINAHL (EBSCO) might have yielded slightly different outcomes. Nonetheless, studies indicate that search results from comparable databases generally exhibit similarity (Gusenbauer 2022).

A specific limitation arises from using the 'nursing' category in the Web of Science, which primarily targets journals classified as nursing journals. An alternative, more comprehensive approach could have involved employing free-text searches using words and phrases associated with nurses and nursing. However, this method might have reduced search specificity, potentially resulting in retrieving articles authored by non-nursing scholars. Another limitation pertains to determining the gender of first authors based on their names and affiliations. While self-identification would have been preferable, it was not feasible in this relatively large-scale study, which also included historical articles. This methodological aspect also relates to the ethical implications of categorising names as binary (man/woman), potentially excluding individuals who do not identify as either.

In comparison to prior, more focused literature reviews within nursing, this study benefits from a notably extensive dataset, incorporating 1000 articles. This contributes to a more broad and inclusive understanding of the overarching research landscape among the most cited nursing articles. Nevertheless, the reliability of bibliometric data depends on its accuracy and comprehensiveness. Since a thorough examination of the full texts of articles was not conducted, important contextual insights into the content and calibre of individual publications might have been missed.

## 5 | Conclusions

This examination of the top 1000 cited nursing articles highlights a notable trend: literature reviews make up a substantially larger proportion of the records in this subset of highly cited articles than they do in the broader pool of nursing articles. Methodological and conceptual articles emerge as the dominant types, with the most common keywords in the sample being 'systematic review', 'qualitative research' and 'concept analysis for example. This suggests that nurses are and should be encouraged to engage with literature reviews to stay informed about the latest evidence-based practices and integrate them into

patient care. It also emphasises the need for nursing students and nurses to be well versed in research methods and conceptual frameworks. This understanding can enhance the ability to critically appraise research and effectively apply findings in clinical practice.

There has been a clear increase in female first authorship among the most cited articles over time. The increasing trend of female first authorship in nursing research might reflect a shift towards greater gender equity in nursing research. This trend should be supported by promoting leadership and research opportunities for female nurses, which can contribute to more diverse perspectives in nursing practice. Most articles were published between 2004 and 2010, consistent with the potential for wider applicability beyond a specific discipline effect typically observed in citation patterns (De Groote et al. 2023). While the analysis revealed a correlation between shorter article titles and higher citation counts, and a correlation between fewer article pages and increased citations, these relationships should be considered with caution due to their small effect sizes.

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### Conflicts of Interest

The author declares no conflicts of interest.

### Data Availability Statement

The data is available through the Web of Science platform. The specific dataset used in the study is available from the first author upon a reasonable request.

### Peer Review

The peer review history for this article is available at <https://www.webofscience.com/api/gateway/wos/peer-review/10.1111/jan.16562>.

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## Supporting Information

Additional supporting information can be found online in the Supporting Information section.