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Dance therapy in rehabilitation: a two-decade bibliometric analysis (2000–2024)

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Dance therapy integrates movement and dance, enhances emotional, cognitive, and physical health, making it a valuable rehabilitation tool. Dance therapy has been applied to clinical populations, addressing depression, Parkinson's disease, and dementia. Despite its expanding application in rehabilitation settings, to our knowledge, no prior study has systematically mapped the bibliometric landscape of dance therapy in rehabilitation. This study performed the first longitudinal bibliometric analysis focused on dance therapy in rehabilitation, identifying key research areas, emerging trends, and the evolution of dance therapy's role in rehabilitation. A systematic search was conducted in the Web of Science Core Collection, yielding 1356 publications from January 1, 2000, to December 31, 2024. Bibliometric analyses were performed using VOSviewer, bibliometrix in R, Scimago, and CiteSpace to construct collaborative networks, perform co-occurrence analyses, and visualize thematic evolutions. The annual number of publications increased significantly over the study period, from three studies in 2000 to 188 in 2024, achieving a compound annual growth rate of 19.34%. A total of 26,254 citations were received by 2024, an average of 19.4 citations per publication. The United States, the United Kingdom, and China emerged as the most productive countries, with notable collaborations among leading institutions such as the University of Haifa and Drexel University. Keyword analyses revealed research hotspots including the efficacy of dance therapy for improving mental health (depression, anxiety), and quality of life through dance therapy, Parkinson's disease, and neurodegenerative diseases. Emerging trends indicate a growing focus on complementary and alternative medicine approaches within the field. This study shows, dance therapy in rehabilitation has experienced substantial growth and diversification of research themes. Enhanced interdisciplinary cooperation and further exploration of emerging trends are recommended to advance the integration of dance therapy into comprehensive rehabilitation strategies.

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Introduction

Dance therapy is a therapeutic approach that uses movement and dance to improve emotional, cognitive, and physical health, as well as to promote social integration (Veronese et al., 2017). The latest definition of dance therapy by The American Dance Therapy Association (ADTA) is "the psychotherapeutic use of dance, movement, body awareness, and embodied communication to foster healing and well-being for all individuals" (The American Dance Therapy Association, 2025).

Beyond its functional benefits, dance therapy represents a unique intersection of artistic practice and health intervention, rooted in embodied experience and culturally embedded forms of communication. Since the establishment of the ADTA in 1966 (Devereaux et al., 2016), dance therapy has been applied to various clinical populations. As an adjunctive treatment in rehabilitation, dance therapy is increasingly employed to help regulate bodily functions, facilitate emotional adjustment, and support disease treatment (Acolin, 2016).

Research has demonstrated its effectiveness to varying degrees of evidence quality in treating a wide range of conditions, such as depression (Meekums et al., 2015), dementia (Karkou and Meekums, 2017; Ruiz-Muelle and López-Rodríguez, 2019), Parkinson's disease (Ernst et al., 2023), and frailty. For example, a systematic review and meta-analysis found that dance therapy can reduce symptoms of depression by promoting positive emotional expression and stimulate the release of endorphins, improving mood (Karkou et al., 2019). In individuals with Parkinson's disease, dance therapy has been shown to improve motor function, balance, and coordination, thereby increasing physical mobility and quality of life with a relatively high level of quality evidence (Barnish and Barran, 2020; Pinto et al., 2024). In older adults, dance therapy has been used to improve strength, balance, and gait, helping to reduce the risk of falls (Lazo Green et al., 2024; Mattle et al., 2020). In patients with dementia, the certainty of evidence remains low (Karkou et al., 2023), contrasting evidence has been reported, while some research has found dance therapy to enhance executive and cognitive functions, such as memory and attention, others have found limited or no significant effects on global cognitive outcomes. With evidence suggesting longer interventions (>3 months) are more successful in improving global cognitive function (Huang et al., 2023).

In recent years, there has been growing recognition of dance therapy's role as an auxiliary treatment alongside traditional rehabilitation methods (Fancourt and Finn, 2019; Hincapié-Sánchez et al., 2021). It is increasingly integrated into rehabilitation settings, offering complementary support for patients recovering from surgery, injury, or chronic illness or physical disability (Hincapié-Sánchez et al., 2021; Swaine et al., 2020; Waugh et al., 2024). By enhancing both physical recovery and emotional resilience, dance therapy provides an innovative approach to rehabilitation, promoting overall well-being and improving patients' quality of life. However, despite its expanding use in rehabilitation, there has been little systematic investigation into the role of dance therapy specifically as an auxiliary treatment in these settings.

Bibliometric studies have the capacity to uncover research evolution, collaboration patterns, and emerging knowledge gaps (Azizan, 2024a) and have provided valuable research in psychology interventions in rehabilitation (Li et al., 2025). Recent bibliometric reviews on sensor-based fall prevention and frailty (Azizan, 2024a, 2024b) and on digital biomarkers for dementia (Azizan, Cao, et al., 2025) illustrate how knowledge mapping guides rehabilitation science. Given the field's rapid expansion, a quantitative mapping is essential to identify collaboration patterns and research gaps. However, there is a lack of bibliometric analysis in the field of dance therapy in rehabilitation. This study seeks to fill this gap by conducting a bibliometric analysis of the existing literature. The aim is to map out the key research areas, identify emerging trends, and offer insights into how dance therapy is positioned within the broader context of rehabilitation research. By visualizing these findings, this analysis will provide a clearer understanding of the interdisciplinary nature of dance therapy and its evolving role in supporting rehabilitation, helping to guide future research in this field.

Methods

Data collection. This study utilized the Web of Science Core Collection (WoSCC) to analyse the literature related to dance therapy. A literature search was conducted in the WoSCC using the search queries:

#1: TS = (Dance therapy OR Dance movement therapy)

#2: TS = (Rehabilitat* OR Recover* OR Heal* OR Restorat* OR Recuperat* OR Restitut* OR Recondition* OR Reintegrat* OR Readaptat* OR Remediat* OR Convalescence OR treat* OR therap*)

#3: Exclusion Terms: TS = (neuroblastoma OR dancing eyes OR opsoclonus-myoclonus syndrome OR dancing eye syndrome OR kinsbourne syndrome OR paraneoplastic syndrome OR rituximab)

The final search query was: (#1 AND #2) NOT #3.

Inclusion and exclusion. The inclusion criteria were as follows: (1) "Article" and "Review" (search conducted on 7 April 2025). (2) Publications published from January 1, 2000, to December 31, 2024, to ensure comprehensive coverage of the literature. The latest publication date of the included articles was December 31, 2024. (3) We included only English-language publications for consistency and comparability. (4) Records contained the title, abstract, keywords, authors, institution, country, and references. All records were exported in "Plain text" format to prevent alterations due to continuous updates.

Exclusion Criteria: (1) Publications from 2025 onwards to avoid the inclusion of ongoing research. (2) All manuscripts other than articles or reviews, for example, corrections, protocol papers, conference proceedings, and gray literature. (3) Studies with incomplete or missing publication details (such as title, abstract, or keywords).

Screening. Initially, papers were screened by assessing the titles and abstracts in accordance with the inclusion criteria. In cases where the title and abstract did not provide sufficient information for a definitive decision, the full text of the paper was reviewed. Two researchers (FY and JRG) independently screened titles and abstracts from the initial search and excluded studies. Cohen's kappa for inter-rater reliability was calculated, yielding a value of 0.836, reflecting substantial agreement beyond chance. This suggests that the reviewers were highly consistent in their decisions.

Data analysis. This study employed a bibliometric knowledge mapping approach to explore the structure, development patterns and emerging trends within the field of dance therapy in rehabilitation. The analysis combined traditional bibliometric methods with advanced data mining, network analysis techniques and visualization tools (Gan et al., 2022) to examine various aspects of the research landscape, including publication trends, country and institutional contributions, journal performance, author-level analysis, and the identification of research hotspots.

The annual publication trends and citation patterns were analyzed using the Bibliometrix package in R (version 4.4.3) (Aria

and Cuccurullo, 2017) and WoSCC. The compound annual growth rate (CAGR) of publications was calculated to assess the overall growth in scholarly output between the first (Nstart) and the final publishing years (Nend), as follows:

$$\mathrm{CAGR} = \left(\frac{N_{end}}{N_{start}}\right)^{\frac{1}{years}} - 1$$

where "years" is the number of years between Nstart and Nend.

A LOESS curve was fitted to the publication data to represent the trend over time. Citation counts were examined by performing a yearly reference count spectroscopy, which allowed for the identification of citation deviations from the 5-year median.

We jointly used VOSviewer (version 1.6.18) and Scimago Graphica (version 1.0.35) to build a collaborative network among countries and institutions (van Eck and Waltman, 2010). VOSviewer was used for analyzing and exporting initial results, and Scimago Graphica was used for map mapping and avoiding overlapping interference in networks. The network analysis was based on co-authorship data and visualized the international collaboration landscape. We analyzed patterns of national collaboration, presenting the top 20 countries and regions on a map, and examined their geographical distribution using Scimago Graphica (Li, 2024). We normalized publication output by gross domestic product (GDP) and population size to account for differences in national resources and population scales. This data was retrieved from the International Monetary Fund, 2024 report (International Monetary Fund, 2025) and United Nations population estimates (United Nations, 2025), respectively. Spearman's rank correlation analysis was conducted to evaluate the relationship between publication output and economic factors, specifically GDP. The analysis calculated the publications per billion dollars of GDP and per million people to examine how economic strength influences research productivity.

Journal performance was assessed by examining metrics such as the H-index using data from the WoSCC. Journals were ranked according to their publication volume, following Bradford's Law to categorize journals into core, related, and peripheral groups. The distribution of publications across these journals was analyzed to understand their relative importance in the field. Additionally, CiteSpace (version 6.2) (Chen et al., 2015) was employed to create a dual-map overlay, which visually represented the citation relationships between citing and cited journals. This method enabled the identification of interdisciplinary interactions and the flow of research across different academic fields. The dual-map overlay helped illustrate how research on dance therapy in rehabilitation is influenced by and contributes to various disciplines, highlighting key citation paths between journals in health, psychology, rehabilitation, and other relevant areas.

Author-level analysis focused on identifying core authors and their collaborative relationships within the field. Core authors were determined using Price's Law based on the number of key articles they had published. Co-authorship networks were generated using Citespace to observe the frequency and strength of collaborations between authors. Additionally, keyword co-occurrence analysis was used to identify thematic clusters in the research conducted by these authors. To ensure that most cooperations among authors are not omitted, the scale factor k in the selection criterion g-index was set to 500 with time slice = 1 and no pruning selected. Tree rings were used to represent nodes. The colors of different tree rings indicate the publication year of the author's literature, and the lines connecting nodes represent the publication year when the authors first formed a collaboration.

Keyword co-occurrence analysis was carried out using VOSviewer to identify major research themes and emerging trends in the field. Citation burst analysis was performed to detect keywords and references experiencing a sudden increase in attention at different time periods, which helped identify areas of growing scholarly interest using CiteSpace (time slice = 1, g-index/k-core = 25 and no pruning selected). Thematic evolution over time was tracked using Sankey diagrams, generated with the Bibliometrix package in R, which visualized the continuity and shifts in key research themes across different time periods (Aria and Cuccurullo, 2017).

Results

As shown in Fig. 1, the literature search resulted in 1674 total documents, after exclusions were applied for date, language and document type, we finally retrieved 1356 publications for analysis, including 1031 articles (76.0%) and 326 reviews (24.0%). The annual number of publications trended upward, showing a significant rise, with a CAGR of 19.3% from 2000 to 2024 as displayed in Fig. 2a. The number of manuscripts grew from only three published manuscripts in 2000, to reaching over 100 for the first time in 2020, and further showing a rapid increase to 188 articles and reviews in 2024. Identified publications received a total of 26,254 citations, with an average of 19.4 citations per publication. Figure 2b depicts the yearly count of cited references and deviation from the 5-year median, showing a steady increase year-on-year of cited references and peaks in deviations from the median in 2006, 2009, and 2015.

Country/region, institution performance, and collaborative networks. Research on dance therapy in rehabilitation has become globally distributed, with contributions spanning 2021 institutions from 72 countries and increasingly shaped by both established research hubs and rapidly emerging regions. Table 1 shows the ten most productive countries and institutions. The United States, the United Kingdom, and China emerged as the most productive countries, contributing 377, 192, and 151 research articles or reviews, respectively. The United States had the highest total citation count and H-index, while Germany exhibited the highest average citation per publication (AC), followed by Italy and Canada. China demonstrated the highest CAGR, followed by Brazil and Spain (Table 2). The international collaboration network analysis identified several distinct research clusters as shown in Fig. 3a. The largest and most productive collaborative cluster was led by the United States with a total link strength (TLS) of 124, followed by the United Kingdom (TLS = 119), Australia (TLS = 82). These three countries, along with Germany (TLS = 69) and Italy (TLS = 40), have the highest TLS in their respective clusters and together form five major clusters.

Among the top ten productive countries, only Brazil and China are classified as developing nations by the International Monetary Fund. Analysis of economic factors revealed a statistically significant positive correlation between the volume of publications and GDP (Fig. 3b) ($r = 0.552$, $P = 0.01$), indicating that countries with stronger economies tend to produce more research output.

Regarding institutional productivity, the University of Haifa in Israel was the most productive institution, followed by Drexel University (USA) and Edge Hill University (UK). Among the top ten institutions, Harvard University (USA) had the highest AC of 102.0, while the University of London (UK) had the highest H-index of 14 (Table 1). As shown in Fig. 3c, institutional collaboration analysis revealed distinct collaborative clusters. The largest cluster was centered around the University of Haifa

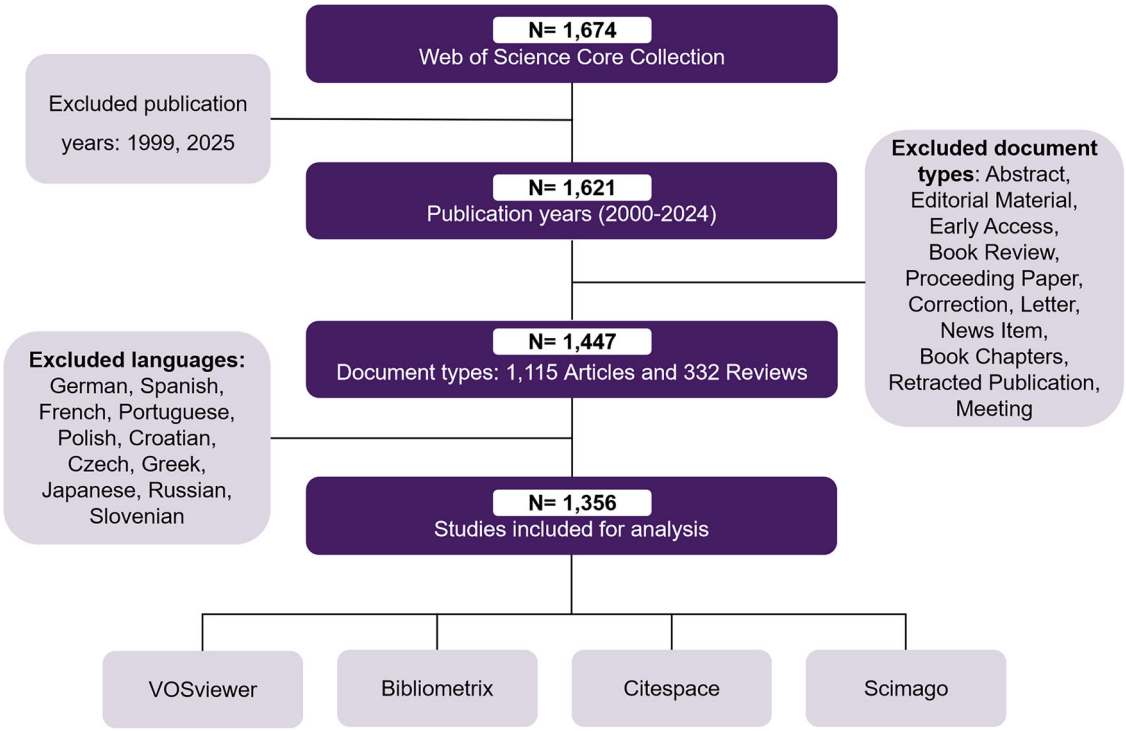

Fig. 1 Flowchart of the literature search and study selection process.

(TLS = 57), with strong connections to Kibbutzim College of Education and Illnois University. Other notable clusters were led by Drexel University (TLS = 56), Edge Hill University (TLS = 59), and Emory University (TLS = 57), with the highest TLSs.

Journal performance. The documents in this field were published in 580 different sources. An analysis of the journals in which dance therapy articles were indexed in WoSCC shows that publication distribution is highly uneven. Journals that are more closely aligned with the subject tend to host a disproportionately high number of articles. According to Bradford's Law, when journals are ranked in descending order by publication volume, they can be divided into three groups: core journals, related journals, and peripheral journals, with the distribution following an approximate ratio of 1: n : n^2 (where n is the Bradford multiplier). In our analysis, 12 core journals were identified, constituting 2.1% of all sources, yet accounting for 455 articles, or 33.6% of the total publications. Further details of these core journals are presented in Table 1. These journals are primarily in the fields of psychology, arts, medicine, and rehabilitation, although numerous other journals across disciplines such as sports, nursing and sociology also publish articles in this field. This indicates that the scope of dance therapy in rehabilitation research is broad and of interest to scholars from various disciplines, all of whom contribute to its development.

The three leading journals in terms of number of related publications were *Arts In Psychotherapy* (151 publications), *Body Movement And Dance In Psychotherapy* (68 publications), and *Frontiers In Psychology* (62 publications). However, when viewing the number of publications per year of publishing, dance therapy-specific journals take the lead. For example, *Body Movement And Dance In Psychotherapy*, and the *American Journal of Dance Therapy* had an average publication per active year of 13.6 and 9.8, respectively.

Figure 4 illustrates a dual-map overlay. The map illustrates how dance therapy research is influenced by and contributes to multiple disciplines, including health and medicine, as well as psychology and rehabilitation, reflecting its multidisciplinary and expanding nature over the study period. The citing journals were predominantly distributed within discipline 6# (Psychological, Education, Health) and discipline 4# (molecular, biology, immunology). On the other hand, the cited journals are mainly distributed within discipline 7# (Psychology, Education, Social) and disciplines 8# (molecular, biology, genetics) and 5# (Health, Nursing, Medicine). Publications in the disciplines of Psychology, Education and Social and those of Health, Nursing, Medicine were influenced by publications in the disciplines of Psychology, Education, Health and Medicine Medical, Clinical.

Author performance and collaborative networks. A total of 4644 authors contributed at least one document in research regarding dance therapy in rehabilitation. In any research field, core authors play a crucial role in advancing the discipline. By analyzing core authors and their relationships with other scholars, we can infer the development status of the field. Using Price's Law, core authors are determined by the number of key articles they have published. Authors with more core articles are considered more authoritative in the field. In dance therapy in rehabilitation, the core author group consists of 97 individuals, representing 2.1% of all authors. This core group's total publications amount to 576, accounting for 42.5% of the total publications in the core literature. These core authors have made significant contributions to the field, although the overall productivity remains dispersed across various authors.

Table 3 presents the top twenty authors in this field, ranked according to the number of publications. There was a skewed distribution of authors in terms of sex, with 85% of these being female, and 55% of authors were based in Europe. V. Karkou was the most published author, this was followed by E. Shuper Engelhard and M.E. Hackney. G.M. Earhart had the highest AC of 102.3, while V. Karkou had the highest H-Index for papers in this field of 13. Analysis of co-authorship is shown in Fig. 5. Figure 5a visualizes author collaboration based on total link

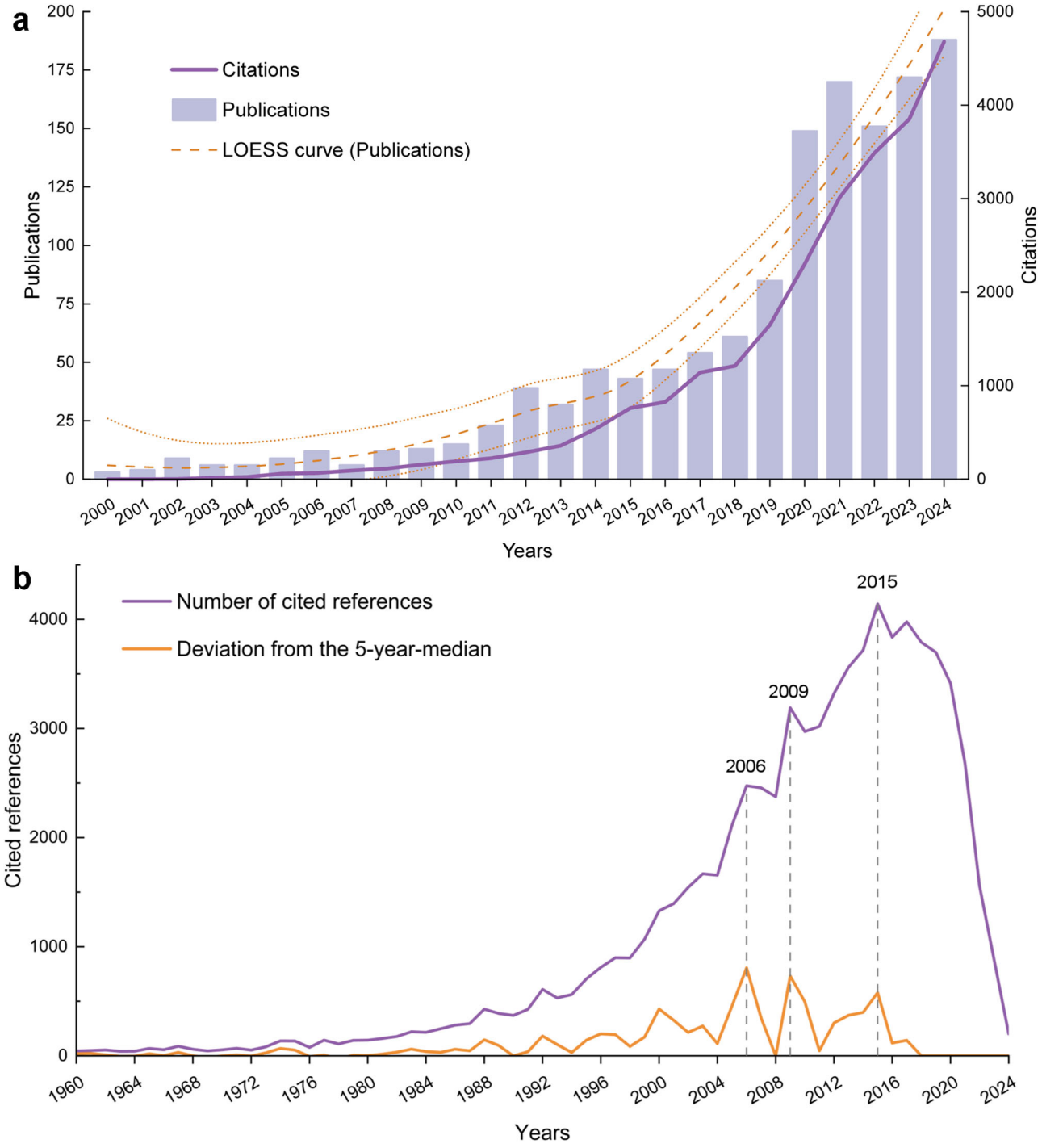

Fig. 2 Production and citation trends for research in dance therapy in rehabilitation. a Annual productions and citations (2000–2024), with a LOESS curve (dashed orange line) illustrating the overall publication trend. The space between the two dotted orange lines represents the 95% CI of the LOESS curve. **b** Yearly count of cited references (purple line) and their deviation from the 5-year median (orange line). The dotted vertical lines mark key inflection points or notable shifts in reference patterns over time.

strength, indicating how frequently pairs of authors co-published. The strongest collaborative clusters were centered around prominent authors such as V. Karkou (29 publications, TLS = 132), M.E. Hackney (16 publications, TLS = 78), and S.C. Koch (13 publications, TLS = 52), reflecting their pivotal roles in fostering collaboration within the field. Figure 5b presents author clusters formed by keyword co-occurrence analysis, revealing thematic groupings in the research conducted by these authors. The largest clusters include "dance movement psychotherapy", predominantly featuring V. Karkou; "physiotherapy", centered around M.E. Hackney; and "body self-efficacy", linked closely to S.C. Koch. Additional emerging thematic groups include "creative arts therapies", "Randomized controlled trials", "intervention development", "fitness", and "music", reflecting the diverse and interdisciplinary approaches applied within dance therapy rehabilitation research.

Table 1 Top most productive countries, institutions and journals related to dance therapy in rehabilitation.

Rank	Source categories	Publications	Average publication per active years	Total citations	AC	H-index
Countries						
1	United States of America	377	15.1	9197	24.4	49
2	United Kingdom*	192	8.7	4617	24.0	36
3	China	151	10.1	2292	15.2	24
4	Australia	92	4.8	2042	22.2	24
5	Germany	83	4.4	2623	31.6	27
6	Spain	73	4.9	1175	16.1	19
7	Canada	69	4.1	1688	24.5	20
8	Israel	67	4.2	637	9.5	14
9	Brazil	63	5.3	1054	16.7	17
10	Italy	56	3.3	1417	25.3	15
Institutions						
1	University of Haifa	48	4.0	535	11.1	12
2	Drexel University	33	3.0	694	21.0	12
3	Edge Hill University	28	2.8	584	20.9	12
4	University of London	28	2.3	502	17.9	14
5	University of Melbourne	20	2.0	408	20.4	9
6	Kibbutzim College of Education	19	2.7	63	3.3	5
7	Harvard University	17	1.9	1734	102.0	12
8	Lesley University	17	1.6	359	21.1	5
9	Emory University	17	2.8	257	15.1	9
10	Universite De Montreal	16	2.3	348	21.8	9
Journals						
1	Arts in Psychotherapy	151	6.3	2756	18.3	27
2	Body Movement and Dance in Psychotherapy	68	13.6	694	10.2	12
3	Frontiers in Psychology	62	6.2	1270	20.5	18
4	American Journal of Dance Therapy	49	9.8	91	1.9	5
5	Cochrane Database of Systematic Reviews	21	1.9	1248	59.4	16
6	Plos One	19	2.7	168	8.8	6
7	Complementary Therapies in Medicine	16	1.5	783	48.9	13
8	Disability and Rehabilitation	15	1.9	278	18.5	10
9	Research in Dance Education	15	2.1	53	3.5	53
10	Complementary Therapies in Clinical Practice	13	2.6	172	13.2	8
11	International Journal of Environmental Research and Public Health	13	2.2	145	11.2	6
12	Journal of Bodywork and Movement Therapies	13	2.6	104	8.0	5

"Total Citations" represents citations received globally. AC "Average Citations per Publication" denotes the mean citations per paper for each author. "Average Publication Per Active Years" denotes the total number of publications publication was observed in each corresponding country, institution, or journal divided by the number of years at least one article was reported. The "H-index" reflects the authors' scholarly impact based on their publications within the dataset.
Rankings are based on the number of publications.
*The United Kingdom aggregates data from England, Scotland, Wales, and Northern Ireland.

Analysis of the knowledge base and research hotspots in the field of dance therapy in rehabilitation. Exploring frequently cited keywords helps uncover emerging research trends and identify areas of significant scholarly interest. A keyword co-occurrence analysis was conducted using VOSviewer (Fig. 6a). Seven main keyword clusters were identified, two of which centered on dance: The first was dance (TLS = 2209), which included dance movement psychotherapy and Laban movement analysis, the second was Dance/movement therapy (TLS = 1462) which included adolescents and mindfulness. The remaining five clusters were: Quality of life (TLS = 1614); Therapy (TLS = 1606), which consisted of breast cancer, survival and cerebral palsy; Adults (TLS = 615), consisting of aging and cognitive impairment; Exercise (TLS = 1937), including reliability, tai chi and qigong; Program (TLS = 629), which included prevalence, quality and guidelines.

Table 4 presents the top 20 reference bursts with the most frequently cited publications. The main themes within the most cited articles were dance therapy in the treatment of psychological conditions, and closely related to the treatment of Parkinson's disease. The top locally cited document was Koch's meta-analysis on dance therapy on psychological outcomes (Koch, 2019), while the most globally cited document was Hackney et al's randomized controlled trial of community-based dancing to modify disease progression in Parkinson's disease (Hackney, 2015). Further, Table 5 presents the top keywords with the most significant citation bursts in the field of dance therapy in rehabilitation. Aerobic exercise had the longest burst of 8 consecutive years (2009–2017). Randomized controlled trials had the strongest burst of 6.9 (2012–2017), followed by the more recent burst of mental health (2023–2024). Further keywords of note included: "gait", "quality of life", and "balance" demonstrate consistent research activity.

Figure 6b illustrates the annual research output across ten major thematic areas, highlighting shifts and trends over the analysis period. Notably, themes such as "quality of life", "balance" and "Parkinson's disease" showed substantial growth, especially in recent years, indicating heightened research attention in these areas. Further insights into thematic evolution are provided in Fig. 6c, which employs a Sankey diagram to visualize thematic continuity and evolution across three distinct periods: 2000–2010, 2011–2018, and 2019–2024. The width of the flows indicates thematic strength and continuity, clearly illustrating how foundational themes like "physical activity", dementia", and

Table 2 Trends in consecutive publication years and growth metrics for leading countries, institutions, and journals.

Rank	Source categories	Consecutive publication years	Start year of consecutive publication	CAGR/cumulative total of consecutive publications
Countries				
1	United States of America	25	2000	12.9%
2	United Kingdom*	17	2008	14.3%
3	China	12	2013	21.6%
4	Australia	14	2011	12.4%
5	Germany	14	2011	8.8%
6	Spain	15	2010	18.7%
7	Canada	11	2014	6.5%
8	Israel	16	2009	14.8%
9	Brazil	11	2014	20.0%
10	Italy	15	2010	14.0%
Institutions				
1	University of Haifa	9	2016	43
2	Drexel University	8	2017	30
3	Edge Hill University	8	2017	26
4	University of London	9	2016	25
5	University of Melbourne	7	2018	17
6	Kibbutzim College of Education	7	2018	19
7	Harvard University	4	2021	8
8	Lesley University	4	2021	15
9	Emory University	5	2020	11
10	Universite De Montreal	4	2014	6
Journals				
1	Arts in Psychotherapy	20	2005	145
2	Body Movement and Dance in Psychotherapy	5	2020	68
3	Frontiers in Psychology	7	2018	55
4	American Journal of Dance Therapy	5	2020	49
5	Cochrane Database of Systematic Reviews	7	2011	15
6	Plos One	5	2020	16
7	Complementary Therapies in Medicine	8	2014	13
8	Disability and Rehabilitation	4	2017	9
9	Research in Dance Education	4	2021	10
10	Complementary Therapies in Clinical Practice	5	2019	13
11	International Journal of Environmental Research and Public Health	4	2016	11
12	Journal of Bodywork and Movement Therapies	5	2020	13

"Consecutive Publication Years" denotes the longest continuous period of annual publications; "CAGR (%)" refers to Compound Annual Growth Rate during this consecutive period; "Cumulative Total of Consecutive Publications" indicates total publications during consecutive years.
Rankings are based on the number of publications.
*The United Kingdom aggregates data from England, Scotland, Wales, and Northern Ireland.

"Psychiatry", among others, evolved into broad research areas from 2011 to 2018. However, since these years the themes have shifted to become more nuanced and specialized areas, including "Parkinson's disease", "autism spectrum disorder", and "body image".

Discussion

The findings of this study provide a comprehensive overview of the evolving landscape of dance therapy in rehabilitation, offering insights into its growth, key contributors, and emerging trends. Our analysis reveals that research on dance therapy in rehabilitation has been ongoing for over two decades, with a notable surge in publications over the past 5 years.

Research in this field has been led by Western nations. In recent years, however, there has been a marked rise in contributions from emerging economies, particularly across East Asia and Latin America. For example, China and Brazil have significantly increased their research output. China's increasing involvement may be linked to a growing emphasis on integrating alternative therapies into their healthcare system (Zhou et al., 2024), with research indicating a rising demand for rehabilitation services, with approximately 33% of the population requiring some form of rehabilitation (Tian et al., 2025). Similar, though more modest trends have been observed in Brazil, where recent research suggests a growing interest in cultural dance therapy programs across Latin America (Acarón et al., 2023). However, it must be stated that while significant growth has been achieved, further development of the fields is needed in these countries. In China, dance therapy in rehabilitation still faces several challenges, including the need for standardized training, greater academic involvement and the establishment of local dance therapy governing bodies (Zhou et al., 2019). In Latin America, comparable struggles have been found, particularly regarding the lack of university-based accredited training programs, limited professional visibility, and insufficient peer support networks (Acarón et al., 2023). Altogether, these findings indicate that interest in dance therapy in rehabilitation is not only global but also expanding into regions that have traditionally been underrepresented in rehabilitation research. While significant growth has been achieved, further development is essential to address

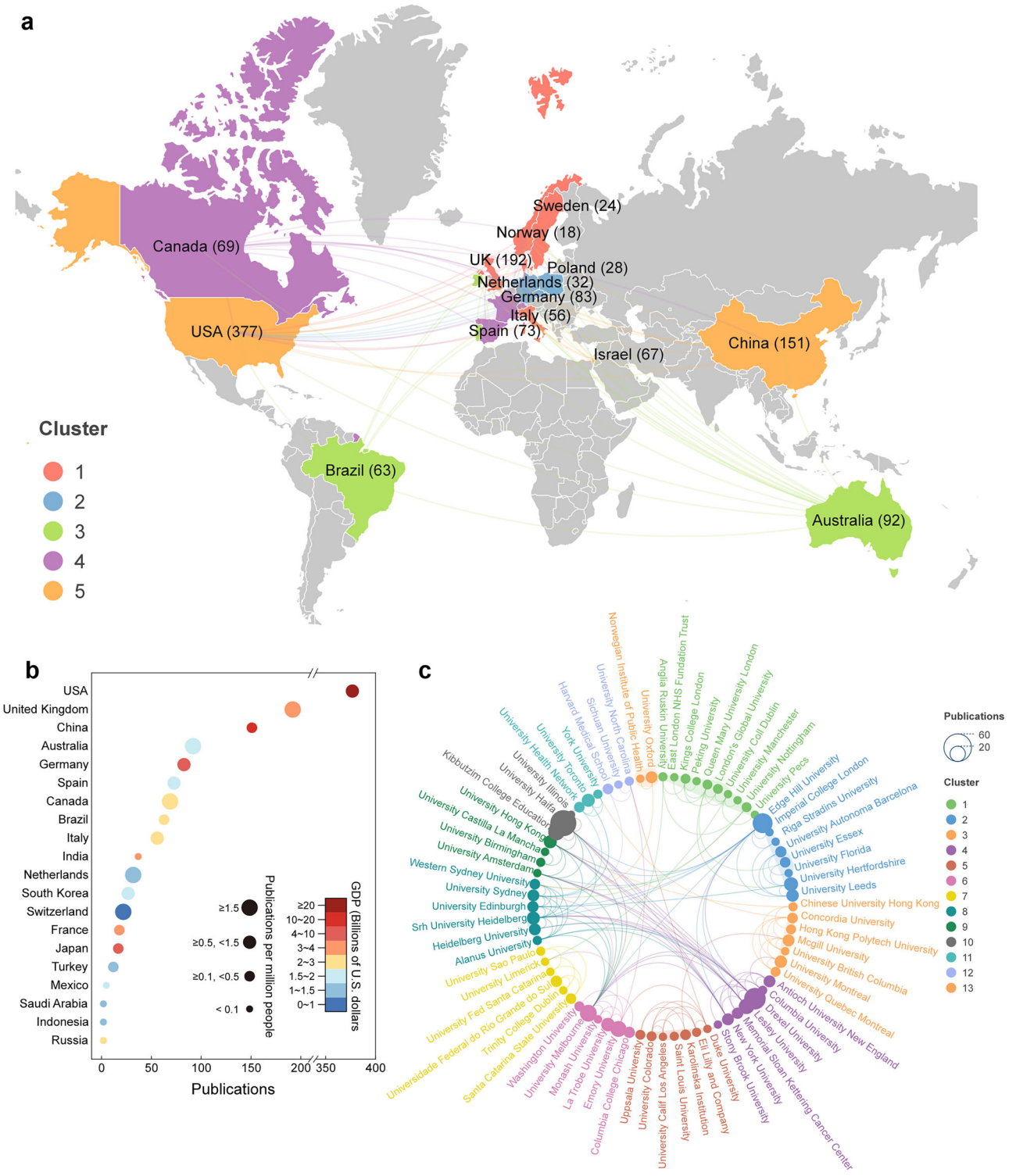

Fig. 3 International and institutional collaboration in research on dance therapy in rehabilitation (2000–2024). a Collaboration network of top publishing countries. Colors indicate collaborative clusters; numbers represent total publications. Thicker lines show stronger collaborations. Clusters were as follows: Clusters were as follows: 1- UK, Norway, Sweden, Italy, Denmark; 2 - Germany, Poland, Netherlands, Czech Republic; 3 - Brazil, Ireland, Portugal, Australia; 4 - Canada, Spain, France, Switzerland; 5 - USA, China, Israel. **b** Publication output per country. Circle size reflects publications per million inhabitants; color represents GDP from lowest (blue) to highest (red). GDP data was retrieved from the International Monetary Fund, 2024 report and population from the United Nations population estimates for 2024. **c** Institutional collaboration network. Node size indicates publication volume; colors represent collaborative clusters. Thicker connecting lines indicate stronger institutional collaborations.

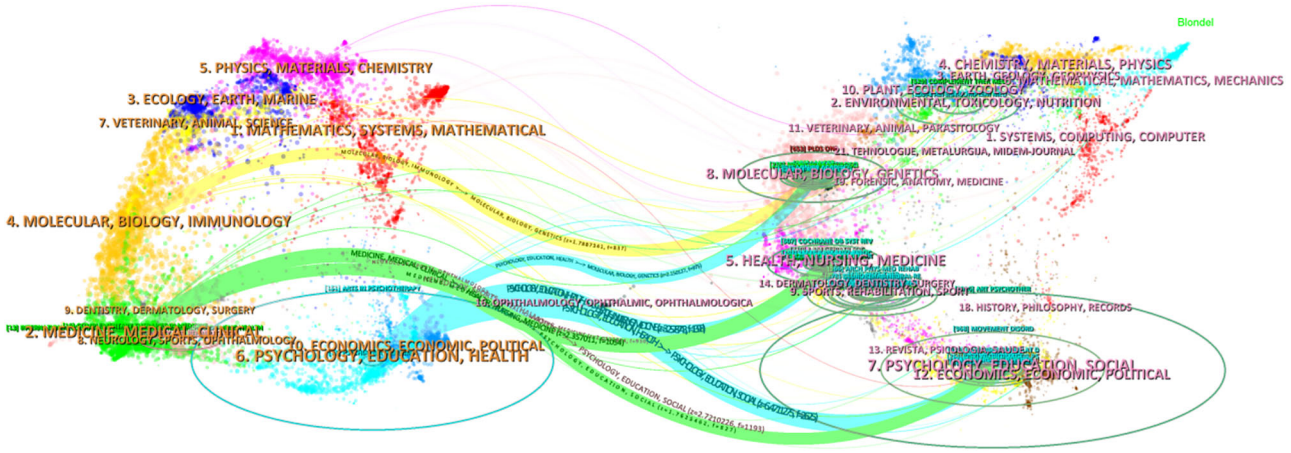

Fig. 4 Dual-map overlay of journal categories in research on dance therapy rehabilitation (2000–2024). The left side of the figure represents citing journals (yellow), while the right side shows cited journals (pink). Colored paths illustrate citation relationships, indicating interdisciplinary interactions between research areas. Thicker and brighter paths represent stronger citation links, highlighting significant cross-disciplinary influences within dance therapy rehabilitation research. **Citing journals (left, yellow):** 1. mathematics, systems, mathematical; 2. medicine, medical, clinical; 3. ecology, earth, marine; 4. molecular, biology, immunology; 5. physics, materials, chemistry. 6. psychology, education, health. 7. veterinary, animal, science; 8. neurology, sports, ophthalmology; 9. dentistry, dermatology, surgery; 10. economics, economic, political. **Cited journals (right, pink):** 1. systems, computing, computer; 2. environmental, toxicology, nutrition; 3. earth, geology, geophysics; 4. chemistry, materials, physics; 5. health, nursing, medicine; 6. mathematical, mathematics, mechanics; 7. psychology, education, social; 8. molecular, biology, genetics; 9. sports, rehabilitation, sport; 10. plant, ecology, zoology; 11. veterinary, animal, parasitology; 12. economics, economical, political; 13. revista, psicologia, saude; 14. dermatology, dentistry, surgery; 16. ophthalmology, ophthalmic, ophthalmologica; 18. history, philosophy, records; 19. forensic, anatomy, medicine; 21. tehnologue, metalurgia, midem-journal. Clusters 15, 17, and 20 in the cited journals are unlabeled in the visualization, as their journal categories were not identified by the Blondel clustering algorithm due to small cluster size or data limitations. There are 18 main clusters labeled in the cited journal map.

Table 3 Top 18 most productive authors in research on dance therapy in rehabilitation (2000–2024).

Rank	Authors	Publications	Consecutive publication years	Local citations	Total citations	AC	H-index
1	Karkou, V.	29	8	49	614	22.7	13
2	Einat, S.E.	20	5	17	67	3.5	5
3	Hackney, M.E.	16	4	90	342	21.4	10
4	Koch, S.C.	14	5	140	710	50.7	11
5	Meekums, B.	13	3	79	429	33.0	11
6	de Azevedo Guimarães, A.C.	11	5	16	75	6.8	6
7	Payne, H.	10	2	22	80	8.0	5
8	Ho, R.T.H.	9	2	123	382	54.6	7
9	Morris, M.E.	9	3	78	527	58.6	9
10	Aithal, S.	9	3	7	174	19.3	7
11	Orkibi, H.	8	2	7	249	31.1	8
12	Boing, L.	8	6	12	79	9.9	6
13	Panhofer, H.	8	3	26	60	7.5	5
14	Rodríguez-Jiménez, R.M.	8	5	0	43	5.4	4
15	Earhart, G. M.	7	2	274	716	102.3	7
16	Bradt, J.	7	2	30	210	30.0	6
17	Haas, A.N.	7	3	48	150	21.4	3
18	Shim, M.	7	1	19	133	19.0	3
19	Powell, J.	7	4	5	87	12.4	6
20	Moula, Z.	7	4	5	83	11.9	6

Authors are ranked by their total number of publications. "Consecutive Publication Year" refers to the longest uninterrupted period of annual publications by the author. "Local Citations" indicates the number of citations received within this dataset, while "Total Citations" represents citations received globally. AC "Average Citations per Publication" denotes the mean citations per paper for each author. The "H-index" reflects the authors' scholarly impact based on their publications within the dataset.

existing challenges and enhance the effectiveness of dance therapy's use in rehabilitation within developing nations.

The main institutions driving this research are situated in the leading collaborating countries. Furthermore, there is a noticeable diversity in institutional contributions across countries. This implies that dance therapy research is being increasingly embraced by institutions with varied expertise in rehabilitation, exercise science, psychology, and arts therapy. The high AC of institutions like Harvard University further underscores their significant role in shaping high-impact research, particularly with dance therapy in relation to physical therapy and rehabilitation in the treatment of osteoarthritis (Katz et al., 2021), as well as in the treatment of autism (Rosenblatt et al., 2011). However, the fragmented nature of institutional collaboration suggests that the

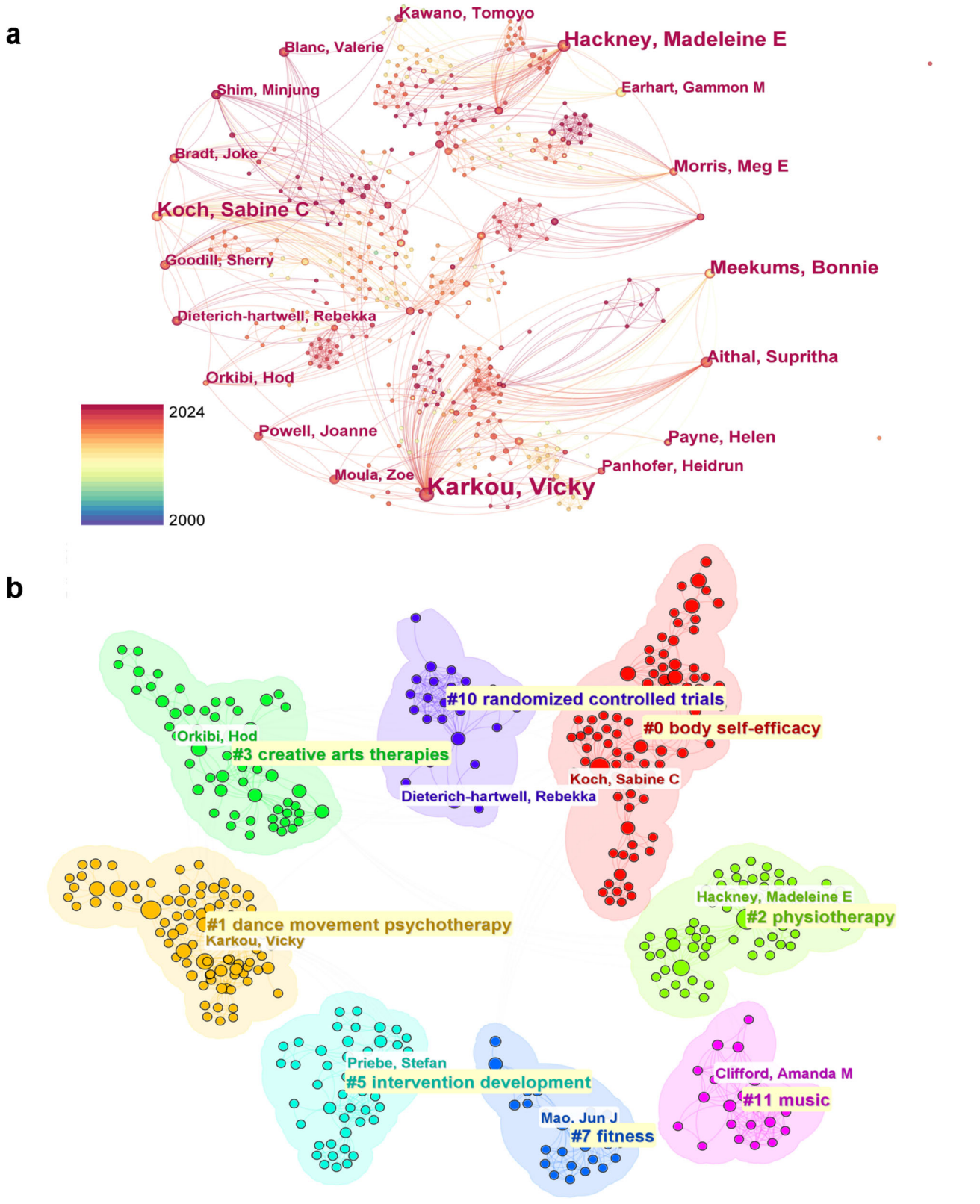

Fig. 5 Author collaboration networks and thematic clusters in dance therapy rehabilitation research (2000–2024). a Author collaboration network. Node size represents authors' publication output; connecting lines indicate co-authorship strength, with colors showing collaboration density from low (blue) to high (red). **b** Author clusters identified through keyword co-occurrence analysis. Colors represent distinct thematic groups; labels indicate key research themes within each cluster.

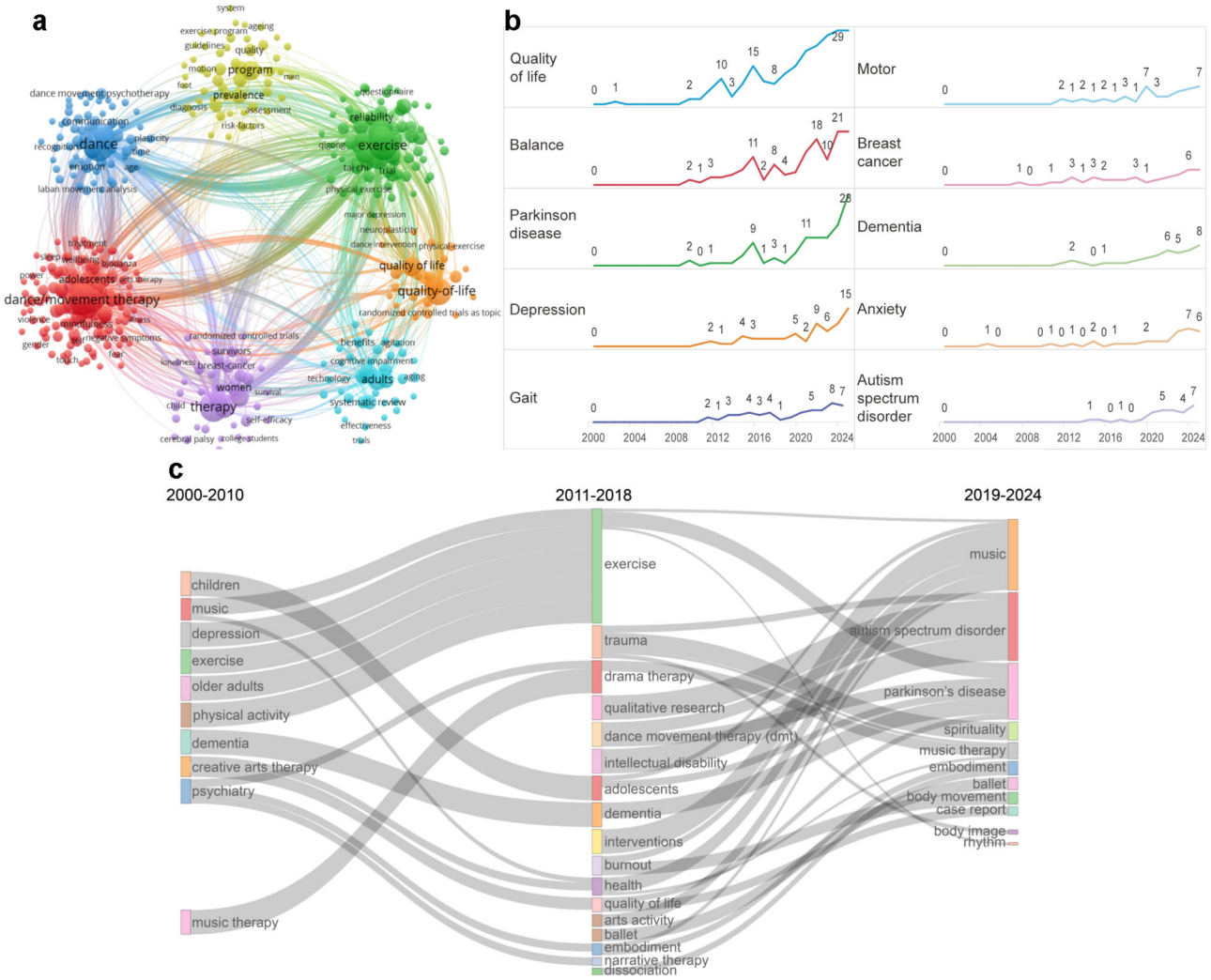

Fig. 6 Thematic trends, keyword co-occurrence, and thematic evolution in research on dance therapy rehabilitation (2000–2024). a Keyword co-occurrence network map. Colors represent keyword clusters, and node size reflects keyword frequency. Connecting lines indicate co-occurrence relationships, with thicker lines denoting stronger keyword associations. **b** Annual research output trends across ten major thematic areas. Numbers represent annual publications per theme, highlighting changes in thematic research focus over time. **c** Sankey diagram illustrating thematic evolution across three time periods (2000–2010, 2011–2018, and 2019–2024). The width of the flows corresponds to the continuity and strength of themes across different periods.

field still lacks centralized coordination, potentially hindering the formation of larger, more cohesive research groups. This fragmentation could slow the translation of research on dance therapy in rehabilitation into clinical practice, as interdisciplinary efforts often require more integrated collaborations.

The concentration of publications in both general and specialized journals also warrants attention. While journals such as Complementary Therapies in Medicine and PLoS One have consistently published research over the years, newer, subject-specific journals such as Body Movement and Dance in Psychotherapy, and The American Journal of Dance Therapy appear central to the dissemination of research on dance therapy in rehabilitation. The development of these specialized journals is an encouraging trend, as they facilitate more focused research within the field and may partly explain the recent surge in publications. However, for dance therapy to be more widely integrated into rehabilitation practices, it will be important to increase its presence in mainstream rehabilitation and healthcare journals, thereby broadening its appeal beyond the dance and psychotherapy communities. The disciplinary analysis of journals revealed that research in the field of dance therapy was concentrated in the disciplines of psychology, education, and health, as well as in the disciplines of molecular, biology, and immunology. Additionally, the disciplines of health, nursing, and medicine, along with the disciplines of psychology, education and social, provided a strong knowledge base for research in these fields. The development in publications in the psychology education and social and those of health, nursing and medicine disciplines were mainly influenced by publications in the psychology education and health and medical, medicine and clinical, suggesting the multidisciplinary origins of dance therapy research in rehabilitation.

At the author level, the field is still evolving. Core authors such as V. Karkou and M.E. Hackney have made significant, ongoing contributions since 2019. In our analysis, eleven distinct thematic clusters were identified within the field of dance therapy. “Dance Movement Psychotherapy”, was primarily represented by the work of Karkou, whose research has focused on interventions that utilize dance to alleviate parenting stress and enhance the social (Aithal et al., 2019) and emotional well-being of children with autism spectrum disorder (Aithal et al., 2021). A second cluster, centered on “Body Self-Efficacy”, features studies by Koch that

Table 4 Top 20 references with the strongest citation bursts in research on dance therapy rehabilitation (2000–2024).

Rank	References, author name (DOI)	Total citations	Year	Strength	Burst years	2000–2024
1	Hackney, M.E. (10.1177/1545968309353329)	185	2010	11.0	2011–2015	
2	Hackney, M.E. (10.2340/16501977-0362)	309	2009	9.0	2011–2014	
3	Hackney, M.E. (10.1016/j.parkreldis.2009.03.003)	171	2009	8.4	2011–2014	
4	Duncan, R.P. (10.1177/1545968311421614)	249	2012	12.1	2013–2017	
5	Volpe, D. (10.1186/1471-2318-13-54)	152	2013	10.2	2014–2018	
6	Koch, S.C. (10.1016/j.aip.2013.10.004)	190	2014	13.1	2015–2019	
7	Shanahan, J. (10.1016/j.apmr.2014.08.017)	123	2015	10.2	2015–2020	
8	McKee, K.E. (10.1080/00222895.2013.834288)	142	2013	9.7	2015–2018	
9	Sharp, K. (10.1016/j.neubiorev.2014.09.009)	147	2014	9.7	2015–2019	
10	Romenets, S.R. (10.1016/j.ctim.2015.01.015)	169	2015	11.5	2016–2020	
11	Lötzke, D. (10.1186/s12883-015-0484-0)	95	2015	9.6	2016–2020	
12	Meekums, B. (10.1002/14651858.CD009895.pub2)	103	2015	7.9	2017–2020	
13	de Natale, E.R. (10.3233/NRE-161399)	75	2017	8.5	2019–2022	
14	Karkou, V. (10.3389/fpsyg.2019.00936)	82	2019	9.8	2020–2024	
15	Michels, K. (10.1016/j.ctim.2018.07.005)	72	2018	9.6	2020–2023	
16	Delabary, M.D. (10.1007/s40520-017-0836-2)	117	2018	9.2	2020–2023	
17	Lee, H.J. (10.1016/j.explore.2017.11.002)	53	2018	8.4	2021–2023	
18	Solla, P. (10.1089/acm.2018.0413)	76	2019	8.1	2021–2024	
19	Koch, S.C. (10.3389/fpsyg.2019.01806)	164	2019	18.5	2022–2024	
20	Millman, L.S.M. (10.1002/cpp.2490)	52	2021	8.2	2022–2024	

References are ranked according to their citation burst strength. "Total citations" represent overall citations received by each reference. "Strength" indicates the intensity of citation bursts, and "Burst years" denote the period during which each reference experienced notably increased citation activity. The shaded bars visually represent burst durations and intensities over the study period. DOI is provided for each reference.

Table 5 Top 11 Keywords with the strongest citation bursts in research on dance therapy rehabilitation (2000–2024).

Keywords	Count	Year	Strength	Burst years	2000–2024
Dance/movement therapy	234	2005	5.5	2006–2012	
Aerobic exercise	24	2002	4.4	2009–2017	
Randomized controlled trial	6	2002	6.9	2012–2017	
Gait	52	2011	3.7	2013–2017	
Balance	130	2009	3.6	2013–2015	
Quality of life	217	2015	4.0	2015–2017	
Parkinson's disease	103	2009	3.3	2015–2019	
Laban movement analysis	12	2017	4.4	2017–2019	
Life	25	2005	3.6	2019–2021	
Participation	23	2019	3.6	2019–2021	
Mental health	42	2018	5.6	2023–2024	

Keywords are ranked according to their citation burst strength. "Total citations" represent overall citations received by each reference. "Strength" indicates the intensity of citation bursts, and "Burst years" denote the period during which each reference experienced notably increased citation activity. The shaded bars visually represent burst durations and intensities over the study period. DOI is provided for each reference.

investigate how dance interventions influence embodied self-perception, movement quality, and affect (Koch et al., 2019), with applications ranging from depression treatment to enhancing vitality in diverse clinical populations. A third cluster, "Physiotherapy", was led by Hackney, whose work examines the efficacy of dance-based interventions, such as adapted tango and line dancing, in improving motor function, balance, and gait in individuals with movement disorders, notably Parkinson's disease, as well as in older adults with mobility limitations (Hackney et al., 2015). The clusters and authors' work span psychotherapeutic applications, embodiment processes, and rehabilitative approaches within the field of dance therapy.

Furthermore, the distribution of publications across authors reveals that the field is not mature enough but is gradually becoming cohesive. Continuous participation and collaboration among core authors have been formed, and different research preferences have emerged among different collaboration groups. In previous research in the field of neurorehabilitation, centralized collaboration hubs were identified among key figures (Azizan, Endrini, et al., 2025), this indicates maturity levels across rehabilitation niches may differ substantially, and emphasizes the importance of core author participation. The continued involvement of key figures is crucial for the field's maturation, but greater participation from a wider pool of researchers is needed to ensure a broader base of expertise.

The emerging trends within the research hotspots offer compelling insights into the current direction of dance therapy. Our keyword analysis highlighted the expanded nature of research in the field of dance therapy in rehabilitation, with wide-ranging subfields, including focuses on therapy such as breast cancer (Silva da Costa et al., 2022) and neurological diseases such as cerebral palsy (López-Ortiz et al., 2019) to the improvement of quality of life. Importantly, the shift from general to specialized research themes, such as mental health and neurodegenerative conditions, indicates a maturing field increasingly focused on specific clinical needs. Furthermore, while we observed that yearly

production of research on quality of life showed a steady increase over the last decade, sharp increases were observed for Parkinson's disease and mental health outcomes such as depression. These findings are supported by keyword bursts in quality of life (2015–2017) and Parkinson's disease (2015–2019), with the latter also showing a significant impact on the 5-year deviation in citations in years 2009 and 2015. The most recent keyword burst from 2023 to 2024 was mental health, which follows the pattern of investigation into the use of dance therapy for mental health among large population groups (Fong Yan et al., 2024), including children, adults (Tomaszewski et al., 2023) and older adults (Huang et al., 2023) and within the use of mental health during injury rehabilitation treatment (Bracewell, 2024). This increased emphasis on mental health and Parkinson's disease likely reflects broader societal and clinical shifts. Rising mental health challenges (Brunette et al., 2023) and increased recognition of dance therapy's use in psychological treatment. In parallel, the growing global burden of Parkinson's disease (Su et al., 2025) has underscored the need for effective rehabilitation strategies (Yoon, 2022).

Comparisons with other creative arts therapies, such as music therapy, also help situate these findings within a broader rehabilitation context. Similar to dance therapy, music therapy has shown growing global uptake, with strong evidence for its use in neurological rehabilitation, including Parkinson's disease, and dementia (Zhi et al., 2024). Both fields face common challenges such as limited standardization, underrepresentation in mainstream rehabilitation journals, and the need for stronger interdisciplinary collaboration (Zhi et al., 2024).

As the research landscape continues to grow, a substantial amount of work in the field of dance therapy focuses on improving psychological and physical health outcomes, with keywords like "Quality of life", "mental health", and "Parkinson's disease". This aligns with the broader application of dance therapy in addressing chronic conditions such as Parkinson's disease, depression, and rehabilitation in physical disability. The increasing focus on these areas reflects a growing understanding of the diverse ways in which dance therapy can address both physical and psychological rehabilitation needs. Emerging topics, such as the use of dance therapy in the treatment of Parkinson's disease and other neurodegenerative conditions, point to an expanding research base that is increasingly concerned with rehabilitation approaches. These findings highlight dance therapy's dual role in both physical recovery and mental health treatment, suggesting that it can be particularly beneficial for patients with complex, varied rehabilitation needs. Similar interdisciplinary specialization has been reported in frailty and dementia bibliometrics (Azizan, 2024b; Azizan, Cao, et al., 2025), suggesting that dance therapy research could likewise benefit from technology-enhanced approaches such as sensor-based monitoring. (Azizan, 2024a) Furthermore, this highlights common drivers in rehabilitation sciences, emphasizing the importance of cross-disciplinary insights and collaborations to enhance patient outcomes.

Limitations. This study has several limitations. First, our search was limited to a single database, excluding non-WOSCC databases may restrict the data available, particularly for the fields of arts and humanities (Liu et al., 2024). However, WOSCC is considered the most comprehensive database with comparatively extensive data. Furthermore, bibliometric studies often favor WOSCC to avoid data errors that can arise from combining sources. Future research could benefit from incorporating additional databases, such as Scopus, to enhance the breadth of the data. Second, only English-language articles were included, which may have led to the exclusion of relevant research published in other languages and could potentially introduce language bias; however, it would be unlikely to change the conclusions of our research (Nussbaumer-Streit et al., 2020). Third, this study did not include gray literature or unpublished trials, which may have led to an underrepresentation of emerging or non-indexed research in the field. Fourth, co-authorship and keyword co-occurrence analyses may not fully capture the extent of collaboration or the true thematic scope of the field. Some authors may have contributed to multiple studies without being identified as core authors, and keyword analysis may miss emerging trends if different terminologies or classifications are used by authors. Fifth, while we included GDP as a measure of economic context, it is important to recognize that economic metrics alone may not fully reflect the diverse factors influencing regional research capacity (Azizan, 2024a). Relying solely on GDP could overlook variations in scientific infrastructure, funding mechanisms, and local research priorities that also shape research output. Sixth, we excluded research from 2025 to avoid the inclusion of ongoing research; however, it must be acknowledged that recent hotspots from 2025 may have been missed. Sixth, in some fields with small author pools, there may be some self-citation effects that exaggerate the influence of studies. However, for influential authors and articles, the high citation count will far exceed the number of articles published from related authors pools. Finally, this study did not include Altmetrics or patent citation analyses, which could provide insights into the translational and societal impact of research. Future studies could incorporate these metrics to better assess the real-world influence of scholarly work in this field.

Conclusion. This study highlights the growing role and emerging maturity of dance therapy in rehabilitation and its growing clinical integration. To strengthen its integration, increased collaboration, institutional involvement, and interdisciplinary dialogue are essential and policy support is needed. Practical steps may include developing international research consortia, incorporating dance therapy into rehabilitation guidelines, and supporting cross-sectoral training. This mapping lays the groundwork for evidence-based integration of dance therapy into global rehabilitation frameworks; future work should standardize interventions, enhance methodological rigor, and link bibliometric trends to patient outcomes.

Data availability

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

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Author contributions

FY: Conceptualization, investigation, data curation, formal analysis, visualization, and writing—review & editing. JWR-G: Investigation, data curation, formal analysis, writing-original draft, and writing—review & editing. JT: Validation and writing—review & editing. SY: Conceptualization, supervision, writing—review & editing, and project administration.

Competing interests

The authors declare no competing interests.

Ethical approval

This study did not involve human participants, identifiable human data, or animal experiments. Consequently, ethical approval was not required in accordance with institutional and national guidelines for studies that do not involve human or animal subjects.

Informed consent

This study did not involve any research with human participants, human data, or human tissue performed by any of the authors. Therefore, informed consent was not required in accordance with institutional and national regulations governing studies that do not include human subjects.

Additional information

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