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Original Research

Mapping of The Thematic Domains of Systematic Review and Meta-analysis Articles in Medical Sciences of Iran Indexed in Scopus

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Abstract

Systematic review and meta-analysis articles are crucial in evidence-based medicine. The present study aims to map the thematic areas of systematic review and meta-analysis articles in the field of medical sciences in Iran, indexed in Scopus, using the NLM classification. This applied-descriptive research employed qualitative content analysis, which involved indexing and classification. The study focused on 2,237 systematic review and meta-analysis articles in the medical sciences of Iran, all published in Scopus in 2021. Data analysis was conducted using Excel software and descriptive statistical methods. The QU category, including Biochemistry, Cell Biology, and Genetics, has the most articles with 527. Coming in second is the QV category (Pharmacology) with 493 articles, followed by the WC category (Communicable Diseases) with 390 articles.

Additionally, the QU category has the most significant number of publication sources, with 318 journals. The QV category ranks second with 284 journals, while WC ranks third with 263. The results show that most systematic review and meta-analysis articles and their sources fall under the QU category. More investigations are needed to understand the growth trend of articles in these areas compared to others.

Keywords: Systematic Review, Meta-Analysis, Scopus, Medical Sciences, NLM, Classification, Iran.

Introduction

Systematic review and meta-analysis articles are crucial scientific works that sit at the top

of the evidence pyramid (Impellizzeri & Bizzini, 2012; Murad, Asi, Alsawas & Alahdab, 2016). Additionally, they hold a special significance in the paradigm of evidence-based medicine (Djulbegovic & Guyatt, 2017; Eastern Illinois University, 2018). Researchers employ a systematic, methodical approach to identify, assess, and select relevant literature for their research inquiries. By adhering to predefined rules, they can effectively address their research questions by extracting, combining, and reporting information from the selected texts (Briner & Denyer, 2012; Shannon, 2002). A meta-analysis is a type of systematic review that uses statistical methods to combine the results of multiple studies (Bazrafshan, Hejazi, Rahmani & Bastan, 2015; Petticrew & Roberts, 2006). These articles are highly cited, and their findings are frequently referenced in articles and chapters of medical books (Finckh & Tramèr, 2008; Greenhalgh et al., 2014).

Because they attract high citations, scientific journals are more likely to publish these types of articles. This trend has contributed to an increase in the publication of such articles (Hatami-Yadegari, 2022; Zhi et al., 2014; Shadi, Asadi, & Nourmohammadi, 2019; Vaziri & Feizabadi, 2017). This rise is also evident in the publication of systematic reviews and meta-analyses in Iran (Hatami Yadegari, 2022; Shadi et al., 2019; Vaziri & Feizabadi, 2017). Given the costs associated with this growth (Bazrafshan et al., 2015), understanding the process can offer valuable insights for future planning and policy-making. Identifying the subject areas of these articles helps highlight the contributions of various specialties in producing valuable evidence. The National Library of Medicine Classification (NLMC) is an ideal tool for this task due to its unique ability to create a cohesive subject classification system for resources in the medical sciences (Brantz & Forsman, 1977).

Researchers have analyzed various studies focusing on the thematic classification of Iran's systematic review and meta-analysis articles. Hatami Yadegari's (2020) research, which examined the systematic review and meta-analysis articles in medical sciences of Iran in the Web of Science database, found that general medicine, pharmacy, and public health are the most frequently covered subjects. Vaziri and Feizabadi (2017) explored the status of systematic review articles in Iran's medical sciences using scientific indicators from the Web of Science database. They identified general and internal medicine as the most productive subject areas. In a scientometric analysis, Nadi-Ravandi and Batooli (2022) highlighted the content and consistency of systematic review and meta-analysis articles in the areas of science, technology, and mathematics education, noting these as highly productive fields.

However, none of these studies employed thematic analysis and classification to determine the thematic categories of the systematic review and meta-analysis articles. Therefore, this research aims to analyze systematic review and meta-analysis articles in medical sciences of Iran, indexed in the Scopus database, and map them according to the NLM classification. By doing so, we aim to provide a comprehensive understanding of the thematic domains and their contributions to the field of medical sciences in Iran. This analysis reveals the distribution of subject categories across Iran's systematic reviews and meta-analyses in the medical sciences, offering valuable insights for future research and policymaking.

Literature Review

This section presents the research background. It first lists systematic review and meta-analysis articles from Iran in chronological order, followed by a chronological listing of other studies on the same topics.

Hatami Yadegari (2022) conducted a scientometric study to analyze systematic reviews and meta-analyses from Iran in the fields of medicine and related sciences, as indexed in the Web of Science database. In this study, 5,231 systematic reviews and meta-analyses published between 2011 and 2020 were examined. In the part of the study that focused on the subject areas of systematic reviews and meta-analyses in Iranian medical sciences, it was reported that the largest number of articles belonged to the subject area of "General Medicine" with 571 articles, followed by "Pharmacology & Pharmacy" with 493 articles, and "Public Health" with 434 articles. It should be noted that no qualitative content analysis was performed on the articles in this study, and the subject areas were reported solely using Web of Science subject categories.

Shadi et al. (2019) conducted a study to determine the growth trend of systematic review articles by Iranian researchers in the field of biomedical sciences and to identify active journals. Persian articles were retrieved from the Islamic World Science Citation Center (ISC) and the Scientific Information Database (SID), while English articles were retrieved from Scopus. This study examined the growth trends in article publications by language (Persian and English), annual growth rates, and publication sources. No thematic analysis was conducted on the reviewed articles in this study. (Shadi et al., 2019)

Vaziri and Feizabadi (2017) conducted a study to examine the status of systematic review articles in the field of medical sciences in Iran using bibliometric indicators. This study reviewed 382 systematic review articles in the field of medical sciences in Iran, indexed in the Web of Science database, from 1970 to 2016. This study analyzed the thematic areas of the reviewed articles. According to the findings, the majority of articles in the field of medical sciences of Iran belonged to the thematic group of general and internal medicine, with 61 articles. This study did not conduct qualitative content analysis, and the thematic categories of the articles were reported solely on the basis of the Web of Science subject categories.

In 2024, Wang, Wang, and Zheng conducted a bibliometric analysis of systematic review and meta-analysis articles in the thematic area of diabetic foot ulcers. This study examined publication trends, authors' countries of origin, publication sources, and specific citation metrics of the articles. No thematic analysis was conducted on the reviewed systematic review and meta-analysis articles, which is understandable given the scope of the research.

In 2025, Stojic, Minder, Boehl, Rivero, Zwahlen, Gemperl, and Glisic conducted a bibliometric analysis of systematic review and meta-analysis articles in the thematic area of spinal cord injury (both human and animal). These articles were extracted from the Web of Science Core Collection and Embase databases through December 16, 2022, without time or language restrictions. A total of 1224 articles, authored by 5237 researchers and published in 424 sources between 1985 and 2022, were examined. The researchers utilized Bibliometrix and VOSviewer tools to analyze the data and identify the main research topics. They analyzed the authors' keywords and created distribution maps and thematic trends.

Additionally, they provided an analysis of thematic maps and the evolution of topics over time. The findings revealed that 15% of the reviewed articles focused on the recovery and management of spinal cord injury, rehabilitation, and quality of life. Overall, this part of the study identified popular topics and research trends in spinal cord injury.

In 2022, Nadi-Ravandi and Batooli conducted a study to analyze the bibliometric, content, and co-occurrence aspects of systematic review and meta-analysis articles in the field of gamification in education. These articles were extracted from the Scopus, Web of Science, and

PubMed databases. A total of 25 articles, including 18 systematic reviews and seven meta-analyses, published between 2016 and 2021, were selected for inclusion in the study. Part of the research involved content analysis of the reviewed articles, revealing that the fields of science, technology, and mathematics accounted for a significant portion of the studies.

In 2014, Zhi et al. examined the publication trends of systematic review articles in the field of hip fractures using data from the Web of Science citation database. This study reviewed 654 articles from 48 countries published between 1995 and 2013. The study analyzed the year of publication, the contributions of governments, organizations, and authors, the average number of citations for their works, and the sources of article publications. No thematic analysis was conducted on the articles, which is understandable given the scope of the research.

In 2014, Ho and Kahn conducted a bibliometric analysis of highly cited review articles indexed in the Science Citation Index Expanded. The study reviewed 1,857 articles published between 1899 and 2011, each receiving at least 1,000 citations by 2011. Data were categorized by publication date, citation counts, journals, Web of Science subject categories, citation life cycles, and works by Nobel Prize winners. The researchers assessed institutional and national publication output using six indicators: total publications, independent publications, collaborative publications, first-author publications, corresponding-author publications, and single-author publications. Notably, thematic content analysis was not performed; only the section assessing journals used Web of Science subject categories.

Materials and Methods

The research employed qualitative content analysis, emphasizing indexing and classification through Medical Subject Headings (MeSH) and the National Library of Medicine (2024a, b, c, d, e) classification system (NLMC) for thematic analysis of the articles. This approach captured the depth and nuance of thematic domains while ensuring the classification adhered to internationally recognized standards, thereby enhancing the credibility and comparability of the findings.

The following search formula was retrieved from the Scopus database on January 25, 2023, to engage the scholarly community. Scopus was chosen as the primary database for data extraction due to its extensive coverage of high-quality, peer-reviewed literature and robust indexing capabilities. Its comprehensive collection of scientific articles, including systematic reviews and meta-analyses, is ideal for our study. To conduct the search strategy, we employed various alternative keywords for "systematic review" and "meta-analysis," using tags such as title/abstract, author keywords, and index terms to identify indexing vocabulary from subject-specific databases, including MeSH (Medical Subject Headings) and Emtree.

(TITLE-ABS (“systematic review*”) OR AUTHKEY (“systematic review*”) OR INDEXTERMS (“systematic review*”) OR TITLE-ABS (meta-analys*) OR AUTHKEY (meta-analys*) OR INDEXTERMS (meta-analys*) OR TITLE-ABS (“meta analys*”) OR AUTHKEY (“meta analys*”) OR INDEXTERMS (“meta analys*”))

The extracted results were narrowed to Iran, the year 2021, and the document types Review and Article. This focus on 2021 aimed to provide a snapshot of recent research trends in Iranian medical sciences. Analyzing articles from a single year helps capture the current research landscape and identify emerging trends. However, due to time constraints of the research project and the extensive workload of qualitative content analysis, reviewing articles from multiple years was not feasible.

Also, the extracted articles focused on the medical sciences subjects listed below. Notably, given psychology's robust relationship with human mental health, the researchers decided to examine it alongside the medical sciences.

- Medicine
- Biochemistry, Genetics, and Molecular Biology
- Nursing
- Pharmacology, Toxicology, and Pharmaceutics
- Immunology and Microbiology
- Health Professions
- Dentistry
- Psychology

The remaining 2,237 articles made up the research community. To identify the subject areas covered in these articles, the core topics were determined by analyzing the titles, abstracts, keywords, and, when available, the full texts. This was done by utilizing the Medical Subject Headings (MeSH). Each article was categorized with at least one and up to three major index terms. Subsequently, the NLM classification was used to assign each article to a category based on its index terms. Notably, in some cases, an article was included in more than one category due to the multiplicity of topics. It is also worth mentioning that the articles were initially indexed and classified by two researchers. Their agreement was then assessed, and any discrepancies were resolved using the opinion of a third researcher as the deciding criterion.

Results

Table 1 presents the findings of thematic analysis and classification of the NLM 2237 reviewed articles to illustrate the subject areas and categories.

Table 1
Frequency distribution of articles based on NLM categories

NLM category	Thematic area	Article from 2237	
		Number	Percent
QU	Biochemistry. Cell Biology and Genetics	527	23.55
QV	Pharmacology	493	22.03
WC	Communicable Diseases	390	17.43
WA	Public Health	273	12.20
WM	Psychiatry	206	9.20
QW	Microbiology. Immunology	186	8.31
WG	Cardiovascular System	178	7.95
WL	Nervous System	177	7.91
W	General Medicine. Health Professions	153	6.83
WK	Endocrine System	149	6.66
WQ	Obstetrics	135	6.03
WI	Digestive System	120	5.36
WJ	Urogenital System	107	4.78
WS	Pediatrics	100	4.47
WP	Gynecology	99	4.42

NLM category	Thematic area	Article from 2237	
		Number	Percent
WE	Musculoskeletal System	99	4.42
WH	Hemic and Lymphatic Systems	95	4.24
WO	Surgery	94	4.20
WU	Dentistry. Oral Surgery	95	4.24
WN	Radiology. Diagnostic Imaging	79	3.53
WB	Practice of Medicine	77	3.44
QT	Physiology	68	3.03
QZ	Pathology	63	2.81
WF	Respiratory System	49	2.19
QY	Clinical Laboratory Pathology	48	2.14
WT	Geriatrics	43	1.92
WR	Dermatology. Integumentary System	40	1.78
QX	Parasitology	39	1.74
WX	Hospitals and Other Health Facilities	25	1.56
WW	Ophthalmology	29	1.29
WY	Nursing	24	1.07
QS	Human Anatomy	17	0.75
WV	Otolaryngology	11	0.49
WD	Medicine in Selected Environments	4	0.17
WZ	History of Medicine. Medical Miscellany	4	0.17

As shown in Table 1, the QU category, related to Biochemistry, Cell Biology, and Genetics, leads with 23.55% (527 articles). Next is the Pharmacology category (QV), accounting for 22.03% (493 articles). The Communicable Diseases category (WC) follows with 17.43% (390 articles). The categories with the most minor representation are WD (Medicine in Selected Environments) and WZ (History of Medicine and Medical Miscellany), each with just 0.17% (4 articles).

Table 2 shows that 2,237 reviewed articles have been published across 989 journals. The highest frequency of publication sources is in the QU category, covering Biochemistry, Cell Biology, and Genetics, with 318 journals (32.15%). The QV category, focusing on Pharmacology, follows with 284 journals (28.71%), and the WC category, related to Communicable Diseases, ranks third with 263 journals (26.59%).

Table 2
Frequency distribution of article sources by NLM categories

NLM category	Sources of publication from 989		Number of articles	Average number of articles per source
	Number	Percent		
QU	318	32.15	527	1.65
QV	284	28.71	493	1.73
WC	263	26.59	390	1.48
WA	180	18.20	273	1.51
WM	151	15.26	206	1.36
QW	147	14.86	186	1.26
WL	138	13.95	177	1.25
WG	141	14.25	178	1.28
W	117	11.83	153	1.30
WQ	96	9.70	135	1.32
WK	102	10.31	149	1.55
WI	96	9.70	120	1.25
WP	84	8.49	99	1.15
WH	77	7.78	95	1.13
WJ	86	8.69	107	1.27
WE	82	8.29	99	1.20
WO	84	8.49	94	1.16
WS	81	8.19	100	1.29
WU	71	7.17	95	1.33
WN	69	9.97	79	1.14
WB	62	6.26	77	1.24
QT	59	5.96	68	1.15
QZ	53	5.35	63	1.18
WF	44	4.44	49	1.11
QY	47	4.75	48	1.02
WT	37	3.74	43	1.16
WR	32	3.23	40	1.25
QX	27	2.73	39	1.44
WX	28	2.83	35	1.25
WW	22	2.22	29	1.31
WY	17	1.71	24	1.41
QS	17	1.71	17	1
WV	10	1.01	11	1.1
WD	4	0.40	4	1
WZ	4	0.40	4	1

The QV category of Pharmacology also boasts the highest average number of articles per publication source at 1.73. The QU category of Biochemistry, Cell Biology, and Genetics comes next, with an average of 1.65 articles per source. The WK category, covering the Endocrine System, has an average of 1.55 articles per source. On the lower end, the QS category for Human Anatomy, the WD category for Medicine in Selected Environments, and the WZ

category for the History of Medicine have the lowest average, with just one article per source.

Discussion

The present study revealed that, of the 2,237 article titles examined, most fell into the QU category, focusing on Biochemistry, Cell Biology, and Genetics. Following this, the QV category in Pharmacology and the WC category in Communicable Diseases had notable shares.

The placement of the highest share of articles under the QU category, which falls under "Biochemistry, Cell Biology and Genetics, may be due to the diversity of subject areas it encompasses. This category includes a wide range of topics, such as proteins, amino acids, peptides, carbohydrates, enzymes, vitamins, cells, genetics, and nutrition (*QU (Biochemistry, Cell Biology and Genetics) Schedule of NLM Classification*, 2024). Placing a significant number of the examined articles in this category might not be far-fetched, given the research potential in this subject domain. However, to better understand these findings, more research is needed. Two scientometric studies on Indian scientific publications in biochemistry report a growing trend in this field (Sudhier & Dileepkumar, 2020; Verma, Borgohain & Hadagali). Additionally, there have been reports of an increasing trend in various genetic studies.

A scientometric study has revealed a rising trend in deep learning research within genetics since 2018 (Zhang & Fan, 2022)**.** Additionally, another study in forensic genetics reports a similar increase in published articles from 2006 onward (Stasi, Mir, Pellegrino, Wani & Shukla, 2023). Some of this growth can be attributed to the overall increase in scientific publications in recent decades. Thelwall and Sud (2022) analyzed publication trends in Scopus over 121 years and found a significant increase in the number of articles and scientific journals indexed in the database. To address whether the high volume of systematic review and meta-analysis articles in the QU category is influenced by the overall growth trend in this field, it is necessary to conduct more scientometric research to examine the publication trends of this domain.

Based on the findings, the second most common article category is QV, which pertains to Pharmacology. According to Hatami Yadegari's (2022) research, most systematic review and meta-analysis articles from Iran in medicine and related sciences, indexed in the Web of Science database, are focused on Pharmacology & Pharmacy, followed by the Medicine, General & Internal category. In this study, the classification of the reviewed articles was reported according to the Web of Science subject categories. However, since Pharmacology and pharmacy fall under the QV category according to the NLM classification (*QV (Pharmacology) Schedule of NLM Classification*, 2024)**.** Hatami Yadegari's (2022) findings align with those of the present study. Similarly, Kissin's 2015 research evaluated drug discovery efforts targeting pain-related molecular targets from 1984 to 2013. Another study in 2014 reviewed publications on 55 drugs used for chronic pain treatment over seven five-year periods from 1979 to 2013 (Kissin, 2014). Both studies indicated an increase in research production in these areas of pharmacology, highlighting their importance to researchers. Despite this, more scientific research is needed to draw definitive conclusions.

According to the research findings, the third most common article category is the WC category, focusing on Communicable Diseases. Given that these articles pertain to 2021, this trend is likely linked to the COVID-19 outbreak, a contagious and infectious disease identified in Wuhan, China, in late December 2019 (TorabiZonouz, Ghasemitabegh, Ghorani, Ebrahimi Sadr, Mahmoud Alilou & Pak, 2020). Nevertheless, the results of this research alone are insufficient to draw a definitive conclusion. It is essential to examine the growth of systematic

review and meta-analyses articles of Iran on this topic, both before and after COVID-19, to provide a more comprehensive perspective. Several studies have reported a growing trend in COVID-19-related articles (Dastani & Ghorbani, 2021; Ejtahed, Oveissi, Tabatabaei-Malazy, Rad, Razi & Larijani, 2021; Harsanto, 2020). It is worth noting that WC506, which falls under the broader WC category of Communicable Diseases, specifically pertains to COVID-19 (*WC (Communicable Diseases) Schedule of NLM Classification*, 2024)**.**

Notably, Vaziri and Feizabadi's (2017) study aimed to examine the status of systematic review articles in Iran's medical sciences using scientific indicators. They found that General Medicine and Internal Medicine were the most productive fields of study. In the current research, General Medicine falls under the Health Professions category W (*W (General Medicine. Health Professions) Schedule of NLM Classification*, 2024), ranked 9th, while Internal Medicine is categorized under WB 115 (*WB (Practice of Medicine) Schedule of NLM Classification*, 2024), ranking 21st in this study. The inconsistency between the two studies' results may stem from differences in the research communities and classification systems used. This study employed the NLM classification to categorize systematic review and meta-analysis articles indexed in Scopus. In contrast, Vaziri and Feizabadi (2017) utilized the Web of Science categories to report the subject domains of systematic review articles, rather than meta-analyses.

Researchers reviewed 2,237 articles published across 989 journals, averaging about 2.26 articles per journal. The findings reveal that the highest publication frequency is in the most productive category, i.e., QU journals in the subject areas of Biochemistry, Cell Biology, and Genetics. In 2021, a total of 2,121 journals in the fields of Biochemistry, Cell Biology, and Genetics were indexed in Scimago (*Scimago Journal in Field of Biochemistry, Genetics and Molecular Biology (QU)*, 2021). Researchers from Iran successfully published their articles in 14.99% of these journals. Similarly, in 2021, Scopus indexed 3,085 journals related to this subject area(Scopus Sources, 2021), and Iranian researchers published their articles in 10.3% of these journals. The QV category of Pharmacology is the second-most-frequent journal category. Among the 716 journals indexed in Scimago (2021) (*Scimago Journals in the Field of Pharmacology, Toxicology and Pharmaceutics, QV*), the articles of Iranian researchers in the fields of Pharmacology, Toxicology, and Pharmaceutics accounted for 39.66% of the journals. Among the 1,204 journals in this subject area on Scopus, researchers from Iran have published in 23.58% of them.

Additionally, the third highest number of journals falls under the WC category for Communicable Diseases. Among the 320 journals indexed in Scimago (*Scimago Journals in the Field of Infectious Disease (WC)*, 2021) in 2021, Iranian researchers published their articles in 82.18% of these journals in the field of Medicine-Infectious Diseases. Additionally, on the Scopus database, researchers from Iran contributed systematic reviews and meta-analyses to 63.68% of the 413 indexed journals (*Scopus Sources*, 2021). These figures highlight the success of Iranian researchers in publishing their work on Communicable Diseases across a broad spectrum of prestigious international journals indexed in Scimago and Scopus.

The research findings indicate that journals in the QV category of Pharmacology have the highest average number of articles, with 1.73 per journal. On the other end of the spectrum, journals in the QS category (Human Anatomy), WD category (Medicine in Selected Environments), and WZ category (History of Medicine, Medical Miscellany) have the lowest average, with just one article per journal. This significant range—from 1.73 to 1—suggests a notable diversity in the publication sources for the examined articles. The growing number of

internationally recognized journals (Thelwall & Sud, 2022) may justify this finding. As the number of internationally prestigious journals increases, researchers have a wider range of options to publish their articles. To further understand this finding, additional research is needed.

While this study offers valuable insights into the thematic distribution of Iranian systematic reviews and meta-analyses in medical sciences for policymakers and researchers, it is essential to acknowledge certain limitations researchers may face when applying its findings. First of all, this study included only articles published in 2021, potentially missing long-term patterns in Iran's systematic review and meta-analysis literature across various medical research fields. For a more thorough grasp of theme domains, future study should cover a wider time period. Second, the study used the Scopus database to retrieve data; for comparison, data from other databases, such as Web of Science and PubMed, should be included in future studies. It might also be beneficial to investigate alternative indexing and classification schemes.

Conclusion

This research provides a comprehensive mapping of the thematic domains of systematic review and meta-analysis articles in Iran's medical sciences, as indexed in Scopus in 2021. The results show that most articles are in the QU category, which focuses on Biochemistry, Cell Biology, and Genetics; the QV category, which is related to Pharmacology; and the WC category, which is associated with Communicable Diseases. The diversity and research potential within these categories highlight the crucial contributions made by Iranian researchers in these fields. The high volume of publications in the QU category may be due to the wide range of topics covered, reflecting an increasing trend in biochemistry and genetics research. Similarly, the large number of articles in the QV category underscores the importance of pharmacology research in Iran, consistent with earlier studies that have found a surge in publications in this field. The COVID-19 pandemic, which has spurred increased research on communicable diseases, has undoubtedly influenced the WC category's significance.

Overall, this study provides a solid foundation for understanding the thematic distribution of systematic review and meta-analysis articles in the medical sciences in Iran. It highlights thematic maps that offer valuable insights for researchers, policymakers, and funding organizations in planning future research and development activities in top-tier studies, which are considered the heart of evidence-based practice. Further research is needed to expand on these findings and explore the evolving patterns in systematic review and meta-analysis articles of Iran in medical sciences.

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