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A BIBLIOMETRIC ANALYSIS OF GLOBAL TRENDS IN INTERPROFESSIONAL APPROACHES TO DIABETES SELF-MANAGEMENT EDUCATION AND SUPPORT (DSMES): INTEGRATION, SUSTAINABILITY, AND DIGITAL TRANSFORMATION PERSPECTIVES

Khaniva Khalilia Alazhar[1] , Ikhwan Yuda Kusuma[1], Afriza Pujiati[1], Nova Mailatunnazza[1]*
[1]Pharmacy Study Program, Faculty of Health, Universitas Harapan Bangsa, 53182 Purwokerto, Indonesia
*Email: ikhwanyudakusuma@uhb.ac.id

Abstract **Background**: Diabetes Self-Management Education and Support (DSMES) plays a key role in improving glycemic control and quality of life for people with diabetes. With the increasing global prevalence of diabetes, interprofessional collaboration and digital integration have become essential for the sustainable, patient-centered delivery of DSMES.
Objective: This study aimed to map the global research landscape on interprofessional Diabetes Self-Management Education and Support (DSMES) from 2020 to 2025, focusing on integration, sustainability, and digital transformation perspectives.
Method: A bibliometric analysis was conducted using the Scopus database, focusing on English-language journal articles published between 2020 and 2025. The search strategy employed Medical Subject Headings (MeSH) and Boolean operators to identify literature on interprofessional, collaborative, and digital DSMES models. Data were analyzed using Biblioshiny (RStudio), VOSviewer, and Microsoft Excel to assess publication trends, citations, and thematic networks.
Results: A total of 582 articles were retrieved, showing a consistent rise in DSMES research, with a peak in 2024. Diabetes Care was the most prolific journal, and McMaster University and the University of Pittsburgh were the leading institutions. Keyword analysis revealed three clusters: traditional diabetes management, chronic comorbidities, and digital/hybrid DSMES models.
Conclusion: Global DSMES research shows rapid growth, with stronger interprofessional collaboration, driven by digital transformation and sustainability goals.
Keywords: Bibliometric, Review, Diabetes Mellitus, Self-Management.

BACKGROUND

Diabetes mellitus remains one of the most pressing global health challenges of the 21st century (1). The International Diabetes Federation (IDF) estimates that 537 million adults aged 20–79 years were living with diabetes in 2023, and this number is projected to exceed 640 million by 2035 if current trends continue (2). The disease accounts for more than 6.7 million deaths annually, largely due to complications such as cardiovascular disease, nephropathy, and retinopathy (3). Beyond its clinical impact, diabetes imposes a considerable economic burden, consuming up to 12% of global health expenditures (4). These statistics highlight the urgent need for effective, sustainable, and patient-centered management strategies (5).

Diabetes Self-Management Education and Support (DSMES) has emerged as a cornerstone in modern diabetes care, emphasizing patient empowerment through knowledge acquisition, behavioral change, and shared decision-making (6). Evidence from Ghana consistently shows that DSMES improves glycemic control, reduces complication risk, and enhances quality of life, while lowering healthcare costs (6). Despite its proven effectiveness, DSMES remains underutilized and inconsistently implemented across health systems, especially in low- and middle-income countries, where resources and professional training are limited (7). The 2017 National Standards for DSMES reaffirmed the importance of education and support in achieving individualized and sustainable outcomes, while also highlighting the transformative role of digital health technologies in extending access and continuity of care (8).

Recent approaches emphasize the interprofessional and integrated nature of DSMES, where physicians, nurses, pharmacists, dietitians, and social workers collaborate to provide holistic, patient-centered care (9). Interprofessional collaboration fosters communication, shared expertise, and coordinated treatment planning, which ultimately improves patient satisfaction and adherence (9). Studies in China show in China that collaborative DSMES interventions enhance clinical outcomes, reduce regimen-related distress, and promote psychosocial well-being (10). This integration aligns with current healthcare reforms toward value-based, team-oriented, and digitally supported care systems (11). The use of hybrid or telehealth DSMES models further expands accessibility and continuity of care, particularly in remote or resource-limited contexts (12).

Despite growing recognition of the benefits of integrated and interprofessional DSMES, significant gaps remain in understanding the global research landscape that underpins these developments (13). A 2025 study by (6) highlighted the cost-effectiveness of DSMES in improving glycemic control and quality of life, emphasizing the need for scalable and equitable implementation. Similarly (14) conceptualized integration frameworks linking DSMES to routine clinical care but noted the absence of consensus on how such integration should be operationalized across diverse settings. Additionally, the 2018 Project SEED trial from India (15) illustrated the potential of peer-led DSMES to deliver low-cost, community-based support, but evidence remains fragmented across disciplines and geographical contexts. These studies provide important insights into the effectiveness and implementation of DSMES, but there is limited research systematically mapping the evolution, interprofessional dimensions, and sustainability perspectives of DSMES from a global bibliometric standpoint (13).

Bibliometric analysis offers a powerful method to quantify and visualize the development of scientific knowledge through publication trends, citation structures, and collaborative networks (16). This approach allows the identification of influential researchers, key institutions, thematic clusters, and knowledge gaps in the field of DSMES (17). To date, no comprehensive bibliometric assessment has synthesized global evidence on interprofessional DSMES and its alignment with digital integration and sustainable care frameworks.

This study aims to conduct a bibliometric analysis of interprofessional approaches to Diabetes Self-Management Education and Support (DSMES) from 2020 to 2025. Specifically, this study focuses on (i) analyzing publication and citation trends, (ii) identifying the most influential authors, institutions, countries, and journals, (iii) mapping collaborative and thematic networks, and (iv) exploring emerging research directions related to the integration and sustainability of DSMES within global healthcare systems. Through this analysis, the study provides a comprehensive overview of how interprofessional and sustainable DSMES models have evolved and identifies potential avenues for advancing future diabetes care research and policy.

METHODS

This study adopts a bibliometric approach to quantitatively analyze and visualize the global research landscape on interprofessional Diabetes Self-Management Education and Support (DSMES). The bibliometric analysis employs mathematical and statistical techniques to assess publication patterns, citation structures, and thematic evolution within the field (18). This approach provides a structured overview of research development and scholarly communication, identifying influential publications, collaborative networks, and emerging research themes (15).

Study Design

Relevant documents were retrieved from the Scopus database to capture peer-reviewed literature on *interprofessional DSMES*. The search included only English-language journal articles published between 2020 and 2025, restricted to items at the final publication stage. Keywords were developed using Medical Subject Headings (MeSH) and terms drawn from prior bibliometric studies, including *"diabetes self-management," "self-management education," "interprofessional," "multidisciplinary,"* and *"digital health,"* combined with Boolean operators to ensure comprehensive coverage.

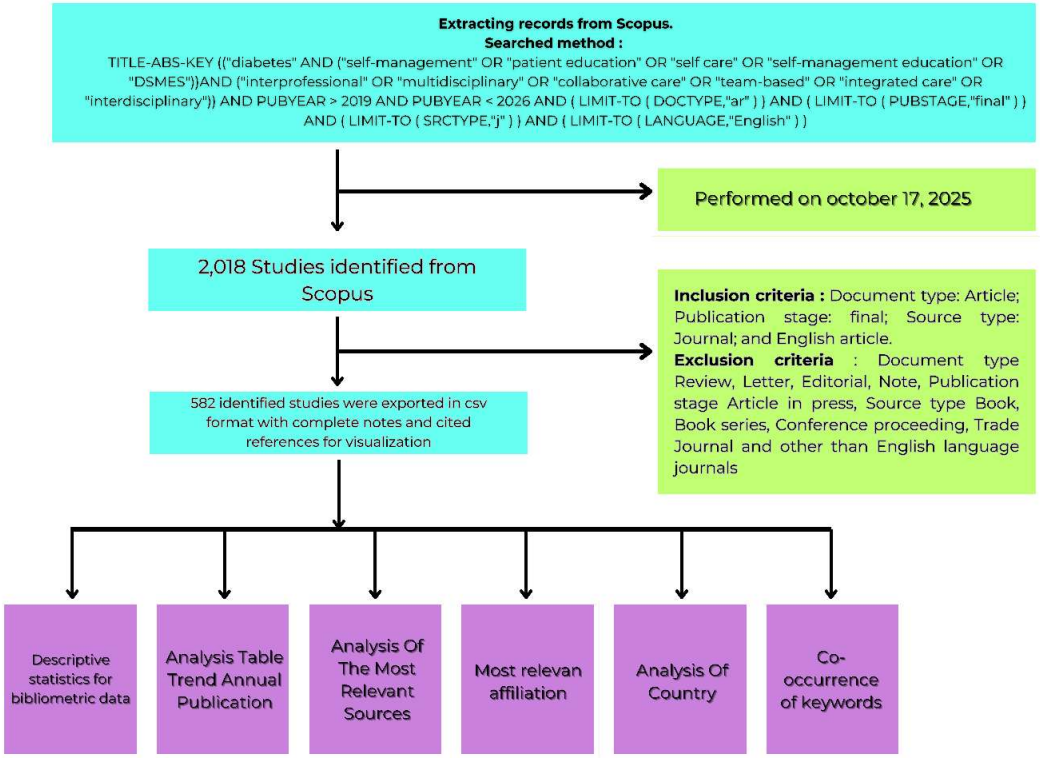

Fig.1 Flow diagram of study selection and data analysis strategies.

Data Selection Strategy

The dataset for the bibliometric review was obtained from the Scopus database, which is a leading database owned by Elsevier. There were several factors considered in the decision to select the Scopus database. Scopus is often used in bibliometric research due to its extensive coverage of peer-reviewed articles since 1970, which goes beyond the coverage provided by Web of Science (19). Scopus is widely recognized for its comprehensive coverage of various publishers and academic fields (20).

1. The search query used was as follows: TITLE-ABS-KEY (("diabetes" AND ("self-management" OR "patient education" OR "self care" OR "self-management education" OR "DSMES"))AND ("interprofessional" OR "multidisciplinary" OR "collaborative care" OR "team-based" OR "integrated care" OR "interdisciplinary")) AND PUBYEAR > 2019 AND PUBYEAR < 2026 AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (PUBSTAGE, "final")) AND (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT-TO (LANGUAGE, "English"))
2. Only English-language journal articles were included, yielding 582.
3. The search was conducted on October 17, 2025. This study represents the first comprehensive bibliometric investigation of the global research landscape on A Bibliometric Analysis of Interprofessional Approaches to Diabetes Self-Management Education and Support (DSMES): Integration and Sustainability Perspectives

Analysis Tools

A combination of five bibliometric tools was used to process and analyze the data, namely: Microsoft Excel 2021 was used for initial data handling and modeling publication trends. RStudio with the Biblioshiny interface enabled interactive data visualization and trend analysis of authors, journals, and institutions (21). VOSviewer (version 1.6.20) supported network mapping and content analysis to explore relationships among documents, keywords, authors, and countries (22). Bibliometrix (R package) facilitated the detailed extraction of bibliographic data for citation, co-citation, and thematic analysis (23).

Type Of Analysis

Three types of analysis were used in this study: General performance analysis assessed publication trends, prolific authors, and contributing countries. Citation analysis identifies the most frequently cited journals, authors, and countries. Network and content analysis included bibliographic coupling, co-citation, and keyword co-occurrence mapping to reveal thematic clusters and collaborative networks.

RESULT AND DISCUSSION

To the best of our knowledge, this is the first bibliometric study to comprehensively map global research trends, collaborations, and thematic evolution in interprofessional Diabetes Self-Management Education and Support (DSMES). The findings reveal a steady and accelerating growth in DSMES-related publications over the past decade, peaking in 2024. This upward trajectory mirrors the growing recognition of DSMES as a cornerstone of contemporary diabetes care. The rise in publication output during the post-pandemic period aligns with the global acceleration of digital health innovations, where DSMES frameworks have increasingly incorporated telemonitoring, mHealth platforms, and hybrid care approaches to sustain engagement and self-efficacy among individuals living with diabetes (24). These findings reflect a paradigmatic shift toward integrated, multidisciplinary, and technology-enhanced models, which prioritize patient empowerment and continuity of care.

The data collected from 582 documents over the period 2020–2025 explains the overall view of the authors contributing to this research area. There is a total of 3,992 authors who have contributed, with no single-authored documents, and an average of 15.9 co-authors per document. This high level of collaboration underlines the interdisciplinary nature of DSMES research, which involves professionals from various healthcare fields, such as physicians, nurses, pharmacists, and social workers. The significant collaboration reflects the importance of interprofessional teamwork, which is essential in the successful implementation of DSMES (25). The absence of single-authored works emphasizes the complexity and need for collaborative efforts in delivering effective diabetes care.

Descriptive statistics for bibliometric data

Fig. 2 explains the overall view of data collected from 582 documents over the period 2020–2025. This data includes published research articles only. There is a total of 3992 authors who have contributed to this research area. Single-authored docs are 0, and Co-Authors per Doc is 15.9.

Fig 2. Descriptive statistics for bibliometric data from 2020 to 2025

Analysis Table Trend Annual Publication

The annual publication trend for the topic of interprofessional Diabetes Self-Management Education and Support (DSMES) reveals a steady increase in the number of articles over the past five years, with a noticeable peak in 2024. In 2020, there were 91 articles published, which increased to 99 in 2021. Despite a slight decline in 2022 to 83 articles, the number rebounded in 2023, reaching 102 articles. The trend continues upward, with 113 articles published in 2024. By 2025, a total of 94 articles were published, maintaining a high level of scholarly activity in this area. This trend indicates a growing interest in DSMES, particularly in interprofessional approaches, and reflects the ongoing research in hybrid and digital models of care.

This upward trend from 91 articles in 2020 to 94 in 2025 demonstrates growing scholarly interest in DSMES, particularly in the context of interprofessional collaboration and digital integration (26). The noticeable rise in 2024 highlights the growing recognition of DSMES as an essential component of contemporary diabetes care, particularly with the increasing use of hybrid and digital models (27). This aligns with the global trend of digital health innovation, where telemonitoring, mobile health platforms, and hybrid approaches are becoming integral to maintaining patient engagement and improving outcomes (28). The data indicate that DSMES is increasingly seen as a dynamic and evolving field, integrating both traditional and digital approaches to diabetes management (29).

Table 1. This table displays the number of articles published annually on interprofessional Diabetes Self-Management Education and Support (DSMES) from 2020 to 2025.

Year	Articles
2020	91
2021	99
2022	83
2023	102
2024	113
2025	94

Analysis Of The Most Relevant Sources

The analysis of the most relevant sources in the field of interprofessional Diabetes Self-Management Education and Support (DSMES) highlights the leading journals contributing to the literature. The journal Diabetes Care stands out as the most prolific source with 36 articles published, followed by the Journal of Medical Internet Research with 13 publications. BMJ Open and BMC Health Services Research have contributed 12 and 11 articles, respectively. Other notable sources include Diabetes Research and Clinical Practice (9 articles), Diabetic Medicine and PLOS One (8 articles each), and Diabetes Spectrum, Journal of Clinical Medicine, and Primary Care Diabetes with 7 articles each. This distribution reflects the central role of these journals in advancing research on digital and interprofessional approaches to diabetes care.

The analysis of the most relevant sources highlights *Diabetes Care* as the most prolific journal, with 36 articles published (30). This journal plays a key role in disseminating DSMES research, particularly research that bridges endocrinology and interprofessional care (6). Following it are *Journal of Medical Internet Research* and *BMJ Open*, which contribute to the growing trend of digital health integration in DSMES. The central role of these journals in advancing DSMES aligns with the increasing importance of digital tools in diabetes care (31). The notable lack of publications from LMICs underscores a gap in the global distribution of DSMES research, which is essential for developing universally applicable models of care (32).

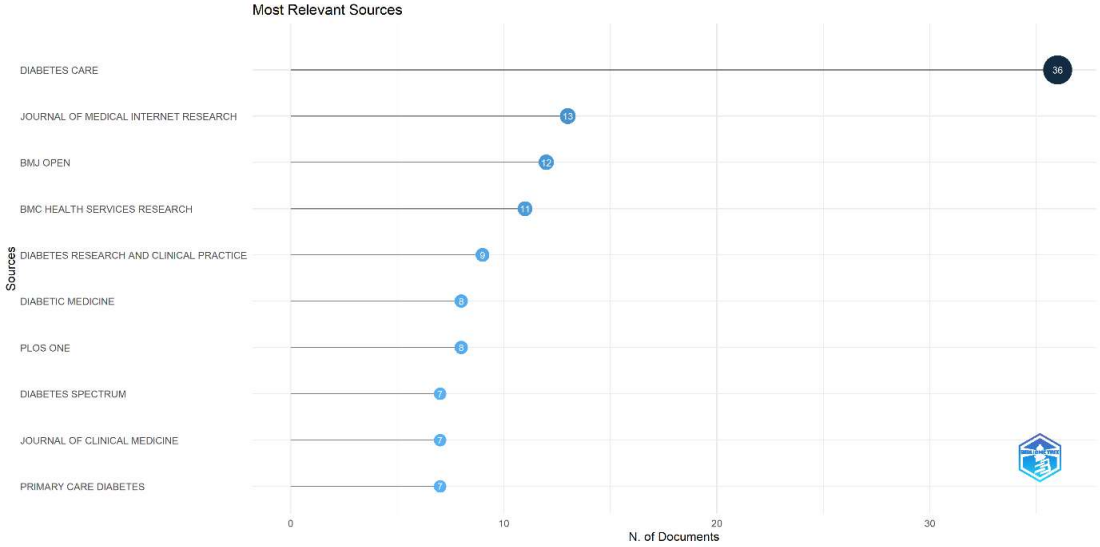

Fig 3. The figure shows the most relevant sources contributing to interprofessional Diabetes Self-Management Education and Support (DSMES) research, with *Diabetes Care* leading with 36 documents.

Most relevant affiliation

The analysis of the most relevant affiliations reveals the leading institutions contributing to the field of interprofessional Diabetes Self-Management Education and Support (DSMES). McMaster University leads with 33 articles, followed closely by the University of Pittsburgh School of Medicine with 31 publications. The University of Chicago and the Chinese University of Hong Kong each contributed 27 and 25 articles, respectively. Other notable institutions include Harvard Medical School, HealthPartners, and Universiteit Antwerpen, each contributing 24 articles. Additionally, the Ministry of Health, Saudi Arabia, Western Norway University of Applied Sciences, and Cumming School of Medicine each produced 23 articles, underscoring the global academic engagement in

this research area.

The analysis of affiliations reveals that McMaster University and the University of Pittsburgh are the leading institutions contributing to the field, with McMaster leading with 33 articles (33). These institutions are prominent in shaping global DSMES frameworks, particularly in high-income countries. However, the limited representation from LMICs highlights the need for broader academic involvement across regions (34). The lack of research from LMICs can be attributed to several factors, including resource constraints and the hierarchical healthcare structures in these regions, such as in Indonesia (35). Overcoming these barriers is essential for ensuring that DSMES interventions are adaptable to different healthcare systems (36).

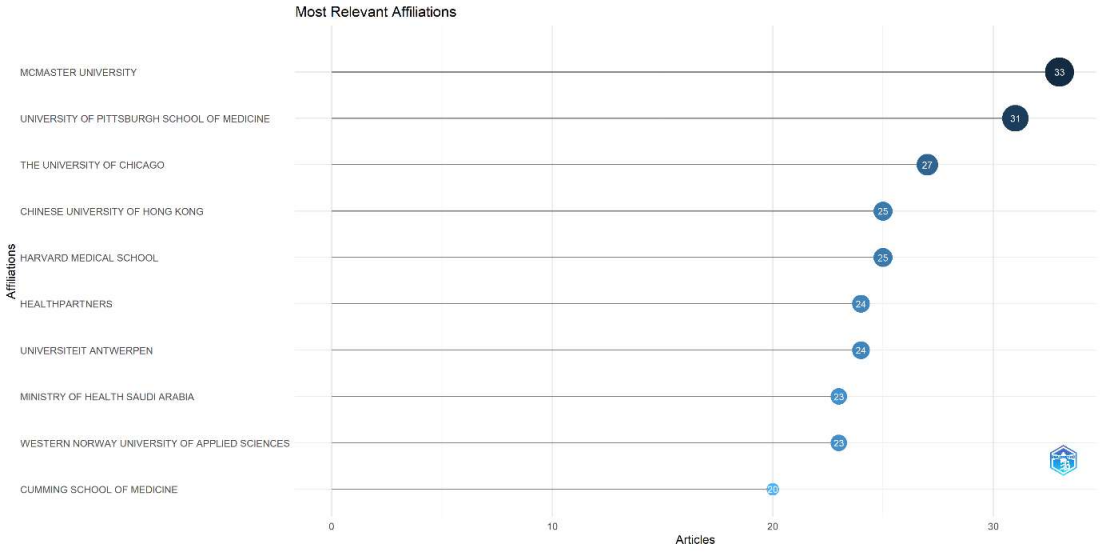

Fig 4. This figure shows the most relevant affiliations in DSMES research, with *McMaster University* leading with 33 articles, followed by *University of Pittsburgh School of Medicine* with 31 articles.

Analysis Of Country

As shown in **Fig. 5**, the United States (1,158 publications) was the most productive country in DSMES research, followed by Australia (348), China (332), and Canada (263). European countries such as Italy (160), France (146), and Spain (110) also contributed substantially, while Japan (91) and Mexico (92) represented significant outputs from Asia and Latin America. The global distribution indicates that research productivity and collaboration are predominantly concentrated in high-income countries, whereas contributions from low- and middle-income nations remain limited and positioned at the periphery of the network.

The United States was the most productive country in DSMES research, followed by Australia, China, and Canada. The high output from these countries reflects the availability of resources, funding, and research infrastructure, which is a crucial factor in advancing DSMES research (37). However, the limited participation from LMICs, as shown in the relatively low publication rates from countries in Africa and Southeast Asia, points to global disparities in research capacity (38). Bridging this gap will require more collaborative efforts between high-income and LMICs to ensure that DSMES frameworks are relevant and scalable across diverse healthcare settings (39).

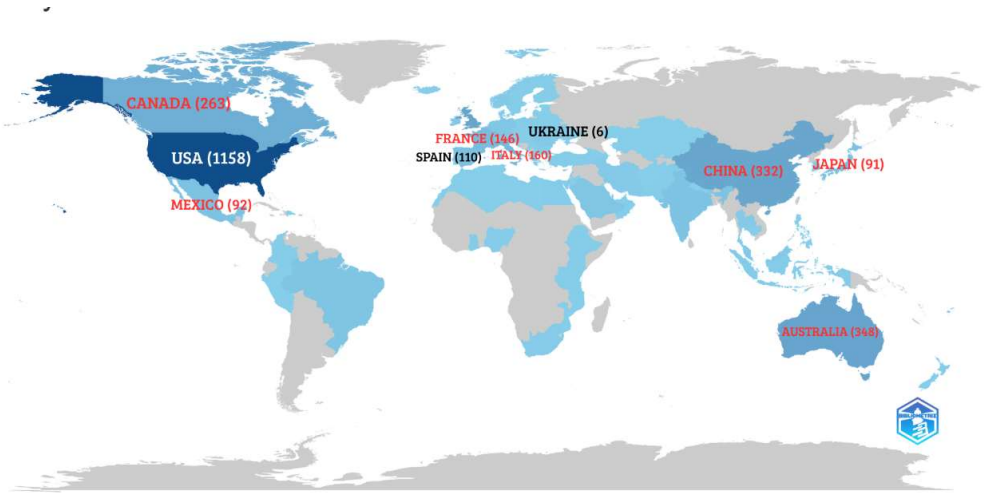

Fig 5. This map illustrates the scientific production by country in DSMES research. The United States leads with 1,158 articles, followed by China (332), Australia (348), and Canada (263). Other notable contributors include France (146), Italy (160), Spain (110), and Japan (91).

Co-Occurrence of Keyword

The co-occurrence keyword network visualizes the thematic clusters in interprofessional Diabetes Self-Management Education and Support (DSMES) research. The network, consisting of three main clusters, shows the interconnectedness of key concepts. The red cluster focuses on traditional diabetes management, including terms like *diabetes mellitus*, *self-management*, *type 2 diabetes*, and *patient education*. The green cluster highlights chronic disease management, with keywords such as *cardiovascular disease*, *chronic kidney failure*, and *patient-centered care*. The blue cluster emphasizes the digital and technological aspects of DSMES, featuring terms like *blood glucose monitoring*, *glucose control*, and *digital tools*. This co-occurrence network illustrates the broad, interdisciplinary nature of DSMES research, which spans from clinical care to digital health innovations.

The co-occurrence of keywords illustrates three thematic clusters: traditional diabetes management, chronic disease management, and digital health (40). The central cluster focuses on diabetes education and self-management, reaffirming the foundational role of DSMES in empowering patients (6). The second cluster linking DSMES to multimorbidity management highlights the growing recognition of diabetes as part of a complex chronic disease continuum, especially in cardiovascular and renal contexts (41). The third cluster emphasizes the integration of digital health technologies, such as telehealth and mobile applications, in DSMES, reflecting the ongoing trend toward hybrid and digitally enhanced models of care (40). This evolution signals the need for continuous adaptation of DSMES frameworks, particularly in response to technological advances (29).

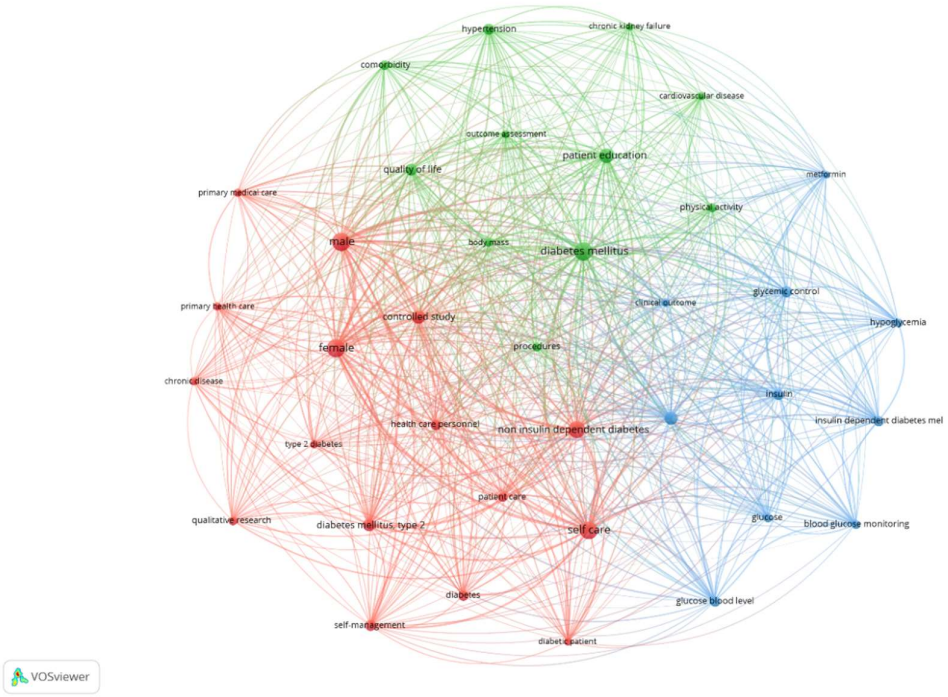

Fig 6. This figure shows the co-occurrence of keywords in DSMES research, highlighting three clusters: traditional diabetes care (red), chronic disease management (green), and digital health (blue).

Despite the strengths of this study, several limitations must be acknowledged. The analysis relied solely on the Scopus database, which may exclude relevant publications from regional or non-indexed sources, thereby underrepresenting emerging research from LMICs. Additionally, bibliometric metrics primarily measure publication quantity and citation impact, rather than the methodological quality or intervention effectiveness of DSMES models. Restricting the search to English-language articles introduces potential linguistic bias and overlooks valuable local evidence. Future studies could benefit from multi-database retrieval, mixed-method bibliometric evaluation, and the inclusion of non-English literature to provide a more comprehensive global overview.

CONCLUSION

This bibliometric analysis provides the first comprehensive overview of global research on interprofessional Diabetes Self-Management Education and Support (DSMES), highlighting its evolution toward integrated, digital, and sustainable models. The findings emphasize the need for interprofessional collaboration in both educational curricula and healthcare practice, advocating for the adoption of hybrid and digital DSMES models to enhance accessibility, particularly in underserved regions. Future research should focus on evaluating the effectiveness and scalability of these models, especially in low- and middle-income countries, through longitudinal studies and simulation-based approaches. Additionally, integrating AI into DSMES could personalize care, while expanding research to include non-English literature would offer a more global perspective on DSMES implementation.

COMPETING INTERESTS

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

AUTHOR'S CONTRIBUTION

Afriza Pujiati and Khaniva Khalilia Alazhar: Conceptualization, Methodology, Data Collection, Validation, Bibliometric Analysis, Manuscript Drafting. Ikhwan Yuda Kusuma: Supervision, Data Interpretation, Critical Revisions. Nova Mailatunnazza: Visualization.

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