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A Bibliometric Analysis of the Meta-Analysis Studies in Nursing: Current Status and Developmental Process

Hemşirelikte Metaanaliz Çalışmalarının Bibliyometrik Analizi: Mevcut Durum ve Gelişim Süreci

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ABSTRACT Objective: Meta-analysis studies offer significant results for evidence-based nursing practices. Therefore, it is crucial to have a comprehensive understanding about the trends and dynamics in current meta-analysis studies. This study aimed to determine the current knowledge structure of meta-analysis studies in nursing with bibliometric analysis. **Material and Methods:** This study was designed as a descriptive bibliometric study. The study data were obtained from the Web of Science database. 942 meta-analysis studies were included in the study. The data analysis was conducted with Excel, SPSS and VOSviewer. **Results:** It was found that meta-analysis studies were published in 99 different journals published between 1988-2021 and 78.14% of these studies received citations. It was determined that 64.33% of the studies were published in the last 5 years (2017-2021). The meta-analysis studies were produced by 3,548 different authors and produced in 1,169 different institutions. The most common subcategory of meta-analysis studies was oncology. Journal of Advanced Nursing was the most productive journal with 112 publications and China produced the greatest number of publications. The most frequently used keywords were "meta analysis", "systematic review", "nursing", "quality of life", "review", "depression", "anxiety", "exercise", "nurse" and "cancer." Recent meta-analysis studies also dealt with ageing and delirium. **Conclusion:** Meta-analysis studies have become growingly popular with regard to the number of publications in recent years. There is a need to increase the evidence especially in the field of nursing education and management. Meta-analysis studies mostly focused on reducing the problems of patients with chronic problems and increasing their quality of life.

Keywords: Bibliometrics; meta-analysis; nurses; nursing

ÖZET Amaç: Metaanaliz çalışmaları, kanıta dayalı hemşirelik uygulamaları için önemli sonuçlar sunmaktadır. Bu nedenle mevcut metaanaliz çalışmalarında, trendler ve dinamikler hakkında kapsamlı bir bakış açısına sahip olmak çok önemlidir. Bu çalışmanın amacı, hemşirelikte metaanaliz çalışmalarının güncel bilgi yapısını bibliyometrik analizle ortaya koymaktır. **Gereç ve Yöntemler:** Bu çalışma, tanımlayıcı bir bibliyometrik çalışma olarak tasarlandı. Çalışma verileri Web of Science veri tabanından elde edildi. Çalışmaya, 942 metaanaliz çalışması dâhil edildi. Veri analizi Excel, SPSS ve VOSviewer ile yapıldı. **Bulgular:** Metaanaliz çalışmalarının, 1988-2021 yılları arasında 99 farklı dergide yayımlandığı ve bu çalışmaların %78,14'ünün atıf aldığı saptandı. Çalışmaların %64,33'ünün son 5 yıl içinde (2017-2021) yayımlandığı tespit edildi. Metaanaliz çalışmaları, 3.548 farklı yazar tarafından ve 1.169 farklı kurumda üretilmiştir. Metaanaliz çalışmalarının en yaygın alt kategorisi onkoloji idi. Journal of Advanced Nursing, 112 yayın ile en üretken dergi olup; Çin, en fazla yayın üreten ülke idi. En sık kullanılan anahtar kelimeler "metaanaliz", "sistematik derleme", "hemşirelik", "yaşam kalitesi", "derleme", "depresyon", "kaygı", "egzersiz", "hemşire" ve "kanser" idi. Yakın zamanda yapılan metaanaliz çalışmaları da yaşlanma ve deliryum ile ilgiliydi. **Sonuç:** Metaanaliz çalışmaları, son yıllarda yayın sayısı açısından giderek daha popüler hâle gelmiştir. Özellikle hemşirelik eğitimi ve yönetimi alanında kanıtların artırılmasına ihtiyaç vardır. Metaanaliz çalışmaları, daha çok kronik sorunları olan hastaların sorunlarını azaltmaya ve yaşam kalitelerini artırmaya odaklanmıştır.

Anahtar Kelimeler: Bibliyometri; metaanaliz; hemşireler; hemşirelik

Meta-analysis basically puts together the study results conducted by various researchers on the same subject by using qualitatively and quantitatively available statistical methods.[1] Also meta-analysis combines results from a number of studies conducted on the same research question.[2] The primary purpose

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of meta-analysis is to combine the results derived from studies conducted with small samples at different places and times, to summarize large data for a better understanding, to increase sample power, to produce more accurate information, to determine the presence and magnitude of the study impact, to shed light on the terra incognita of a specific field of study.[3]

Meta-analysis serves as a vital tool in evaluating the efficiency of nursing interventions. The need for strong evidence for evidence-based practice led nurses to conduct meta-analysis studies.[4] Meta-analysis is extensively used in many studies in nursing. In previous studies, the efficiency of nursing interventions for dyspnea in patients with chronic obstructive pulmonary disease, the effects of nursing education on students' critical thinking skills, the effect of nurses' own smoking behaviors on professional smoking cessation practices, work-related psychosocial risk factors and musculoskeletal diseases in hospital nurses, the relationship between structural reinforcement and organizational commitment and the efficiency of nursing interventions among patients with cancer were examined by meta-analysis method.[5-10] However, it was concluded that no previous nursing studies carried out with bibliometric analysis have been reported that investigated the meta-analysis characteristics and knowledge structure.

Bibliometric analysis is a long-standing epistemological research method and it has become widely popular in recent years to map out the trends in the quantitative analysis in scientific researches and publications.[11,12] Bibliometric analysis basically enables the researcher to explore a given field of scientific research with a particular focus on the most productive authors, institutions, countries, and journals.[13,14] Besides, it also unravels the bibliometric connections with a special analysis of citations and keywords.[15] Bibliometric studies help to characterize the present condition of fields of research and to plan research topics to figure out new trends in scientific research.[16,17] Thus, this study is based on a bibliometric analysis method in order to provide an objective and systematic perspective to investigate meta-analyses in nursing.

A review of nursing literature demonstrated no previous studies that investigated the current status, development and trends in meta-analysis studies with bibliometric analysis, which mainly inspired the researchers to conduct this particular study. This study was conducted to fill this gap in the literature. It is recommended that the results of this particular study would promote the development of meta-analysis studies in nursing and the design of further studies.

MATERIAL AND METHODS

AIM AND STUDY DESIGN

This study primarily targeted to map out the current knowledge structure and developmental process of meta-analysis studies in nursing. To this end, the study focused on the dynamics and trends in meta-analysis studies published between 1988-2021. The researchers documented and visualized the study data, e.g., the number of documents, the number of authors, the number of citations, the most cited studies, the most productive writers, journals, countries and keywords by using bibliometric analysis. This study was designed as a descriptive bibliometric study.

This study seeks to answer the following research questions:

1. The development of meta-analysis studies between 1988-2021.

2. Leading authors, institutions, journals and countries in terms of study count.

3. The most cited meta-analysis studies.

4. Trends and patterns in the keywords of the meta-analysis studies.

DATA COLLECTION

The research data were obtained from the Web of Science (WoS) database. This database was deliberately chosen by the researchers for offering a rich archive of publications and citations, hosting journals with high impact factors, allowing efficient access to bibliographic data as confirmed by several other studies.[18,19] Also the WoS platform, as the world's most trusted research publication and citation index, contains the universe of journals included in the Science Citation Index Expanded, the Social Sciences Cita-

tion Index, the Arts & Humanities Citation Index and the Emerging Sources Citation Index.[20] The search for data was conducted on April 11, 2021, and the following retrieval strategy was used: [TI=(meta analysis OR meta-analysis OR meta-analyses) OR AB=(meta analysis OR meta-analysis OR meta-analyses) OR TS=(meta analysis OR meta-analysis OR meta-analyses) OR AK=(meta analysis OR meta-analysis OR meta-analyses)] AND WC=nursing, Indexes=SCI-EXPANDED, SSCI, Timespan=1970-2021. As a result, it was noted that 1,929 studies in total were reached in this study. As this study aimed to investigate meta-analysis studies, 664 articles and 1,151 reviews were selected for the study. Forty-three meeting abstracts, 80 early access, 2 book reviews, 11 letters, 5 proceeding papers, 1 news item, 47 editorial material and 9 corrections were excluded from the analysis. All information with reference records in 1,815 studies (all article information available, including the names of the authors, abstracts, keywords, editors and references) were exported. Having analyzed the publications individually and excluded all publications that didn't include meta-analysis, the researchers compared their results and reached an inter-reviewer agreement on studies to be included. As a result, 942 studies were included in the study.

DATA ANALYSIS

Bibliometric analyses and science mappings were carried out using the following software systems: Excel and VOSviewer (Version 1.6.16, Center for Science and Technology Studies of Leiden University). The Pearson correlation analysis was used to analyze the correlation between the number of publications and the year of publication. For statistical analysis, a p value of less than 0.05 was considered significant.

ETHICAL CONSIDERATIONS

As this study was conducted without any human subjects, an ethical approval was not required.

RESULTS

ANNUALS TRENDS IN META-ANALYSIS STUDIES

The study results indicated that 942 meta-analysis were published between 1988-2021. The number of publications ranged from 1-180 by years. It was further found that a majority of studies (180 studies) were published in 2020 and that 64.33% of the studies were published within the last 5 years (2017-2021). The decrease in 2021 can be explained with the fact that this study was conducted in the middle of 2021 (Figure 1). The publication years and the number of publications were correlated which demonstrated a positive correlation (r=0.755, p=0.001).

JOURNAL ANALYSIS

In light of the study results, it was found that the studies were published in 99 different journals. It was found that Journal of Advanced Nursing was the most productive journal with 112 publications, International Journal of Nursing Studies was the 2nd most productive journal with 107 publications, and Heart & Lung was the third most productive journal with 51 publications. Additionally, 52.54% of the studies were published in the top 10 journals including most of the meta-analysis studies. Six journals were in Q1 category and all journals had an impact factor of 1.00 or higher except one journal.

Figure 2 describes the historical process of journals publishing meta-analysis studies. Navy blue ones represent journals that publish meta-analysis studies in the early period, while yellow ones represent journals recently. Journals that publish meta-analysis studies in the early period were Journal of Korean Academy of Nursing and Nursing Research. Nursing Open, Nursing in Critical Care and Public Health Nursing were journals that published meta-analysis studies recently (Figure 2).

CATEGORY ANALYSIS

The subcategories of meta-analysis studies were also analyzed. The most common subcategory was oncology (88 studies), which was followed by cardiovascular system & cardiology (80 studies), respiratory system (51 studies), rehabilitation (46 studies) and health care sciences & services (45 studies) (Figure 3).

AUTHOR AND INSTITUTION ANALYSIS

The results further indicated that these studies were produced by 3,548 different authors. The number of publications per author was also analyzed and it was found

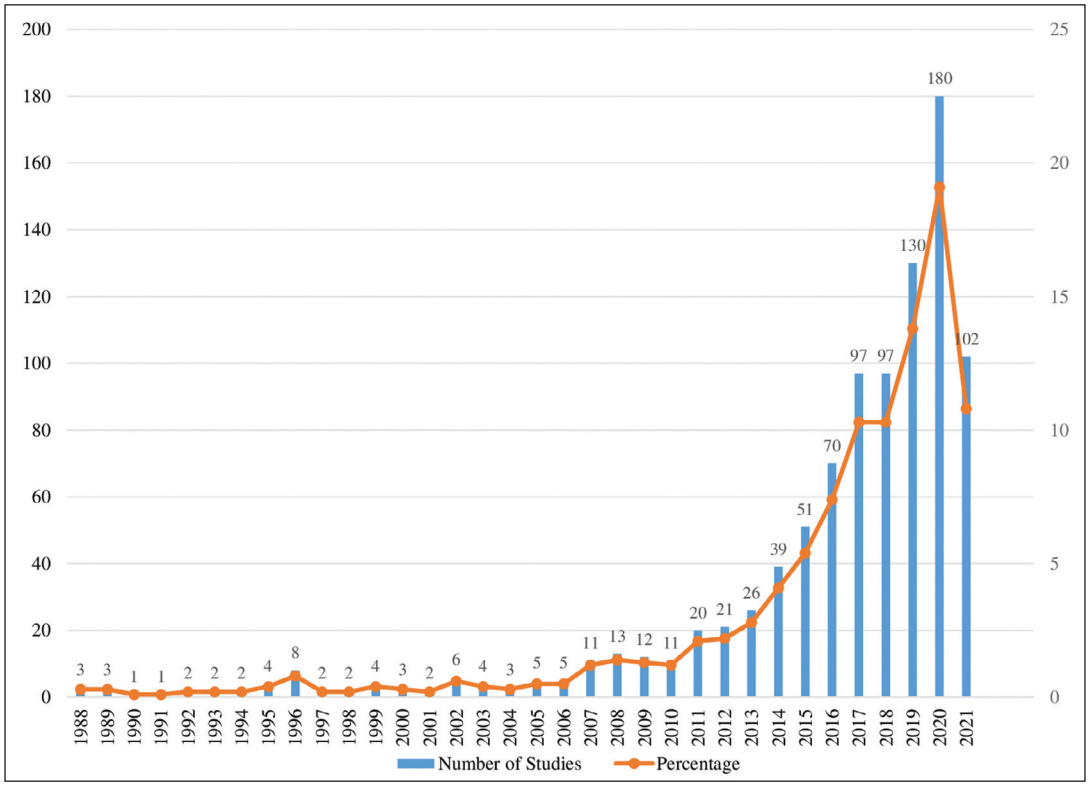


FIGURE 1: The annual number of meta-analysis studies.

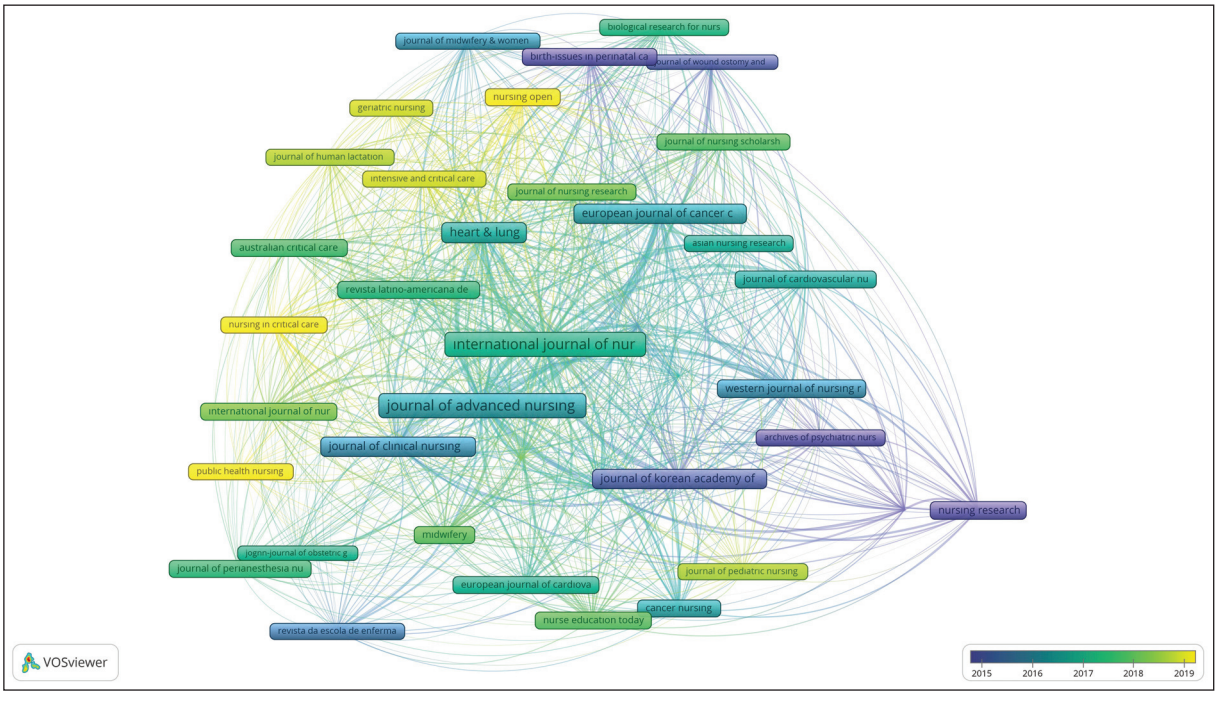


FIGURE 2: A chronological overview of journals publishing meta-analysis studies.

that the number of authors with one publication was 3,128 (88.16%), the number of authors with two publications was 298 (8.39%), and the number of authors with 3 publications was 72 (2.02%). The most produc-

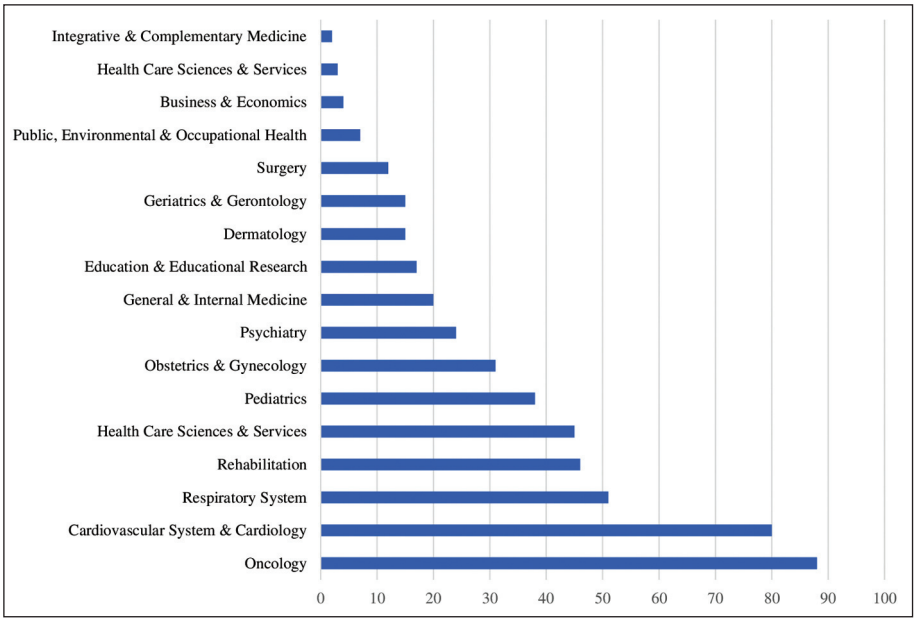


FIGURE 3: Distribution of studies by Web of Science categories.

tive authors were Park, Seong-Hi (n=10 studies), Tsai, Pei-Shan (n=9 studies), Chang, Shu-Fang (n=7 studies) and Chiu, Hsiao-Yean (n=7 studies), respectively.

Moreover, it was reported that meta-analysis studies were produced in 1,169 different institutions. The top 3 institutions were Taipei Medical University (Taiwan), Chinese University of Hong Kong (Hong Kong) and National University of Singapore (Singapore).

COUNTRY ANALYSIS

It was also stated that meta-analysis studies were produced by researchers from 68 different countries. People's Republic of China (n=272 studies) is the leading in meta-analysis studies followed by USA (n=197 studies) and South Korea (n=115 studies), respectively. It was further noted that 61.99% of the studies were published in these three countries. USA, Canada and Belgium were the countries that produced meta-analysis studies in the early period. Turkey, Iran and India were the countries that produced meta-analysis studies recently.

KEYWORD ANALYSIS

It was further noted that the authors used 2,177 different keywords in meta-analysis studies. Figure 4 presents a network of keywords that were used more than 5 times. The most commonly used keywords were "meta-analysis" (510 times), "systematic review" (252 times), "nursing" (116 times), "quality of life" (48 times), "review" (40 times), "depression" (39 times), "anxiety" (37 times), "exercise" (37 times) and "nurse" (35 times), "cancer" (34 times) (Figure 4).

The cluster analysis demonstrated that the keywords were composed of 8 clusters. Keywords in the same cluster are shown in the same color. Cluster 1 included 13 items such as breast cancer, breastfeeding, children, critical care, delirium, evidence-based practice, exercise, mortality, obesity, older adults, physical activity, pregnancy, systematic review and meta-analysis. Cluster 2 included 10 items, which were analysis, burnout, heart failure, intervention, mental health, nurse, nurses, prevalence, stroke, systematic review. On the other hand, Cluster 3 included 6 items, which are aged, meta-analysis, pressure ulcer, prevention, risk factors, review. Cluster 4 included 5 items, which are dementia, depression, literature review, sensitivity, specificity. Moreover, Cluster 5 included 5 items, which are fatigue, quality of life, self-efficacy, self management, Type 2 diabetes. Cluster 6 included 4 items, which are education, nursing, randomized controlled trials, stress. Cluster 7 included 4 items, which are adults, anxiety, music, pain. Finally, Cluster 8 included 2 items,

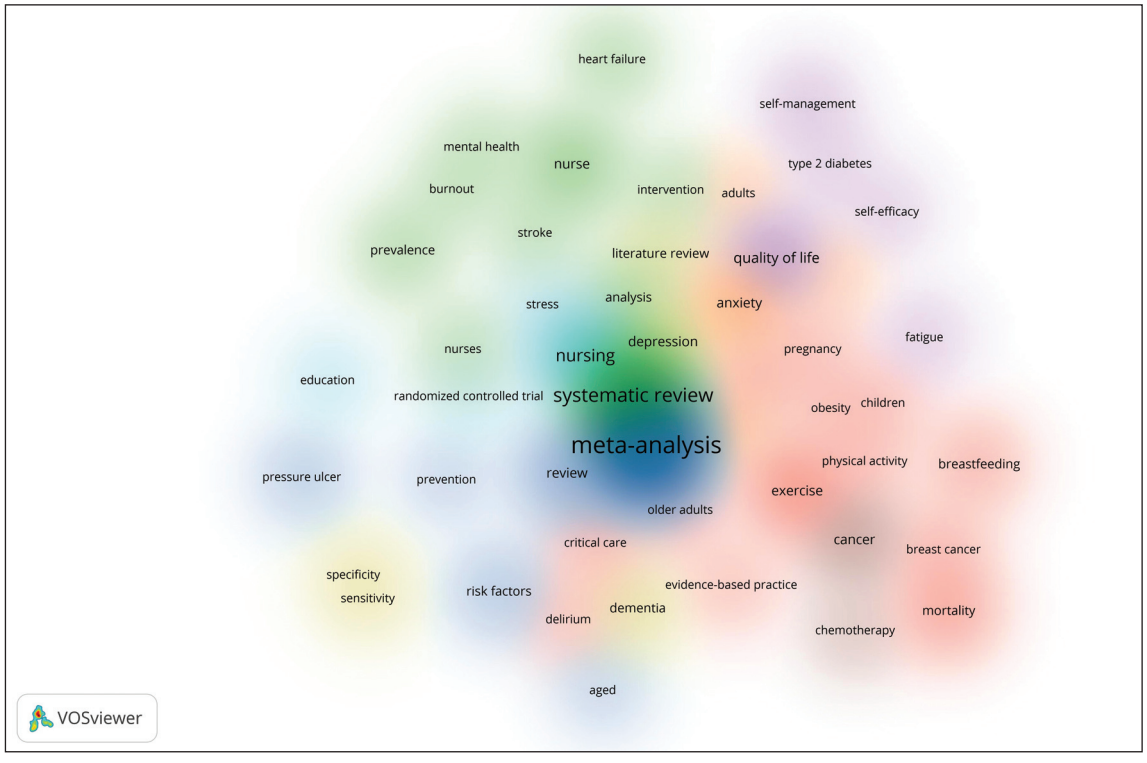


FIGURE 4: Author keywords co-occurrence density network.

which are cancer, chemotherapy. Eight clusters were more associated with oncology, health education, cardiovascular diseases, geriatrics, mental health and obstetrics & gynecology.

Figure 5 shows the historical process of keywords in meta-analysis studies. Navy blue ones represent keywords used in early meta-analysis studies (evidence-based practice, children, music, fatigue, adults, prevention) while yellow items represent keywords used rather recently (stress, delirium, older adults, self-efficacy and prevalence) (Figure 5).

CITATION ANALYSIS

The meta-analyses included in the study had 14,423 citations in total. 2.33% of studies had 100 or more citations (22 studies), 4.24% had citations between 50-99 (40 studies), 24.52% had citations between 10-49 (231 studies), 47.02% had citations between 1-9 (443 studies). Whereas, it was also found that 21.86% of these studies had no citations at all (206 studies). The 10 most cited studies had 3,410 citations (23.64%) in total. The most cited study was conducted by Beck with 1,131 citations.[21] Five out of 10 most cited studies were conducted by Beck and these studies were focusing on depression.[21-25] These studies were mostly published in Nursing Research (5 studies) and Journal of Advanced Nursing (3 studies).

DISCUSSION

Meta-analysis studies play a profound role in summarising evidence of healthcare interventions accurately and reliably.[26] This bibliometric study, therefore, aims to map out the most significant articles, authors, countries, institutions, and research topics in meta-analyses so as to pave the way for future researchers.

The study findings demonstrated a steady increase in meta-analyses a majority of which were conducted within the last 5 years. A gradual increase in the numbers of meta-analysis over the years also indicates a growing interest among nursing researchers, which is considered to be a significant and affirmative evidence. Meta-analysis studies

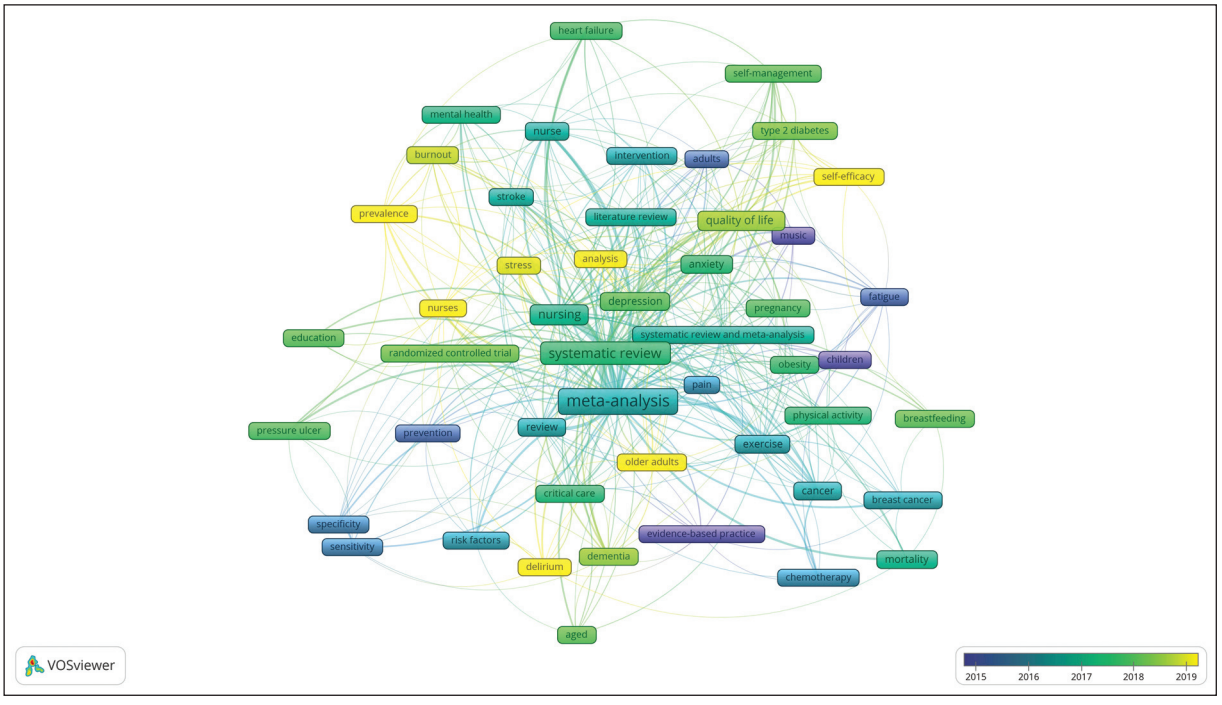


FIGURE 5: A chronological overview of co-occurrence map of author keywords.

simply provide an overall synthesis and evaluation of the results of previous studies.[27] In this regard, meta-analysis studies provide an insight into the development of the mass of knowledge in nursing studies, which might result from a recent increase in evidence-based nursing studies.[28,29] Additionally, researchers have been obviously motivated by journals with higher impact values such as Journal of Advanced Nursing and International Journal of Nursing Studies which increasingly publish meta-analysis studies.

The results of our study further indicated that a majority of meta-analysis studies were conducted in the People's Republic of China, the USA and South Korea. A review of the recent studies in scientific literature also suggested different results with reference to the most productive countries in bibliometric studies. Yang et al., for instance, carried out a study on meta-analysis studies in diabetic research and reported that the most productive countries were the USA, England and Netherlands.[30] On the other hand, Gogos et al., similarly analyzed meta-analyses in dentistry and found that the USA and Switzerland were pioneers in this field.[31] In a relevant study focusing on meta-analysis studies in psychology, it was noted that the USA, Canada and England were leading countries.[32] Moreover, in several other bibliometric studies in nursing, the USA was found to be the most productive country.[33,34] In this study, it may be related to Chinese research priorities in achieve different results. Thus, Zhao et al., reported that evidence based nursing was a widely established and relatively mature field of study in Mainland China.[29] Consequently, countries prioritize evidence-based practices may motivate researchers to conduct highly evidence-based meta-analysis studies.

The authors of the studies were also analyzed and it was found that the studies were produced by 3,548 authors and a majority of authors had published a meta-analysis study. That the number of authors was 3 times more than the number of studies indicates that these studies were mostly multi-authored studies, which is considered to comply with the nature of meta-analysis studies. As a rule, a second reviewer is needed to evaluate the inclusion criteria and the quality of studies in meta-analysis.[35] Another interesting result about the authors of meta-analysis studies is that a majority of these authors had only

one study, which brought out the question "What prevented these authors from producing more multi analysis studies?" It is suggested to conduct further researches focusing on this particular question in order to increase the number of meta-analysis. The study findings also illustrated that the most productive authors were Park, Seong-Hi, Tsai, Pei-Shan, Chang, Shu-Fang and Chiu, Hsiao-Yean, which elicits that these authors were key authors in meta-analysis studies in nursing. It is recommended for future researchers who are seeking guidance or support in meta-analysis to follow and cooperate with these authors.

Keywords characteristically point out the scope and research trend of the publication as well as serving as a significant index in quantitative studies.[36] Most frequently used keywords are also considered to successfully reflect the study focus and/or research trends in a given field of study.[37] The study findings showed that the most frequently used keywords were "meta analysis", "systematic review", "nursing", "quality of life", "review", "depression", "anxiety", "exercise", "nurse" and "cancer", which indicated the hot topics in meta-analysis studies, i.e. these topics were currently being investigated.

The keyword analysis further demonstrated that author keywords were concentrated in 8 clusters, which are oncology, health education, cardiovascular diseases, geriatrics, mental health and obstetrics & gynecology, which was confirmed by the bibliometric study on evidence based nursing conducted by Zhao et al.[29] Considering the results of the keyword analysis, it might be deduced that meta-analysis studies rather focused on reducing and preventing complications of patients and improving quality of life. It is recommended that further studies focus on education and management in nursing.

The historical development of meta-analysis studies was also investigated and it was found that there was a growing interest in meta-analysis studies in new journals and countries. It was further reported that recent meta-analysis studies also dealt with ageing and delirium. Thus, it could be suggested that meta-analysis studies in future would increase in number with new evidence.

STRENGTHS AND LIMITATIONS

The real strength of this study is to use bibliometric analysis method in order to determine the fundamental characteristics of meta-analysis studies in nursing. Additionally, this study is the first study to investigate the meta-analysis studies in nursing. However, this study has certain limitations. The number of studies were confined with the dates when the data were collected. The number of studies may change over time. Another limitation is that the study data were derived from the WoS database. Therefore, the study data were limited to those accessible via WoS database. A further research using other databases like "Scopus", "PubMed" or "Cochrane" may yield different results. Also, this study included studies in SCI-EXPANDED, SSCI indexes published only in nursing category.

CONCLUSION

This research is considered to provide crucial information about meta-analysis studies in nursing. Meta-analysis studies have a growing structure in recent years. It was reported that the Peoples Republic China was the leading country in meta-analysis studies and that the Journal of Advanced Nursing, International Journal of Nursing Studies, and Heart & Lung were pioneer journals in meta-analysis studies. The study results indicated that meta-analysis studies rather focused on reducing complications of patients with chronic diseases and improving their quality of life. However, there is a need for meta-analysis studies on nursing education and management. It is recommended for future researchers to focus on such nursing education and management topics such as retention, workforce, workplace violence, psychoeducation, compassion fatigue, nurse-led care, learning outcomes, ethical dilemmas to provide further evidence. Beyond any doubt, researchers will be highly motivated to contribute to the scientific literature on the condition that journals with high impact values continue to publish meta-analysis studies. As a conclusion, taking the results of this study into consideration will certainly help to increase the number of meta-analysis studies and eventually to improve evidence based nursing practices. It is also recommended that future research

focus on the barriers that prevent researchers from conducting meta-analysis studies.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and/or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

All authors contributed equally while this study preparing.

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