Journal of Multidisciplinary Healthcare

Dovepress
Taylor & Francis Group

Open Access Full Text Article

REVIEW

A Bibliometric Analysis of Research Trends in Psychological Interventions for Stroke Survivors: Focusing on Resilience and Psychological Well-Being (2000-2024)

Yaoyao Li[1], Kim Lam Soh[1], Xiujuan Jing[2], Lili Wei[3], Hasni Idayu Saidi[4], Kim Geok Soh[5]

[1]Department of Nursing, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Selangor, Malaysia; [2]Department of Neurology, Zibo Central Hospital, Zibo, Shandong, People's Republic of China; [3]Department of Dean's Office, The Affiliated Hospital of Qingdao University, Qingdao, Shandong, People's Republic of China; [4]Department of Biomedical Science, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Selangor, Malaysia; [5]Department of Sports Studies, Faculty of Educational Studies, Universiti Putra Malaysia, Serdang, Selangor, Malaysia

Correspondence: Kim Lam Soh, Department of Nursing, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Selangor Darul Ehsan, Malaysia, Tel +60 19-936 9893, Email sklam@upm.edu.my

Video abstract

Point your SmartPhone at the code above. If you have a QR code reader the video abstract will appear. Or use: https://youtu.be/FewjeWETcqA

Purpose: This study aims to conduct a bibliometric analysis of research literature on psychological interventions for stroke survivors published from 2000 to 2024, focusing on psychological resilience and psychological well-being, utilizing VOSviewer and CiteSpace.

Patients and Methods: Literature data was sourced from the Web of Science Core Collection database (WoSCC). A total of 373 relevant articles published between January 1, 2000, and September 30, 2024, were included. CiteSpace and VOSviewer analyzed the literature from perspectives including authorship, country of origin, institutions, journals, references, and keywords.

Results: Annual publication output has steadily increased, reaching a peak in 2023 (55 articles). Vranceanu Ana-Maria emerged as the most productive author with eight publications. The United States led in research output (98 articles) and centrality (0.32), with Harvard University being the leading institution (24 articles). "Disability and Rehabilitation" was the most productive journal (12 articles), while "Stroke" was the most co-cited journal (241 times). Recent research trends emphasized meta-analysis (strength=3.6), assessment tool validation (strength=3.49), and acceptance-based interventions (strength=2.89), mainly focusing on psychological resilience cultivation and well-being promotion.

Conclusion: This bibliometric analysis reveals the increasing scholarly interest in psychological interventions for stroke survivors, particularly in resilience and psychological well-being research. The field has evolved from focusing on disease-related factors to systematic intervention research, with a growing emphasis on methodological standardization and individualized interventions. These findings provide significant theoretical and practical implications for improving psychological health services for stroke survivors. Future research should strengthen high-quality empirical studies, refine assessment tools, and innovate intervention strategies to better address the complex psychological needs of stroke survivors and enhance their resilience and psychological well-being, ultimately improving rehabilitation outcomes and quality of life for stroke survivors.

Keywords: bibliometric analysis, stroke survivors, psychological intervention, psychological resilience, psychological well-being, CiteSpace

Introduction

Stroke, as a severe cerebrovascular disorder, has emerged as the second leading cause of mortality and a primary cause of disability worldwide.[1] The Global Burden of Disease study indicates that approximately 15 million individuals suffer from stroke annually, with one-third experiencing permanent functional impairment.[1] Clinical nursing practice

Received: 8 November 2024
Accepted: 27 February 2025
Published: 19 March 2025

demonstrates that stroke survivors, beyond experiencing physical symptoms such as motor deficits and dysphasia, frequently encounter complex psychological health challenges. Recent evidence confirms that approximately 40–60% of patients manifest depressive symptoms,[2] 30–50% experience anxiety symptoms,[3] while a significant proportion develop post-traumatic stress disorder and adjustment disorders.[4] These psychological health complications significantly impact patients' rehabilitation adherence and self-care capabilities. This diminishes their quality of life and ultimately resulting in elevated mortality and disability rates.[5] Consequently, enhancing psychological nursing interventions for stroke survivors has become an indispensable core component of contemporary holistic rehabilitation.[6]

Over the past two decades (2000–2024), psychological interventions for stroke survivors have undergone a significant paradigm shift, transitioning from traditional symptom-oriented nursing models toward a holistic rehabilitation approach based on positive psychology.[7] This transformation stems from researchers' profound understanding of patients' psychological health needs and the successful application of positive psychology in chronic condition management.[8] This shift emphasizes the importance of integrated multidisciplinary collaboration, combining expertise from nursing science, psychology, rehabilitation medicine, and healthcare management to address the complex psychological challenges faced by stroke survivors. In contrast to conventional models, positive psychology emphasizes the identification and cultivation of patients' psychological strengths and resources, promoting the development of positive emotions and psychological potential.[9] This theoretical framework has driven a significant transformation in stroke-related psychological nursing, expanding its scope from basic complication prevention to comprehensive psychological potential development.[10] Notably, since 2015, with the advancement of evidence-based practice and interdisciplinary integration, psychological resilience and psychological well-being have progressively emerged as fundamental theoretical foundations guiding healthcare professionals in implementing psychological interventions.[11]

Psychological resilience, as a core concept in positive psychology, reflects patients' capacity to maintain and restore psychological health when confronting illness-related challenges.[12] Nursing research demonstrates that stroke survivors with higher levels of psychological resilience exhibit not only enhanced illness adaptation and self-management capabilities but also more active engagement in rehabilitation exercises and daily care activities.[13] Similarly, as another key concept in positive psychology, psychological well-being represents patients' optimal psychological functioning at both cognitive and emotional levels.[14] Large-scale clinical investigations reveal that elevated psychological well-being significantly enhances patients' rehabilitation adherence and nursing cooperation, facilitates social function restoration, and improves overall quality of life.[15] Cutting-edge nursing intervention studies further confirm a significant positive correlation between psychological resilience and psychological well-being, indicating that systematic nursing interventions targeting these two aspects can markedly improve patients' rehabilitation outcomes.[16]

Despite the rapid growth in relevant research, a systematic analysis of the overall development trends in this field still needs to be improved. While traditional reviews have provided important references for understanding the field's development, they demonstrate notable limitations in revealing the evolution of research hotspots, nursing practice innovations, and knowledge structures.[17] Bibliometrics, as an objective literature analysis method, can systematically demonstrate the development trajectory, practice patterns, and research frontiers of specific domains through multidimensional quantitative analysis of nursing research literature.[18] This methodology not only precisely identifies nursing research hotspots and knowledge foundations but also profoundly reveals nursing scholars' collaboration networks and interdisciplinary characteristics, providing scientific evidence for future nursing practice and research development.[19] However, no studies have yet employed bibliometric methods to systematically analyze the developmental trends of psychological resilience and psychological well-being in psychological interventions for stroke survivors.[20]

Therefore, this study aims to conduct a systematic analysis of research related to psychological interventions for stroke survivors published between 2000 and 2024 using bibliometric tools such as CiteSpace and VOSviewer. Specifically, this analysis will focus on the research progress of two core concepts: psychological resilience and psychological well-being. This study will analyze multiple aspects of nursing research in this field, including development trends, knowledge distribution patterns, and geographical characteristics. It will also explore the evolution of nursing intervention themes and emerging research directions, while identifying core research teams and collaboration networks, with particular focus on the knowledge foundations and theoretical frameworks related to psychological resilience and psychological well-being. Through this systematic analysis, we aspire to provide scientific references for

enhancing the practice level and research quality of psychological nursing interventions for stroke survivors, promoting in-depth development in this field.

Materials and Methods

Search Strategy

This study conducted literature retrieval based on the Web of Science Core Collection (WoSCC). As an internationally recognized high-quality digital literature database, WoSCC is widely considered the optimal resource for bibliometric analysis.[21] To ensure the completeness and accuracy of retrieved data, we selected the Science Citation Index Expanded (SCI-Expanded, 1900-present) as the citation index.[22] Furthermore, we adhered to internationally recognized bibliometric methodologies to ensure methodological rigor.[23] These standards provided a robust theoretical foundation for the bibliometric analysis conducted in this study. Despite the increasing recognition of psychological interventions in stroke survivors, research specifically focusing on resilience and psychological well-being remains limited. To present the trends of this field, we included not only intervention studies but also other types of studies. This method ensures a broader understanding the trends of resilience and psychological well-being in stroke survivors, while also identifying the scientific foundation of intervention strategies.

The retrieval strategy was as follows:

Topic 1(TS) = ("stroke" OR "cerebrovascular accident" OR "brain infarction" OR "ischemic stroke" OR "hemorrhagic stroke") AND

Topic 2(TS) = ("psychological intervention*" OR "mental health intervention*" OR "psychotherapy" OR "cognitive therapy" OR "behavioral therapy" OR "mindfulness" OR "counseling" OR "psychological support" OR "psychological treatment") AND

Topic 3(TS) = ("resilience" OR "psychological resilience" OR "emotional resilience" OR "mental resilience" OR "psychological well-being" OR "well-being" OR "quality of life" OR "mental health" OR "emotional health").

The retrieval timeframe was set from January 1, 2000, to September 30, 2024, to comprehensively reflect the latest advances in psychological intervention research for stroke survivors. The included literature types comprised original research articles and reviews, as they provide complementary perspectives in understanding psychological interventions. Original research articles provide direct empirical evidence, while reviews offer existing evidence, establish theoretical frameworks, and identify research gaps. This comprehensive inclusion enabled thorough analysis of research development trajectories and knowledge structures in this field. Considering English as the predominant language of international scientific communication, we restricted the literature language to English to ensure the readability of included literature and the universality of research findings.

Analysis Tools

This study employed multiple bibliometric analysis tools and visualization software to comprehensively analyze the bibliometric characteristics of psychological intervention research for stroke survivors. Initially, we utilized Microsoft Excel 2019 for data management and preliminary descriptive statistics. Specifically, Excel was used to organize the original literature data by annual publications, calculate the total number of publications, and generate visualizations such as line charts to illustrate publication trends. Subsequently, we employed CiteSpace 6.2.3 R3 and VOSviewer 1.6.17 software for in-depth bibliometric analysis and visualization. Both software packages are Java-based platforms and are widely recognized information visualization tools in bibliometric research.[20,24]

Using CiteSpace, we conducted a multi-dimensional analysis of the literature data on psychological interventions for stroke survivors. Initially, we generated an author publication network map to reveal the core authors and their publication volumes in this field. Based on this, we performed a cluster analysis of the author network to explore research teams and collaborative groups in the domain. Additionally, we generated an author co-citation network map to identify scholars with significant influence in the field. Through CiteSpace, we also created country and institution maps, demonstrating the geographical distribution characteristics and institutional collaboration patterns in this field. Furthermore, we conducted a dual map overlay analysis of journals to illustrate the interdisciplinary knowledge exchange

and dissemination patterns in this domain. In the dual-map overlay, the left side represents citing literature, while the right side represents cited literature, with curves indicating citation links. The z-value function was used to amplify the more robust flow trajectories, with higher z-values depicted by thicker links.

Using VOSviewer, we focused on Analyzing the knowledge structure and research theme evolution in psychological interventions for stroke survivors. By creating a journal co-citation network map based on publication volumes (Figure 1A), we identified significant journals and their citation patterns in this field. Through keyword co-occurrence analysis (Figure 1B), we constructed a keyword co-occurrence network map, highlighting the structural distribution of research themes and hotspots. Meanwhile, we demonstrated the knowledge density and distribution patterns of various research themes using the keyword density visualization map (Figure 1C). Furthermore, we conducted a visualization analysis of country/region distribution in the literature data, revealing the global research landscape in this field. Finally, by generating a reference co-citation network map, we delineated this domain's knowledge lineage and theoretical foundations.

Research Ethics

This study was conducted as a bibliometric analysis. All data were sourced from online resources, and no animals or human subjects were involved. Therefore, ethical approval from an ethics committee was not required.

Results

Analysis of Publication Output and Citations

From 1 January 2000 to 30 September 2024, 373 articles meeting the inclusion criteria were retrieved from the Web of Science Core Collection database (Figure 2), comprising 258 original research articles and 115 review articles. Overall, this field yearly literature output demonstrates a steady upward trend (Figure 3A).

Figure 3B illustrates the annual citation frequencies of published literature between 2000 and 2024. The total citation frequency of 373 articles showed a significant growth trend. Annual citation frequencies increased progressively from 813 in 2020 to 978 in 2021, rising to 1203 in 2022 and reaching a peak of 1285 in 2023. The citation frequency for the first nine months of 2024 was 1138, indicating sustained academic attention to research outcomes in this field. Specifically, citation frequencies for original research articles increased from 424 in 2020 to 665 in 2023, while citation frequencies for review articles rose from 389 in 2020 to 620 in 2023, reflecting the significant roles both original research articles and review articles played in advancing disciplinary development.

Analysis of Authors and Co-Cited Authors

Figure 4A and Table 1 list the top five authors by publication volume, with Vranceanu, Ana-Maria publishing the most (8 articles), followed by Rosand, Jonathan and Lin, Ann (7 articles each), then Gates, Melissa (6 articles) and Wong, Dana (5 articles). Through keyword cluster analysis of the author collaboration network, we identified 14 significant clusters (Figure 4B), encompassing research themes such as hormone replacement therapy, mindfulness intervention, depression treatment, and physician-advised patient action.

Figure 4C presents the co-cited author network map. Among all co-cited authors, Hackett ML received the highest citation frequency (75 times), followed by Ayerbe L (39 times), Zigmond AS (33 times), Lincoln NB (31 times), and Beck AT (26 times) (Table 1). The research outputs of these highly cited authors constitute the core knowledge foundation for psychological intervention research in stroke survivors. Among co-cited authors, Hackett ML demonstrated the highest centrality (0.16), followed by Beck AT (0.14), Ayerbe L (0.12), American Psychiatric Association (0.11), and Bakas T (0.1). These researchers have exerted significant influence in the field, playing important roles in connecting different research groups and facilitating knowledge integration and dissemination.

Analysis of Countries and Institutions

Figure 5A illustrates the global distribution and collaborative relationships of participating countries or regions in this research field. The country network map generated by CiteSpace (Figure 5B) demonstrates that multiple countries and

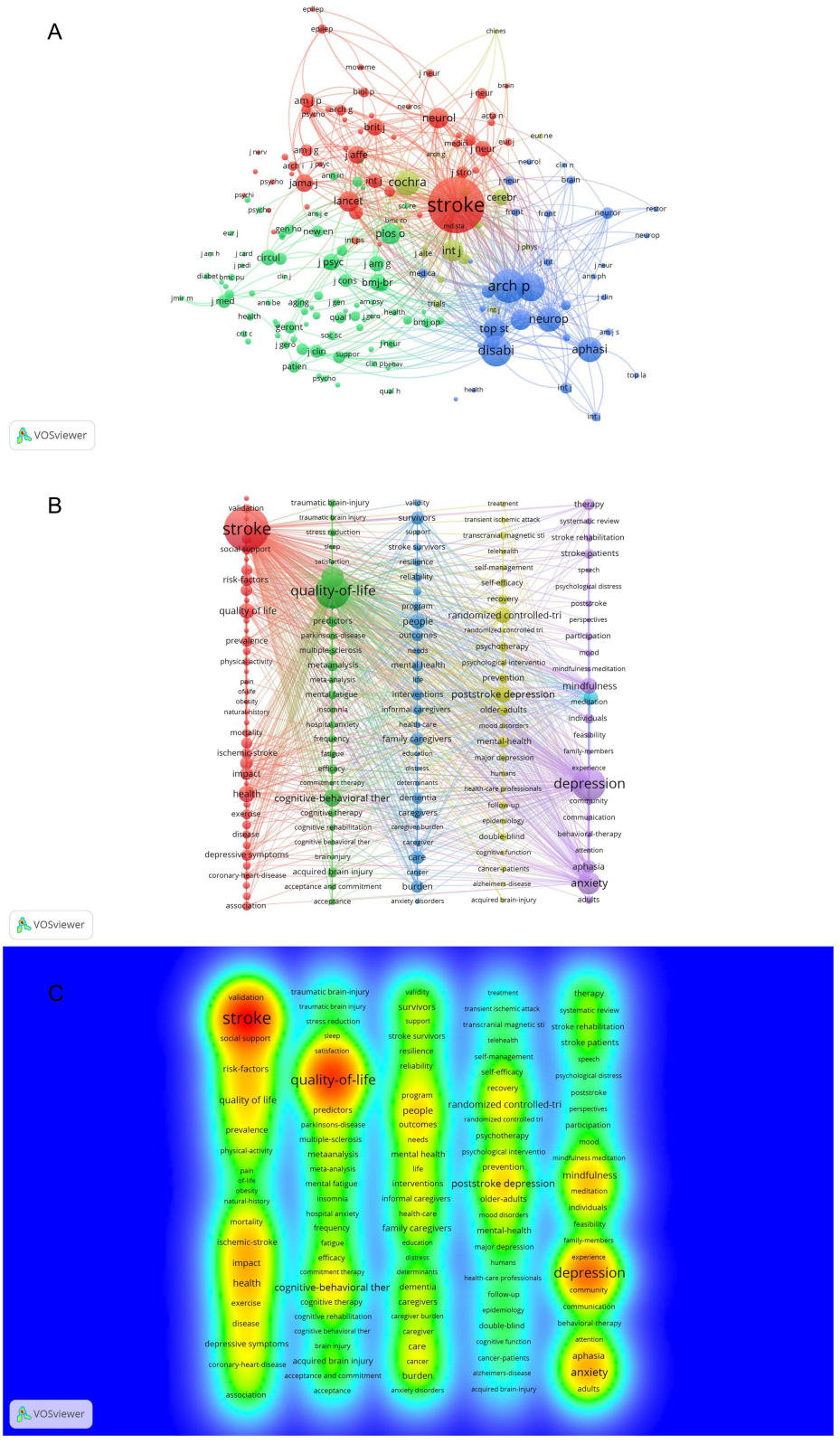

Figure 1 (**A**) Map of co-cited journals with publications. (**B**) Map of co-occurring keywords with occurrences. (**C**) Map of keywords density.

https://doi.org/10.2147/JMDH.S505135

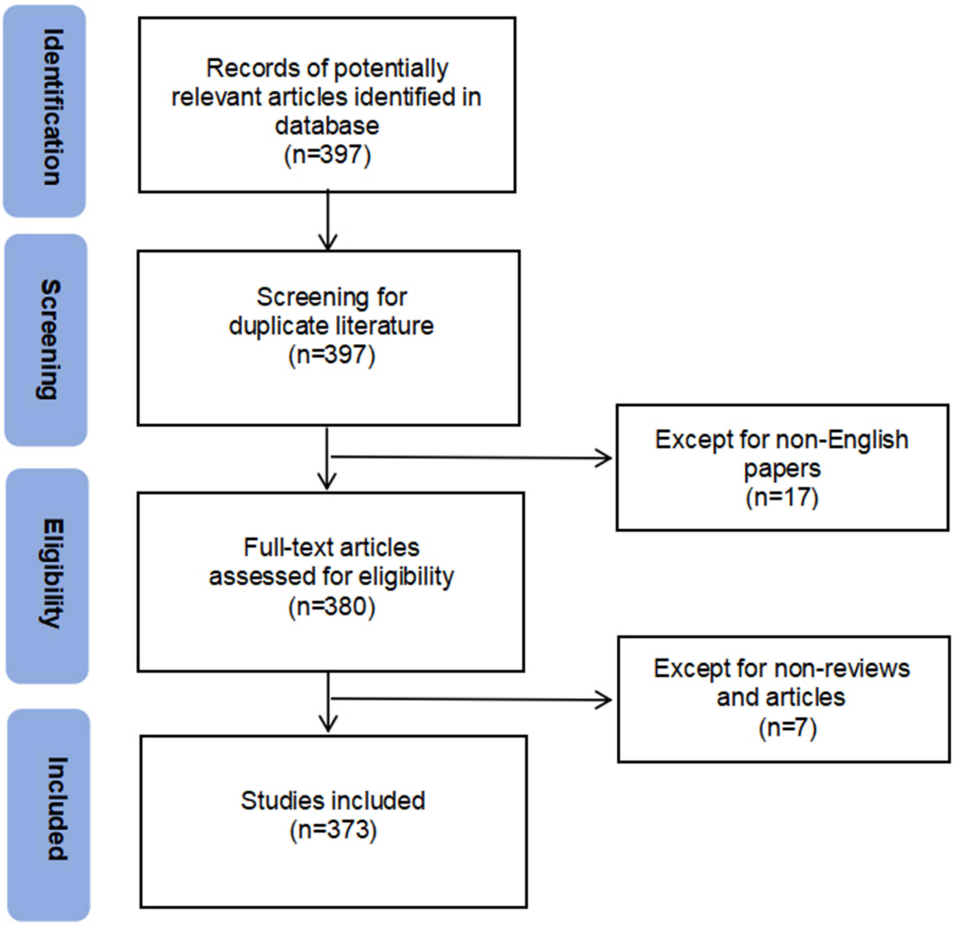

Figure 2 The flow chart of screening process.

regions have contributed to publications on psychological interventions for stroke survivors. The United States leads with 98 publications, followed by the United Kingdom (56) and China (50) in second and third positions, with Australia (42) and Canada (20) following (Table 2). Apart from China, the top five countries by publication volume are developed nations, highlighting their dominant position in this research domain. Purple circles in the figure indicate centrality, with values above 0.1 representing significant nodes. Regarding centrality, the United States ranks first with 0.32, followed by Canada (0.27), Australia (0.26), the United Kingdom (0.22), and China (0.10). These countries have played a significant role in global research collaboration (Table 2).

Figure 5C presents the institutional distribution network map. Among the top five institutions by publication volume, three are from the United States, one from the United Kingdom, and one from Australia. Harvard University leads with 24 publications, followed by Harvard Medical School and the University of Nottingham (14), La Trobe University (13), and Massachusetts General Hospital (12) ranking fourth and fifth respectively (Table 3). Analysis of institutional centrality through CiteSpace reveals that Harvard University has the highest centrality (0.29), followed by Brigham and Women's Hospital (0.13), Complutense University of Madrid (0.10), Monash University (0.09), and Pennsylvania Commonwealth System of Higher Education (0.07). Apart from Harvard University, Brigham and Women's Hospital, and Complutense University of Madrid with centrality values exceeding 0.1, other institutions show relatively low centrality, indicating that inter-institutional collaboration requires further strengthening (Table 3).

Analysis of Journals and Co-Cited Journals

In psychological interventions for stroke survivors, Figure 6 presents the results of a dual-map analysis of journals containing relevant literature. Research findings indicate that literature in psychology, education, and health domains

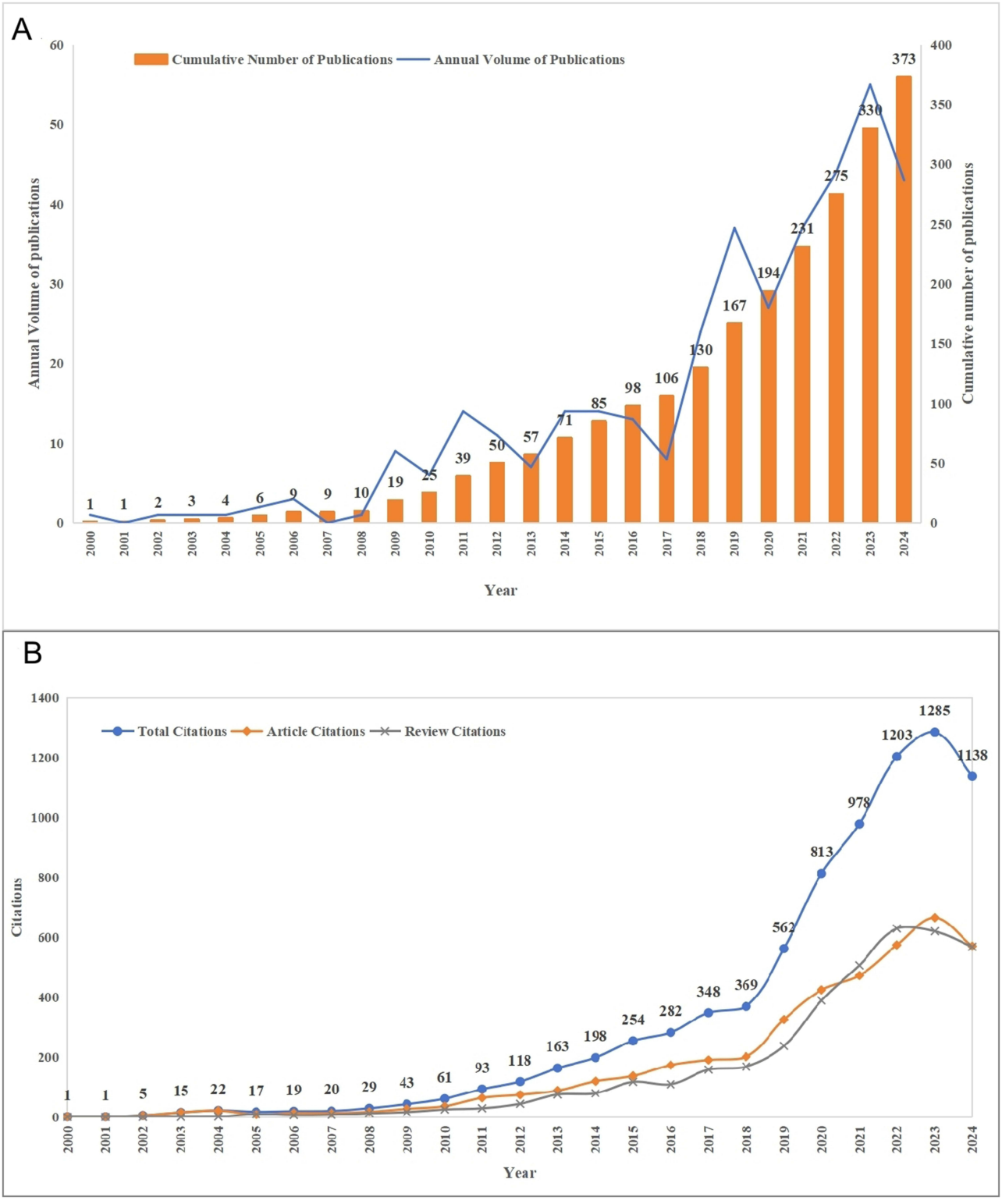

Figure 3 The quantity of publications and citations. (**A**) The publication output and its growth trend from 2000 to 2024. (**B**) The annual citation count from 2000 to 2024.

https://doi.org/10.2147/JMDH.S505135

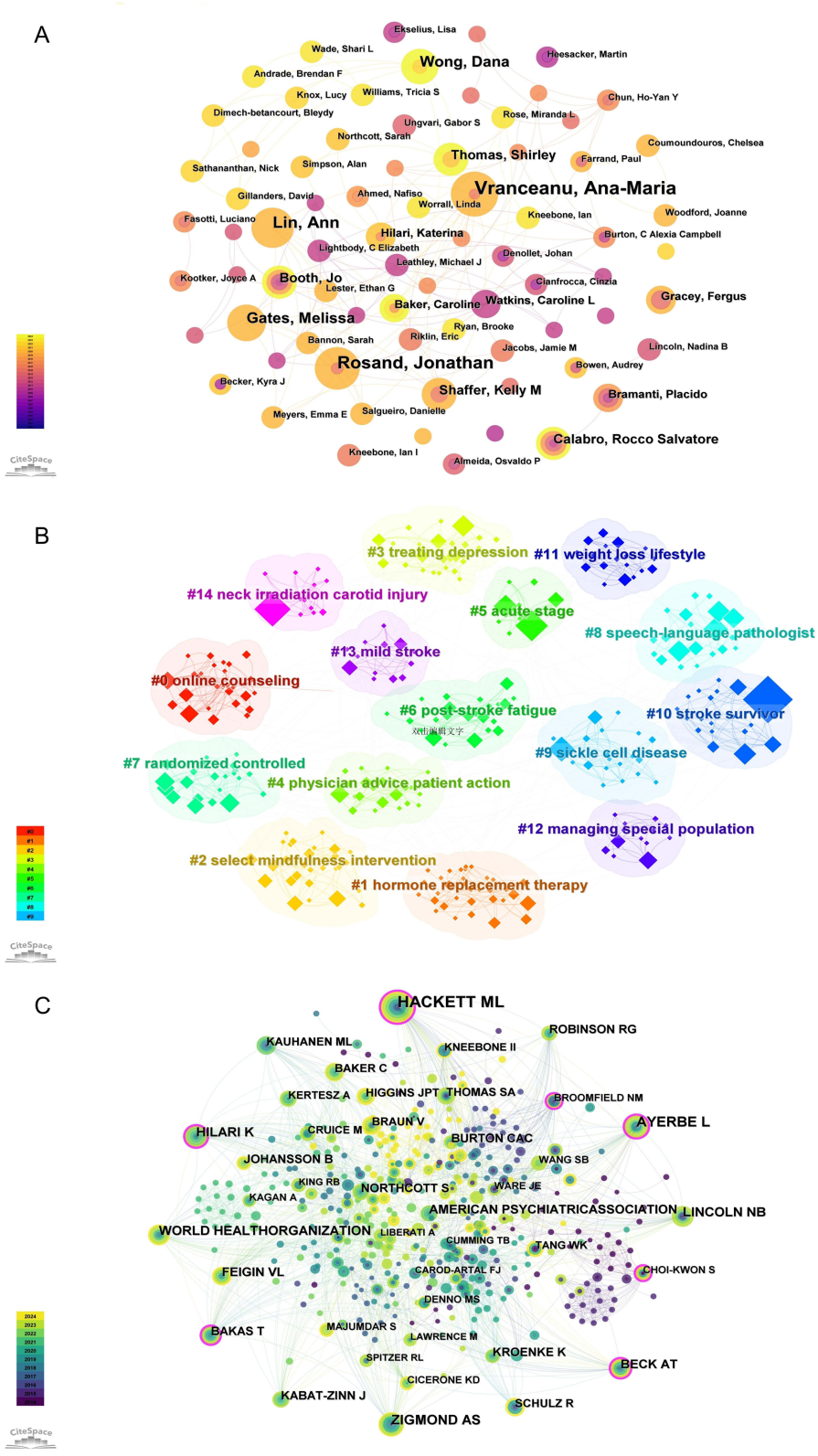

Figure 4 (**A**) Map of authors with publications. (**B**) Map of clustering of authors. (**C**) Map of co-cited authors with publications.

Table 1 Top Five Active Authors and Co-Cited Authors

Rank	Authors	Count	Cited Authors	Count times	Cited Authors	Centrality
1	Vranceanu, Ana-Maria	8	Hackett ML	75	Hackett ML	0.16
2	Rosand, Jonathan	7	Ayerbe L	39	Beck AT	0.14
3	Lin, Ann	7	Zigmond AS	33	Ayerbe L	0.12
4	Gates, Melissa	6	Lincoln NB	31	American Psychiatric association	0.11
5	Wong, Dana	5	Beck AT	26	Bakas T	0.1

(represented by blue trajectories) is primarily influenced by literature from psychology, education, and sociology fields (z=4.21, f=3942), as well as health, nursing, and medicine domains (z=2.73, f=2685).

Additionally, literature in pharmacy and medicine fields (represented by green trajectories) is significantly influenced by literature from nursing, pharmacy, and health domains (z=1.76, f=1869). Meanwhile, literature from psychology, education, and social domains (pink trajectories) has also substantially influenced literature in rehabilitation exercise and sports fields (z=3.38, f=3237). These interdisciplinary citation relationships comprehensively reflect the multidisciplinary characteristics of psychological intervention research for stroke survivors.

Table 4 lists the top 10 journals ranked by publication volume. "Disability and Rehabilitation" has 12 articles that play a significant role in this field. "Cochrane Database of Systematic Reviews" ranks second with 11 articles and the highest impact factor (IF 2023=8.8), while "Topics in Stroke Rehabilitation" ranks third with 10 articles. Notably, six of the top 10 journals originate from the United Kingdom, demonstrating the UK's dominant position in this research domain. The average citations per article vary considerably among these journals, ranging from 8.50 for "Brain Impairment" to 60.91 for "Cochrane Database of Systematic Reviews", reflecting the varying influence of different journals in this field.

We used VOSviewer software to conduct cluster analysis on 187 journals with co-citation frequencies exceeding 20 times for further study of journal co-citations. As shown in Figure 1A, the journal co-citation network formed clusters of different colors. The red cluster primarily encompasses mental health and aging research, epidemiology and public health, behavioral medicine and psychological therapy, and health services. These journals collectively focus on improving chronic patients' health status through psychological and behavioral interventions, with particular emphasis on psychological health management for patients with conditions such as stroke. The central green cluster covers research in neurology and brain science, psychiatry, geriatric mental health, mental health in public health, and psychological intervention approaches for depression and anxiety. These studies jointly focus on the application and impact of mental health in neurological diseases and elderly populations. The blue cluster primarily includes rehabilitation medicine, speech-language pathology and therapy, occupational therapy, brain injury and neurorehabilitation, and frontier research in neuroscience. These studies collectively emphasize various rehabilitation approaches to enhance functional recovery and quality of life for post-stroke patients. The yellow cluster mainly involves geriatric medicine and aging research, physical rehabilitation and stroke recovery, alternative and complementary medicine, neurology, and evidence-based medicine. These studies focus on the unique needs of elderly populations during stroke rehabilitation while exploring the effectiveness and evidence base of various rehabilitation methods. The clustering distribution of these journals reflects the multidisciplinary characteristics of psychological intervention research for stroke survivors. Analyzing articles published in these journals provides theoretical and empirical foundations for this study.

As shown in Table 5 and Figure 1A, "Stroke" has the highest journal co-citation frequency (241 times), followed by "Archives of Physical Medicine and Rehabilitation" (173 times) and "Disability and Rehabilitation" (165 times). These journals have high publication volumes and play central roles in knowledge dissemination within this field. Calculation of journal centrality through CiteSpace reveals that the "American Journal of Epidemiology" has the highest centrality (0.17), followed by the "American Journal of Psychiatry" (0.13) and "Archives of Physical Medicine and Rehabilitation" (0.10) (Table 5). These journals are important hubs in connecting different disciplines and facilitating knowledge

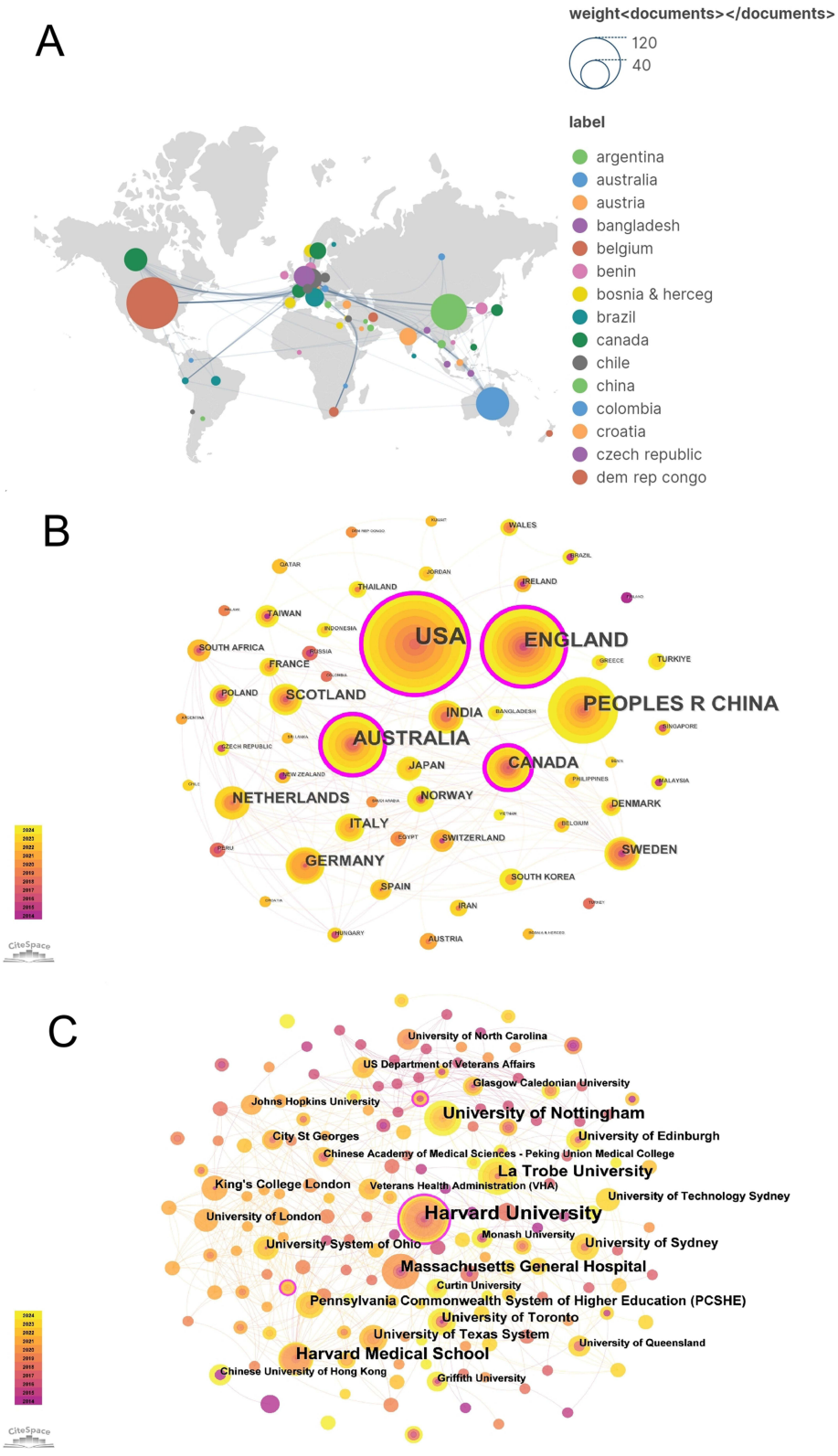

Figure 5 (**A**) The distribution of countries/regions. (**B**) Map of countries. (**C**) Map of institutions.

Table 2 Top Five Countries in Terms of Count and Centrality

Rank	Country	Count	Country	Centrality
1	USA	98	USA	0.32
2	ENGLAND	56	CANADA	0.27
3	PEOPLES R CHINA	50	AUSTRALIA	0.26
4	AUSTRALIA	42	ENGLAND	0.22
5	CANADA	20	PEOPLES R CHINA	0.1

Table 3 Top Five Institutions in Terms of Count and Centrality

Rank	Institution	Count	Institution	Centrality
1	Harvard University	24	Harvard University	0.29
2	Harvard Medical School	14	Brigham & Women's Hospital	0.13
3	University of Nottingham	14	Complutense University of Madrid	0.1
4	La Trobe University	13	Monash University	0.09
5	Massachusetts General Hospital	12	Pennsylvania Commonwealth System of Higher Education (PCSHE)	0.07

integration. Notably, while some specialized rehabilitation medicine journals, such as "Clinical Rehabilitation" and "Topics in Stroke Rehabilitation", have relatively lower centrality values, they hold significant value in guiding the clinical practice of psychological interventions for stroke survivors.

Analysis of Co-Cited References

To examine reference co-citations, we constructed a reference co-citation network map using VOSviewer (Figure 7). From 18,158 references, we selected those with co-citation frequencies of no fewer than 9 times for analysis, ultimately

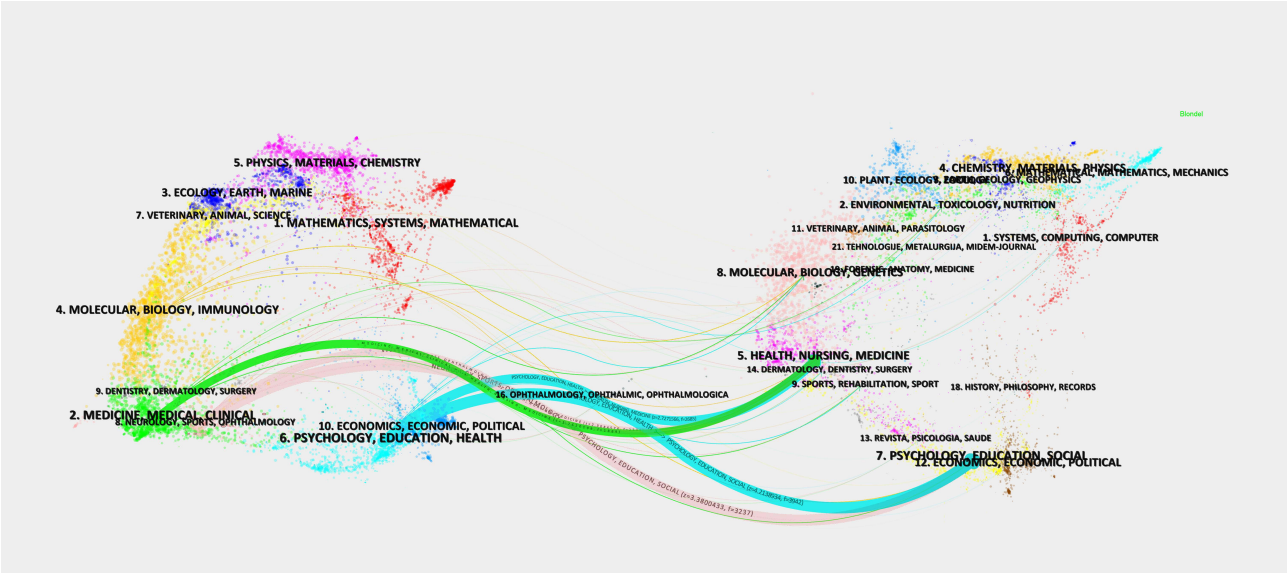

Figure 6 The dual-map overlay illustrating journals and respective publications.

https://doi.org/10.2147/JMDH.S505135

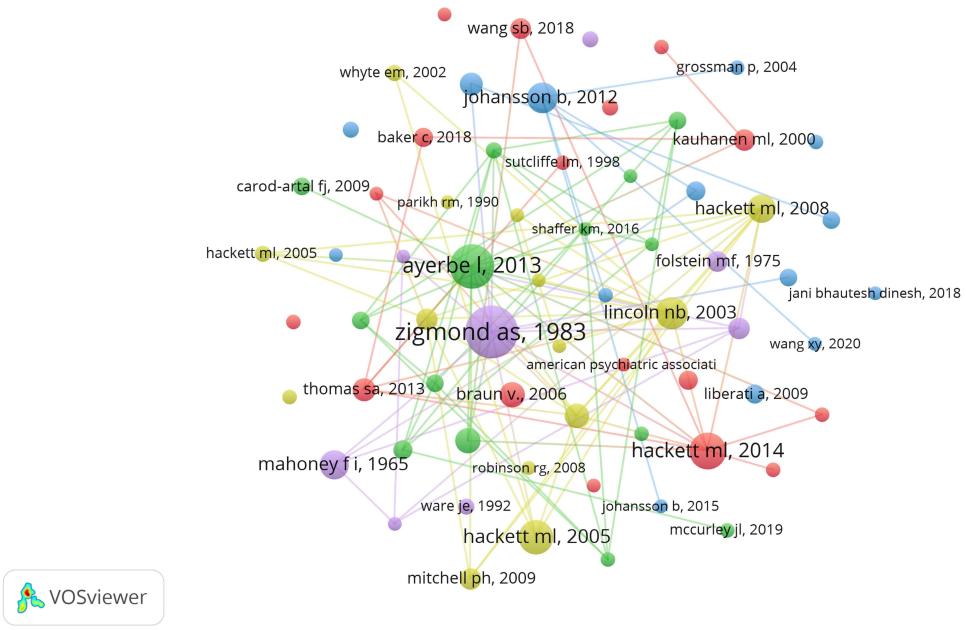

Figure 7 Map of co-cited references with citations.

identifying 68 core references. These analyses enabled us to construct a knowledge network in the field of psychological interventions for stroke survivors.

Table 6 lists the top 10 most-cited references, comprising four original research articles and six reviews. These highly cited publications were primarily published between 1983 and 2014. The article "The hospital anxiety and depression scale" by Zigmond et al, published in 1983, received the highest number of citations (40 times), introducing a measurement tool for assessing anxiety and depression in hospital patients. The review article by Ayerbe et al, published in 2013, ranked second (33 times), systematically reviewing the natural history, predictive factors, and prognosis of post-stroke depression. The article by Hackett et al from 2014 ranked third (27 times), updating the

Table 4 Top 10 Academic Journals Based on Publications

Rank	Source (Abbreviations)	Publications	Citations	Average Citations/ Publications	Country	IF (2023)
1	Disability and Rehabilitation	12	220	18.33	United Kingdom	2.1
2	Cochrane database of systematic reviews	11	670	60.91	England	8.8
3	Topics in Stroke Rehabilitation	10	207	20.70	United Kingdom	2.2
4	Neuropsychological Rehabilitation	9	91	10.11	United Kingdom	1.7
5	Aphasiology	8	100	12.50	England	1.5
6	Stroke	8	417	52.13	United States	7.8
7	Trials	8	74	9.25	United Kingdom	2.0
8	Brain Impairment	6	51	8.50	Australia	1.1
9	BMJ Open	5	74	14.80	United Kingdom	2.4
10	Frontiers in Psychology	5	113	22.60	Switzerland	2.6

Table 5 Top Five Co-Cited Journals in Terms of Counts and Centrality

Rank	Co-cited counts	Cited journal (Abbreviations)	Centrality	Cited journal (Abbreviations)
1	241	Stroke	0.17	American Journal of Epidemiology (AM J EPIDEMIOL)
2	173	Archives of Physical Medicine and Rehabilitation (ARCH PHYS MED REHAB)	0.13	American Journal of Psychiatry (AM J PSYCHIAT)
3	165	Disability and Rehabilitation (DISABIL REHABIL)	0.1	Archives of Physical Medicine and Rehabilitation (ARCH PHYS MED REHAB)
4	132	Clinical Rehabilitation (CLIN REHABIL)	0.09	American Journal of Preventive Medicine (AM J PREV MED)
5	122	Topics in Stroke Rehabilitation (TOP STROKE REHABIL)	0.08	The BMJ (British Medical Journal) (BMJ-BRIT MED J)

Table 6 Top 10 Co-Cited References in Terms of Citations

Rank	Title	Citations	Year	First Author	Journal	Document Type
1	The hospital anxiety and depression scale.[25]	40	1983	Zigmond A S	Acta Psychiatrica Scandinavica	Research
2	Natural history, predictors and outcomes of depression after stroke: systematic review and meta-analysis.[26]	33	2013	Ayerbe L	The British Journal of Psychiatry	Review
3	Part I: frequency of depression after stroke: an updated systematic review and meta-analysis of observational studies.[27]	27	2014	Hackett M L	International Journal of Stroke	Review
4	Predictors of depression after stroke: a systematic review of observational studies.[28]	25	2005	Hackett M L	Stroke	Review
5	Cognitive behavioral psychotherapy for depression following stroke: a randomized controlled trial.[29]	23	2003	Lincoln N B	Stroke	Research
6	Mindfulness-based stress reduction (MBSR) improves long-term mental fatigue after stroke or traumatic brain injury.[30]	22	2012	Johansson B	Brain injury	Research
7	Interventions for treating depression after stroke.[31]	21	2008	Hackett M L	Cochrane database of systematic reviews	Review
8	Using thematic analysis in psychology.[32]	20	2006	Braun V	Qualitative research in psychology	Research
9	Frequency of anxiety after stroke: a systematic review and meta-analysis of observational studies.[33]	18	2013	Burton C A C	International Journal of Stroke	Review
10	Interventions for preventing depression after stroke.[34]	18	2008	Hackett M L	Cochrane Database of Systematic Reviews	Review

frequency of post-stroke depression through Meta-analysis. Hackett ML authored four of the top 10 articles as first author, reflecting this scholar's significant contribution to psychological intervention research in stroke survivors.

The reference co-citation network displays five distinct clusters (Figure 7). The red cluster primarily encompasses psychiatry and mental health diagnostics, rehabilitation research, and psychological and physical rehabilitation of post-stroke survivors. The green cluster mainly covers post-stroke depression and mental health, geriatric care and rehabilitation, psychopathology and behavioral interventions. The blue cluster focuses on mindfulness therapy and psychological interventions, psychological support in stroke rehabilitation, utilization of psychological assessment tools, and systematic review methodologies. The yellow cluster primarily encompasses treatment and psychological interventions for post-stroke depression, applications of clinical psychology in rehabilitation, systematic reviews and evidence-based practice, and psychopathology research. The purple cluster mainly involves the development and application of psychometric instruments, the implementation of systematic reviews and evidence-based medicine in interventions, functional assessment of stroke patients, and health-related quality of life evaluation.

Analysis of Co-Occurring Keywords

Analyzing keyword co-occurring may reveal core themes and research priorities in psychological interventions for stroke survivors. As of September 2024, 1844 keywords have been identified in this research domain. Using VOSviewer software, we set a minimum co-occurrence frequency of 5, ultimately including 176 keywords for analysis (Figure 1B). We utilized the Pajek software package for keyword clustering, where nodes represent keywords, node size reflects keyword co-occurrence frequency, and connecting lines indicate association strength. Figure 1C presents the density visualization of keywords, facilitating rapid assessment of the knowledge framework and research hotspot distribution in this field.

We identified five keyword clusters in the network (Figure 1B and Table 7). The red cluster primarily addresses chronic disease management, nursing burden, caregiver support, intervention effects on health outcomes, quality of life research. It includes keywords such as "interventions" and "quality of life". The green cluster mainly involves psychological and cognitive therapy for neurological disorders, intervention efficacy studies, and systematic review methodologies. Representative keywords include "cognitive behavioral therapy", "double-blind". The blue cluster focuses on research linking cardiovascular diseases with depression, improving overall patient health through psychological support and behavioral interventions. Keywords include "mental health", "behavioral therapy". The yellow cluster primarily addresses mental health issues (such as "anxiety", "depression"), behavioral treatment and community support, family caregiver roles, and rehabilitation needs of post-stroke patients, including keywords like "depression",

Table 7 Top 10 Keywords

Rank	Occurrences	Keyword
1	135	Quality of life
2	82	Stroke
3	59	Depression
4	41	Anxiety
5	41	Cognitive behavioral therapy
6	35	Mental health
7	34	Randomized controlled trial
8	32	Poststroke depression
9	31	Health
10	30	People

"anxiety". The purple cluster involves the development and validation of psychometric instruments and symptom management during rehabilitation, with keywords like "mindfulness", "symptoms".

Table 7 lists high-frequency keywords with co-occurrence frequencies exceeding 30 times. The core terminology in this field comprises "quality of life" (135 times), "stroke" (82 times), "depression" (59 times), "anxiety" (41 times), and "cognitive behavioral therapy" (41 times). Additionally, frequently occurring keywords include "mental health" (35 times), "randomised controlled trial" (34 times), "poststroke depression" (32 times), "health" (31 times), and "people" (30 times), reflecting key research concerns and methodologies in this field.

Discussion

Using bibliometric analysis, this study systematically analyzed the developmental trends in psychological intervention research focusing on resilience and psychological well-being among stroke survivors. Through VOSviewer and CiteSpace, we identified the major contributors and high-impact literature in this field. The findings revealed the knowledge structure of this research field, providing scientific evidence for advancing psychological interventions targeting resilience and psychological well-being among stroke survivors. Additionally, this study laid the foundation for clinical practice utilizing multidisciplinary integration and complementary resources. These findings contribute to promoting and improving the psychological health of stroke survivors and enhancing their quality of life.

Development Trends of Psychological Intervention Among Stroke Survivors

Scholarly publication volume serve as a crucial indicator for measuring the developmental trajectory of a research field.[35] Figure 3A shows the publications on psychological interventions focusing on resilience and psychological well-being among stroke survivors from 2000 to 2024 (Figure 3A). The publication volume increased substantially after 2018, reaching 55 articles in 2023. In the first nine months of 2024, 43 articles were published, reflecting the growing research interest in this field (Figure 3A). The citation analysis reveals a growth in scholarly impact, with annual citations increasing from 369 in 2018 to 1285 in 2023 (Figure 3B). The findings indicate that this field has emerged as a prominent research hotspot, drawing increasing scholarly attention. In recent years, the growing emphasis on stroke survivors' psychological health and the documented benefits of resilience and psychological well-being in rehabilitation outcomes have contributed to this research expansion.[36,37] Given the increasing global burden of stroke and the recognized need for psychological support, this field is likely to maintain its growth trajectory.[38]

Overall Characteristics of Psychological Intervention Among Stroke Survivors

The bibliometric analysis revealed distinct geographical patterns in psychological intervention research for stroke survivors. Developed countries, led by the United States, dominated the field, reflected both in publication volume (the United States leading with 98 articles) and centrality in international collaboration networks (Table 2). This geographic distribution pattern may be attributed to multiple factors: firstly, these countries have well-developed healthcare systems and substantial research resources;[39] secondly, their long-standing expertise in neurorehabilitation and mental health has established a solid foundation for research on resilience and psychological well-being;[40] furthermore, their strong emphasis on geriatric mental health has facilitated the advancement of related research.[41] The institutional analysis revealed the distribution of research productivity, with Harvard University leading in publication output (24 articles), followed by significant contributions from Harvard Medical School (14 articles) and the University of Nottingham (14 articles) (Table 3). These institutions demonstrate not only strong research capabilities but also distinctive advantages in interdisciplinary integration and innovation, providing essential research infrastructure and support for studies on resilience and psychological well-being.[40] Within this research landscape, analysis of author publication networks and author co-citation networks revealed a notable pattern: while Vranceanu Ana-Maria was the most productive author (8 articles), Hackett ML received the highest number of citations (75 citations) and centrality (0.16) (Table 1). This citation pattern suggests an evolution in the research focus: studies on post-stroke depression, a predominant mental health concern, provided the foundation for research on resilience and psychological well-being.[42] The bibliometric analysis indicates a transition from symptom-oriented research to comprehensive psychological health

promotion approaches.[43] The works of other frequently cited researchers, including Ayerbe L (39 citations) and Zigmond AS (33 citations), have contributed to this shift in research emphasis.

Through analysis of author and institutional productivity identified key research contributors in this field. The bibliometric analysis of journal and the journal dual-map further delineated the evolution of knowledge structure in psychological intervention research on resilience and psychological well-being among stroke survivors. Analysis of journal showed that Disability and Rehabilitation had the highest publication output (12 articles), while the Cochrane Database of Systematic Reviews demonstrated the highest citations (Average Citations/Publications=60.91) (Table 4). Journal analysis revealed three interconnected research clusters: rehabilitation journals, represented by Disability and Rehabilitation, focusing on clinical assessment and intervention strategies for post-stroke psychological health;[44] evidence-based medicine journals, with the Cochrane Database of Systematic Reviews emerging as a highly influential journal, emphasizing systematic reviews of psychological intervention effectiveness;[45] and specialized journals, with Topics in Stroke Rehabilitation as a representative, exploring comprehensive rehabilitation strategies, particularly the integration of psychological health and functional recovery.[46] This disciplinary structure reflects significant transitions in stroke survivor psychological intervention research: evolving from single rehabilitation approaches to evidence-based comprehensive intervention, shifting from general psychological issues to resilience and psychological well-being enhancement, while demonstrating increasing methodological standardization in the field.[47] Analysis of the journal dual-map further supported this evolution in intervention approaches. The journal dual-map analysis identified systematic knowledge flow patterns, specifically, scholarly output in psychology, education, and health (blue trajectory) was predominantly influenced by research contributions from psychology, education, and sociology (z=4.21, f=3942). Meanwhile, publications from psychology, education, and sociology fields (pink trajectory) exhibited significant citation relationships with literature in rehabilitation, exercise, and sports (z=3.38, f=3237) (Figure 6). These knowledge flow patterns indicate that this field is transcending traditional single-disciplinary boundaries, reconstructing psychological intervention systems through multidisciplinary knowledge integration.[48] This trend of multidisciplinary convergence is directing psychological intervention research for stroke survivors toward more scientific and systematic development pathways, further establishing a solid theoretical foundation for research on resilience and psychological well-being.[48]

Knowledge flow analysis revealed the multidisciplinary characteristics of this field, while co-cited references analysis further reflected the deepening process of research focus. The co-cited references analysis identified three main clusters (Table 6): research on assessment tools, represented by the Hospital Anxiety and Depression Scale developed by Zigmond et al (40 citations); systematic reviews of post-stroke depression, represented by Ayerbe et al (33 citations) and Hackett et al (27 citations); and cognitive behavioral therapy research, represented by Lincoln et al (23 citations). This co-cited references analysis demonstrates researchers' systematic efforts in developing a complete research framework, from assessment tool to intervention strategy, indicating the field's progression toward more rigorous and comprehensive research approaches.

Research Focus Changes in Stroke Survivor Psychological Interventions

Keyword co-occurrence analysis reflects the evolution of research themes in psychological interventions for stroke survivors (Table 7). "Quality of life" (135 occurrences) emerged as the most frequent keyword, indicating that research focus has expanded from symptom management to quality of life enhancement. Detailed analysis revealed that the high frequency of keywords "depression" (59 occurrences), "anxiety" (41 occurrences), and "poststroke depression" (32 occurrences) indicates research concentration on psychological symptom identification and intervention (Table 7). While this symptom-focused research direction has provided significant insights into the mental health issues of stroke survivors, it reveals a limitation in the attention to patients' overall mental health.[49] With the deepening of research, keywords representing comprehensive health, such as "mental health" (35 occurrences) and "health" (31 occurrences), began to appear frequently, indicating a shift in research focus. In particular, the high frequency of "cognitive behavioral therapy" (41 occurrences) not only demonstrates the standardization of intervention methods, but more importantly reflects the research attention to patients' cognitive reconstruction and behavioral adaptation capabilities, establishing a foundation for resilience research.[50] Meanwhile, the occurrences of "randomized controlled trial" (34 occurrences) in the keyword network indicates the field's development toward evidence-based practice, providing scientific evidence for the effectiveness of resilience and psychological well-being interventions. Notably, the keyword "people" (30

occurrences) reflects the person-centered research orientation, indicating that research increasingly emphasizes patients' subjective experiences and individual needs, highlighting their active role in the rehabilitation process.[51] This shift in research focus from "symptom management" to "capability enhancement" demonstrates not only the enrichment of research content but also the innovation in intervention concepts. Under this new conceptual framework, research aims to help stroke survivors establish positive life attitudes and improve rehabilitation outcomes through strengthening resilience and enhancing psychological well-being, indicating that this field has entered a more scientific and humanistic phase.[52]

Analysis of references with the strongest citation bursts revealed the evolution of research hotspots in psychological interventions for stroke survivors (Table 8). In early studies, systematic reviews and meta-analyses by Burton et al (strength=3.07) and Ayerbe et al (strength=5.29), which highlighted both the complex mental health challenges of stroke survivors and the importance of enhancing positive psychological attributes, laying the groundwork for resilience and mental well-being oriented interventions.[26,53] In subsequent research, Hackett et al (Strength=4.26), through an updated systematic review of post-stroke depression prevalence, emphasized the necessity of psychological interventions while highlighting the importance of developing positive psychological intervention strategies.[27] Sekhon et al's study (Strength=2.82) deepened the concept of psychological interventions by integrating patients' subjective experiences and individual needs.[54] Citation burst analysis revealed Wang et al's meta-analysis (strength=5.05), which demonstrated

Table 8 Top 20 References With The Strongest Citation Bursts

References	Year	Strength	Begin	End	2000–2024
Burton et al[53]	2011	3.07	2012	2016	
Ayerbe et al[26]	2013	5.29	2013	2018	
ODonnell et al[59]	2010	2.55	2013	2014	
Johansson et al[30]	2012	2.33	2013	2015	
Radman et al[60]	2012	2.45	2014	2015	
Hackett et al[27]	2014	4.26	2017	2019	
Jaracz et al[61]	2015	2.82	2018	2019	
Sekhon et al[54]	2015	2.82	2018	2019	
Northcott et al[62]	2017	2.49	2018	2021	
American Psychiatric Association (APA).[63]	2022	2.65	2022	2022	
Baker et al[64]	2018	2.64	2019	2024	
McCurley et al[57]	2019	2.77	2020	2024	
Wang et al[65]	2019	2.72	2021	2024	
Wang et al[55]	2018	5.05	2022	2024	
Majumdar et al[56]	2019	4.79	2022	2024	
Wang et al[66]	2020	3.2	2022	2024	
Page et al[67]	2021	3.18	2022	2024	
Jani et al[68]	2018	2.28	2022	2024	
Wathugala et al[69]	2019	2.28	2022	2024	
Manning et al[70]	2019	2.28	2022	2024	

that cognitive behavioral therapy significantly improved mental health in patients with post-stroke depression, including depressive symptoms, anxiety, and activities of daily living.[55] This systematic evaluation of intervention effectiveness provided significant references for exploring effective intervention strategies to enhance resilience and psychological well-being in stroke survivors. Majumdar et al's research (strength=4.79) conducted group-based acceptance and commitment therapy, demonstrating that this intervention helped stroke survivors accept reality and reconstruct meaning in life, thereby improving their mental health levels.[56] This intervention approach integrating acceptance and behavioral change provided new theoretical and practical evidence for developing intervention strategies. Notably, McCurley et al's qualitative research (strength=2.77) explored in depth the challenges faced by patients and caregivers, identifying intervention needs based on psychological resilience.[57] The above analysis of references with the strongest citation bursts provided comprehensive insights into psychological interventions for stroke survivors. Overall, the citation burst analysis revealed a systematic development from symptom management to individualized needs and further to diversified interventions in psychological intervention research for stroke survivors. This process not only reflects the standardization of research methods and innovation in intervention strategies, but also indicates the development of interventions based on resilience and psychological well-being. These findings provide significant implications for optimizing psychological interventions for stroke survivors.[58]

In addition to the analysis of references with citation bursts, keyword burst analysis revealed the developmental trajectory of psychological intervention research (Table 9). Keywords "frequency" (strength=2.94) and "predictors"

Table 9 Top 20 Keywords With The Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	2000–2024
Coronary heart disease	2003	2.49	2003	2016	
Community	2011	2.31	2011	2012	
Frequency	2012	2.94	2012	2017	
Predictors	2012	2.55	2012	2015	
Survivors	2012	2.48	2012	2014	
Randomized controlled trial	2006	2.63	2014	2015	
Poststroke depression	2012	3.52	2015	2016	
Social support	2015	3.25	2015	2020	
Family caregivers	2005	3.49	2018	2021	
Informal caregivers	2010	3.23	2018	2021	
Dementia	2006	2.5	2018	2020	
People	2013	2.4	2018	2021	
Stress reduction	2019	3.01	2019	2020	
Therapy	2019	2.33	2019	2020	
Meta analysis	2014	3.6	2021	2024	
Stroke patients	2019	2.52	2021	2024	
Validation	2022	3.49	2022	2024	
Psychometric property	2020	2.97	2022	2024	
Acceptance	2022	2.89	2022	2024	
Mental fatigue	2015	2.46	2022	2024	

(strength=2.55) reflected the initial research focus on identifying and predicting mental health issues. Subsequently, keyword "poststroke depression" (strength=3.52) indicated attention to specific psychological symptoms in stroke survivors. Keywords "social support" (strength=3.25) and "family caregivers" (strength=3.49) indicated increasing research attention to social support in mental health, providing theoretical foundations for developing interventions focusing on resilience and psychological well-being.[71] The burst of "metaanalysis" (strength=3.6) indicated increased attention to evidence-based practice, supporting the optimization of psychological interventions through systematic evaluation of intervention effectiveness and contributing to research on interventions focusing on resilience and well-being.[72]

Clinical Implications of Psychological Resilience and Well-Being for Stroke Survivors

The analysis of references and keywords with citation bursts demonstrated the increasing clinical applications of resilience and well-being in psychological interventions for stroke survivors. Specifically, enhancing psychological resilience can improve patients' capacity to cope with challenges related to health,[73] while increasing mental well-being contributes to maintaining positive emotional experiences and life satisfaction.[74] These findings contribute to the theoretical framework of psychological interventions for stroke survivors and provided scientific evidence for optimizing clinical practice.

In the acute phase, patients face both physiological and psychological impacts from sudden illness,[75] where rebuilding a sense of control and confidence is crucial for developing psychological resilience and enhancing psychological well-being.[76] The citation burst of "stress reduction" (strength=3.01) indicated that early stress management interventions help patients establish positive attitudes toward illness, enhance resilience, and improve treatment adherence and rehabilitation participation.[77] Studies demonstrated that relaxation training and mindfulness effectively improves patients' coping abilities and emotional regulation.[78,79] Healthcare providers should help patients understand their condition, manage anxiety and stress, and establish initial confidence in rehabilitation through active communication and emotional support.[80] Subsequently, individualized psychological assessment and interventions should be implemented based on patients' functional status and psychological need.[80] Additionally, the implementation of individualized recreational activities, including music therapy and occupational activities, supports positive psychological adaptation in stroke survivors with functional impairments.[81,82]

During rehabilitation progression, patients experience psychological exhaustion and discouragement in prolonged training.[83] The maintenance of rehabilitation engagement is essential, requiring enhanced resilience and psychological well-being for improved rehabilitation outcomes.[84] Research by Majumdar et al (burst strength=4.79) confirmed that group-based acceptance and commitment therapy significantly improved patients' resilience and psychological well-being.[56] Specifically, this therapy improved patients' resilience and psychological well-being through acceptance of current health status, value identification, and structured goal setting in rehabilitation.[56] Wang et al's research (strength=3.2) showed that individualized mindfulness and relaxation techniques improved stress management capacity and adaptive functioning in daily activities.[66] These studies indicated that combining group and individualized intervention promotes comprehensive mental health.[85] These findings suggest that healthcare providers should implement a comprehensive intervention. During group sessions, they can use acceptance and commitment therapy to help patients accept their current status, identify personal values, and set achievable rehabilitation goals, while building peer support networks.[86] In individual interventions, they can guide patients in practicing mindfulness and relaxation techniques to strengthen their psychological well-being.[87] Through integrating these psychological approaches with rehabilitation training, healthcare providers can help patients achieve progressive improvements and optimize rehabilitation outcomes.

During the maintenance phase, patients confront social reintegration and lifestyle adaptation challenges, with psychological needs focusing on social adjustment and reconstruction of life values.[88] Research by McCurley et al (strength=2.77) indicated that establishing social support systems improved resilience and psychological well-being.[57] The findings indicated that multilevel social support networks improved coping abilities and mental health outcomes through increased social participation.[57] Baker et al (burst strength=2.64) further demonstrated that family-centered comprehensive psychological support improved patients' ability to manage life transitions while enhancing life satisfaction.[44] Specifically, systematic training of family members in communication skills and psychological support

methods, enabling the application of positive communication, emotional support, and behavioral reinforcement strategies in daily life, helping patients rebuild confidence and sense of value.[44] Based on these findings, healthcare providers should establish systematic intervention protocols during the maintenance phase. This involves developing patient-centered multidimensional support networks that integrate family, peer, and professional support.[89] Family members are guided to participate in psychological rehabilitation processes, reinforcing patients' resilience and psychological well-being through daily interactions.[90] Concurrently, facilitating patient participation in community activities expands social networks and increases social support.[91] Healthcare providers need to conduct regular evaluations of support system effectiveness, adjust intervention strategies as needed, and assist patients in role transition, facilitating the progression from rehabilitation to social reintegration.[91]

Resilience and psychological well-being interventions at different rehabilitation stages demonstrate systematic and dynamic intervention properties. The intervention includes establishing basic psychological resilience through stress reduction techniques and individualized activities in the acute phase, enhancing resilience and well-being through acceptance and commitment therapy and mindfulness in the rehabilitation phase, and achieving role transition and life reconstruction through social support systems in the maintenance phase. This staged intervention not only develops and enhances resilience and psychological well-being, but also provides continuous psychological support throughout rehabilitation. The synergistic enhancement of resilience and psychological well-being at each stage promotes mutual reinforcement, jointly improving rehabilitation outcomes. This intervention provides new perspectives for enhancing mental health among stroke survivors and indicates directions for future research and practice.

Strengths and Limitations

This study employed bibliometric analysis to systematically analyze 373 publications on psychological interventions for stroke survivors from 2000 to 2024, providing comprehensive insights into current research status and trends in this field. The application of visualization tools including VOSviewer and CiteSpace enabled multidimensional analysis of authors, countries, institutions, journals, citations, and keywords, clearly presenting research hotspots and frontier dynamics. This study not only constructed the knowledge map of this field but also focused on the clinical application value of resilience and psychological well-being, providing evidence-based support for optimizing clinical intervention strategies. The systematic bibliometric analysis also offers important references for future research directions.

However, this study has several limitations. Firstly, due to the constraints of CiteSpace and VOSviewer software and techniques, we only included English-language publications from the WoSCC database, potentially excluding important research findings, particularly high-quality studies published in other languages. Second, while bibliometric analysis reveals research trends, it cannot provide detailed analysis of research content. Additionally, to reflect recent research hotpots, the search period was extended to September 2024, which may affect the analysis of overall research trends in 2024.

Based on the findings and limitations, future research should expand literature search scope to include multilingual publications from multiple databases for comprehensive understanding of this field. High quality empirical studies should be strengthened, particularly randomized controlled trials examining intervention effectiveness of resilience and psychological well-being. Considering cultural influences on psychological interventions, future research needs to examine intervention applicability across different cultural contexts and develop culturally adapted assessment tools and intervention protocols. Additionally, qualitative research would provide insights into key factors during intervention processes, offering comprehensive theoretical support for intervention optimization.

Conclusion

This bibliometric analysis examined 373 publications on psychological interventions for stroke survivors from 2000 to 2024, focusing on research trends in resilience and psychological well-being. Analysis indicated that the most productive authors included Vranceanu Ana-Maria, Rosand Jonathan, and Lin Ann. The United States, United Kingdom, and China emerged as major contributing countries, with Harvard University as the most productive institution. Journal analysis showed that Disability and Rehabilitation and Cochrane Database of Systematic Reviews played significant roles in this field. Analysis of knowledge structure revealed a shift in research focus from disease-related factors to systematic

psychological interventions. This transition reflects not only the advancement of psychological intervention research but also provides important evidence for improving rehabilitation outcomes and quality of life among stroke survivors in clinical practice.

Data Sharing Statement

The datasets used in the current study are available in the context of the study.

Acknowledgment

The authors would like to thank all reviewers and editors for their comments on this paper. All assertions contained in this article are exclusively those of the writers and do not necessarily represent their connected organizations, the publisher, the editors, or the reviewers. Any product evaluated or claim made by its manufacturer is not guaranteed or sponsored by the publisher.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

This study was supported by the Chinese Nursing Association (ZHKY202118) and the Research Project on Quality of Care (Evidence-based) Management (YLZLXZ23G108).

Disclosure

The authors declare no conflict of interest related to the research, authorship, or publication. The authors affirm that they have no affiliations with any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this manuscript that could have influenced its outcome.

References

1. Feigin VL, Brainin M, Norrving B, et al. World stroke organization (WSO): global stroke fact sheet 2022. *Int J Stroke*. 2022;17:18–29. doi:10.1177/17474930211065917
2. Choi HL, Yang K, Han K, et al. Increased risk of developing depression in disability after stroke: a Korean nationwide study. *Int J Environ Res Public Health*. 2023;20:842. doi:10.3390/ijerph20010842
3. Khazaal W, Taliani M, Boutros C, et al. Psychological complications at 3 months following stroke: prevalence and correlates among stroke survivors in Lebanon. *Front Psychol*. 2021;12:663267. doi:10.3389/fpsyg.2021.663267
4. Kumar SP, Wu Clark A, Jerez V, et al. Emergency department threat perceptions and PTSD symptoms after suspected stroke. *Circulation*. 2023;148 (Suppl 1):A18827. doi:10.1161/circ.148.suppl_1.18827
5. Abualait TS, Alzahrani MA, Ibrahim AI, Bashir S, Abuoliat ZA. Determinants of life satisfaction among stroke survivors 1 year post stroke. *Medicine*. 2021;100:e25550. doi:10.1097/MD.0000000000025550
6. Eriku GA, Bekele G, Yitayal MM, Belete Y, Girma Y. Depressive symptoms and its associated factors among primary caregivers of stroke survivors at Amhara Regional State tertiary hospitals: multicenter study. *Neuropsychiatr Dis Treat*. 2023;19:1675–1684. doi:10.2147/NDT.S418074
7. Pang PC, Cheung DS, Chiang VC. Visual art intervention for people with stroke on holistic well-being: a critical review. *J Holist Nurs*. 2022;40 (2):123–145. doi:10.1177/08980101211032062
8. Mou H, Wong MS, Chien WT. Effectiveness of dyadic psychoeducational intervention for stroke survivors and family caregivers on functional and psychosocial health: a systematic review and meta-analysis. *Int J Nurs Stud*. 2021;120:103969. doi:10.1016/j.ijnurstu.2021.103969
9. Putri TARK, Ramadita W, Supriatin E, Hayati SN. Psychoeducational intervention for family caregiver burden in stroke patients care. *Risenologi J*. 2022;7:21–25. doi:10.47028/j.risenologi.2022.71a.327
10. Saban KL, Tell D, De La Pena P. Nursing implications of mindfulness-informed interventions for stroke survivors and their families. *Stroke*. 2022;53:3485–3493. doi:10.1161/STROKEAHA.122.038457
11. Chan CKP, Lo TLT, Wan AHY, Leung PPY, Pang MYC, Ho RTH. A randomised controlled trial of expressive arts-based intervention for young stroke survivors. *BMC Complement Med Ther*. 2021;21:1–10. doi:10.1186/s12906-020-03161-6
12. Tsai SJ, Li CC, Tsai SM, Kao SC, Pai HC. The effect of action modules on resilience and psychological health of stroke patients: a pilot non-randomised control trial. *J Clin Nurs*. 2023;32(1–2):311–319. doi:10.1111/jocn.16238

13. Bartoli D, Brugnera A, Grego A, Alvaro R, Vellone E, Pucciarelli G. Stroke disease–specific quality of life trajectories and their associations with caregivers' anxiety, depression, and burden in stroke population: a longitudinal, multicentre study. *Eur J Cardiovasc Nurs*. 2024;23:160–168. doi:10.1093/eurjcn/zvad054
14. Patchwood E, Foote H, Vail A, et al. Wellbeing after stroke (WAterS): feasibility testing of a co-developed acceptance and commitment therapy intervention to support psychological adjustment after stroke. *Clin Rehabil*. 2024;38:979–989. doi:10.1177/02692155241239879
15. Ibrikji S, Blaginykh E, Man S, Uchino K. Abstract TP52: post-acute transition of care in stroke patients: a systematic review. *Stroke*. 2023;54. doi:10.1161/str.54.suppl_1.TP52
16. Gao N, Li Y, Sang C, He J, Chen C. Effect of high-quality nursing on neurological function, psychological moods, and quality of life of elderly patients with stroke. *Front Neurol*. 2023;14:1259737. doi:10.3389/fneur.2023.1259737
17. Wang C, Shi Y, Lu H, et al. Global nursing research activity from 2009 to 2020: a bibliometric analysis. *Int J Nurs Pract*. 2022;28(5):e13063. doi:10.1111/ijn.13063
18. Donthu N, Kumar S, Mukherjee D, Pandey N, Lim WM. How to conduct a bibliometric analysis: an overview and guidelines. *J Bus Res*. 2021;133:285–296. doi:10.1016/j.jbusres.2021.04.070
19. Liu Y, Li X, Wang Y, Li X. Dignity in nursing: a bibliometric and visual analysis of scientific publications. *Scand J Caring Sci*. 2023;37:384–396. doi:10.1111/scs.13118
20. Chen M, Zhang Y, Dong L, Guo X. Bibliometric analysis of stroke and quality of life. *Front Neurol*. 2023;14:1143713. doi:10.3389/fneur.2023.1143713
21. Vu DK. Digital transformation and SMEs: a systematic literature review using bibliometric analysis. *Res Rev Int J Multidiscip*. 2024;9:136–142.
22. Yan L, Wang S. Mapping the literature on academic publishing: a bibliometric analysis on WOS. *SAGE Open*. 2023;13(1):21582440231158562. doi:10.1177/21582440231158562
23. Glänzel W. The need for standards in bibliometric research and technology. *Scientometrics*. 1996;35(2):167–176. doi:10.1007/BF02018475
24. Xu F, Bai L, Dai Z, Cheng H. Research hotspots and trends in post-stroke dysphagia: a bibliometric analysis. *Front Neurosci*. 2023;17:1275748. doi:10.3389/fnins.2023.1275748
25. Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand*. 1983;67(6):361–370. doi:10.1111/j.1600-0447.1983.tb09716.x
26. Ayerbe L, Ayis S, Wolfe CDA, Rudd AG. Natural history, predictors and outcomes of depression after stroke: systematic review and meta-analysis. *Br J Psychiatry*. 2013;14–21. doi:10.1192/bjp.bp.111.107664
27. Hackett ML, Pickles K. Part I: frequency of depression after stroke: an updated systematic review and meta-analysis of observational studies. *Int J Stroke*. 2014;9(8):1017–1025. doi:10.1111/ijs.12357
28. Hackett ML, Anderson CS. Predictors of depression after stroke: a systematic review of observational studies. *Stroke*. 2005;36(10):2296–2301. doi:10.1161/01.STR.0000183622.75135.a4
29. Lincoln NB, Flannaghan T. Cognitive behavioral psychotherapy for depression following stroke: a randomized controlled trial. *Stroke*. 2003;34(1):111–115. doi:10.1161/01.STR.0000044167.44670.55
30. Johansson B, Bjuhr H, Rönnbäck L. Mindfulness-based stress reduction (MBSR) improves long-term mental fatigue after stroke or traumatic brain injury. *Brain Inj*. 2012;26(13–14):1621–1628. doi:10.3109/02699052.2012.700082
31. Hackett ML, Anderson CS, House A, Xia J. Interventions for treating depression after stroke. *Cochrane Database Syst Rev*. 2008;4:CD003437. doi:10.1002/14651858.CD003437.pub3
32. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77–101. doi:10.1191/1478088706qp063oa
33. Burton CAC, Murray J, Holmes J, Astin F, Greenwood D, Knapp P. Frequency of anxiety after stroke: a systematic review and meta-analysis of observational studies. *Int J Stroke*. 2013;8(7):545–559. doi:10.1111/j.1747-4949.2012.00906.x
34. Hackett ML, Anderson CS, House A, Halteh C. Interventions for preventing depression after stroke. *Cochrane Database Syst Rev*. 2008;3:CD003689. doi:10.1002/14651858.CD003689.pub3
35. Zafar L, Masood N. Impact of field of study trend on scientific articles. *IEEE Access*. 2020;8:128295–128307. doi:10.1109/ACCESS.2020.3007558
36. Guillaumier A, Spratt NJ, Pollack M, et al. Evaluation of an online intervention for improving stroke survivors' health-related quality of life: a randomised controlled trial. *PLoS Med*. 2022;19:e1003966. doi:10.1371/journal.pmed.1003966
37. Chow EO, Fung SF, Singh H. Actor-partner effects of well-being, hope, and self-esteem on depression in stroke survivor-caregiver dyads: a randomized controlled trial. *Clin Rehabil*. 2023;37(3):394–406. doi:10.1177/02692155221128758
38. Wan X, Chau JPC, Mou H, Liu X. Effects of peer support interventions on physical and psychosocial outcomes among stroke survivors: a systematic review and meta-analysis. *Int J Nurs Stud*. 2021;121:104001. doi:10.1016/j.ijnurstu.2021.104001
39. Shubina I. Scientific publication patterns of systematic reviews on psychosocial interventions improving well-being: bibliometric analysis. *Interact J Med Res*. 2022;11:e41456. doi:10.2196/41456
40. Assonov D. Two-step resilience-oriented intervention for veterans with traumatic brain injury: a pilot randomized controlled trial. *Clin Neuropsychiatry*. 2021;18:247–259. doi:10.36131/cnfioritieditore20210503
41. Banse E, Petit G, Cool G, et al. Case study: developing a strategy combining human and empirical interventions to support the resilience of healthcare workers exposed to a pandemic in an academic hospital. *Front Psychiatry*. 2022;13:1023362. doi:10.3389/fpsyt.2022.1023362
42. Wang X, Shang S, Yang H, et al. Associations of psychological distress with positive psychological variables and activities of daily living among stroke patients: a cross-sectional study. *BMC Psychiatry*. 2019;19:381. doi:10.1186/s12888-019-2368-0
43. Armaou M, Pears M, Konstantinidis S, Blake H. Evolution of primary research studies in digital interventions for mental well-being promotion from 2004 to 2023: a bibliometric analysis of studies on the web of science. *Int J Environ Res Public Health*. 2024;21(3):375. doi:10.3390/ijerph21030375
44. Baker C, Foster A, D'Souza S, et al. Management of communication disability in the first 90 days after stroke: a scoping review. *Disabil Rehabil*. 2021;44:8524–8538. doi:10.1080/09638288.2021.2012843
45. Hounsri K, Zhang J, Kalampakorn S, et al. Effectiveness of technology-based psychosocial interventions for improving health-related outcomes of family caregivers of stroke survivors: a systematic review and meta-analysis. *J Clin Nurs*. 2024;33(11):4207–4226. doi:10.1111/jocn.17370
46. Minshall C, Pascoe M, Thompson D, et al. Psychosocial interventions for stroke survivors, carers and survivor-carer dyads: a systematic review and meta-analysis. *Top Stroke Rehabil*. 2019;26:554–564. doi:10.1080/10749357.2019.1625173

47. Cahill LS, Carey L, Lannin N, et al. Implementation interventions to promote the uptake of evidence-based practices in stroke rehabilitation. *Cochrane Database Syst Rev*. 2020;10:CD012575. doi:10.1002/14651858.CD012575.pub2
48. Vluggen TPMM, van Haastregt JCM, Tan FES, Verbunt JA, van Heugten CM, Schols JMGA. Effectiveness of an integrated multidisciplinary geriatric rehabilitation programme for older persons with stroke: a multicentre randomised controlled trial. *BMC Geriatr*. 2021;21:134. doi:10.1186/s12877-021-02082-4
49. Hong MW, Lee JH, Lee KW, Kim SB, Kang M-G. Risk factors for depressive symptoms in Korean adult stroke survivors: the Korea National Health and Nutrition Examination Survey IV-VII (2007-2018). *Int J Environ Res Public Health*. 2021;18(15):8178. doi:10.3390/ijerph18158178
50. Riepenhausen A, Wackerhagen C, Reppmann ZC, et al. Positive cognitive reappraisal in stress resilience, mental health, and well-being: a comprehensive systematic review. *Emot Rev*. 2022;14(4):310–331. doi:10.1177/17540739221114642
51. Elvén M, Prenkert M, Holmström IK, Edelbring S. Reasoning about reasoning - using recall to unveil clinical reasoning in stroke rehabilitation teams. *Disabil Rehabil*. 2024;46:1–10.
52. Matérne M, Simpson G, Jarl G, Appelros P, Arvidsson-Lindvall M. Contribution of participation and resilience to quality of life among persons living with stroke in Sweden: a qualitative study. *Int J Qual Stud Health Well-Being*. 2022;17:2119676.
53. Campbell Burton CA, Holmes J, Murray J, et al. Interventions for treating anxiety after stroke. *Cochrane Database Syst Rev*. 2011;2011(12):CD008860.
54. Sekhon JK, Douglas J, Rose ML. Current Australian speech-language pathology practice in addressing psychological well-being in people with aphasia after stroke. *Int J Speech Lang Pathol*. 2015;17(3):252–262. doi:10.3109/17549507.2015.1024170
55. Wang SB, Wang YY, Zhang QE, et al. Cognitive behavioral therapy for post-stroke depression: a meta-analysis. *J Affect Disord*. 2018;235:589–596. doi:10.1016/j.jad.2018.04.011
56. Majumdar S, Morris R. Brief group-based acceptance and commitment therapy for stroke survivors. *Br J Clin Psychol*. 2019;58(1):70–90. doi:10.1111/bjc.12198
57. McCurley JL, Funes CJ, Zale EL, et al. Preventing chronic emotional distress in stroke survivors and their informal caregivers. *Neurocrit Care*. 2019;30(3):581–589. doi:10.1007/s12028-018-0641-6
58. Van Agteren J, Lasiello M, Lo L, et al. A systematic review and meta-analysis of psychological interventions to improve mental wellbeing. *Nat Hum Behav*. 2021;5(5):631–652. doi:10.1038/s41562-021-01093-w
59. O'Donnell MJ, Xavier D, Liu L, et al. Risk factors for ischaemic and intracerebral haemorrhagic stroke in 22 countries (the INTERSTROKE study): a case-control study. *Lancet*. 2010;376(9735):112–123. doi:10.1016/S0140-6736(10)60834-3
60. Radman N, Staub F, Aboulafia-Brakha T, Berney A, Bogousslavsky J, Annoni JM. Poststroke fatigue following minor infarcts: a prospective study. *Neurology*. 2012;79(14):1422–1427. doi:10.1212/WNL.0b013e31826d5f3a
61. Jaracz K, Grabowska-Fudala B, Górna K, Jaracz J, Moczko J, Kozubski W. Burden in caregivers of long-term stroke survivors: prevalence and determinants at 6 months and 5 years after stroke. *Patient Educ Couns*. 2015;98(8):1011–1016. doi:10.1016/j.pec.2015.04.008
62. Northcott S, Simpson A, Moss B, Ahmed N, Hilari K. How do speech-and-language therapists address the psychosocial well-being of people with aphasia? Results of a UK online survey. *Int J Lang Commun Disord*. 2017;52(3):356–373. doi:10.1111/1460-6984.12278
63. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Washington, DC: American Psychiatric Association; 2022.
64. Baker C, Worrall L, Rose M, Hudson K, Ryan B, O'Byrne L. A systematic review of rehabilitation interventions to prevent and treat depression in post-stroke aphasia. *Disabil Rehabil*. 2017;40(16):1870–1892. doi:10.1080/09638288.2017.1315181
65. Wang X, Smith C, Ashley L, Hyland ME. Tailoring self-help mindfulness and relaxation techniques for stroke survivors: examining preferences, feasibility and acceptability. *Front Psychol*. 2019;10:391. doi:10.3389/fpsyg.2019.00391
66. Wang X, Li J, Wang C, Lv J. The effects of mindfulness-based intervention on quality of life and poststroke depression in patients with spontaneous intracerebral hemorrhage in China. *Int J Geriatr Psychiatry*. 2020;35(5):572–580. doi:10.1002/gps.5273
67. Page MJ, Moher D, Bossuyt PM, et al. PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. *BMJ*. 2021;372:1.
68. Jani BD, Simpson R, Lawrence M, Simpson S, Mercer SW. Acceptability of mindfulness from the perspective of stroke survivors and caregivers: a qualitative study. *Pilot Feasibility Stud*. 2018;4:1–9. doi:10.1186/s40814-018-0244-1
69. Wathugala M, Saldana D, Juliano JM, Chan J, Liew SL. Mindfulness meditation effects on poststroke spasticity: a feasibility study. *J Evid Based Integr Med*. 2019;24:2515690X19855941. doi:10.1177/2515690X19855941
70. Manning M, MacFarlane A, Hickey A, Franklin S. Perspectives of people with aphasia post-stroke towards personal recovery and living successfully: a systematic review and thematic synthesis. *PLoS One*. 2019;14(3):e0214200. doi:10.1371/journal.pone.0214200
71. Bhattarai M, Jin Y, Smedema SM, Cadel KR, Baniya M. The relationships among self-efficacy, social support, resilience, and subjective well-being in persons with spinal cord injuries. *J Adv Nurs*. 2021;77(1):221–230. doi:10.1111/jan.14573
72. Allen M. Understanding the practice, application, and limitations of meta-analysis. *Am Behav Sci*. 2019;64(1):74–96. doi:10.1177/0002764219859619
73. Yan H-Y, Lin H-R. Resilience in stroke patients: a concept analysis. *Healthcare*. 2022;10(11):2281. doi:10.3390/healthcare10112281
74. Van Nimwegen D, Hjelle EG, Bragstad LK, et al. Interventions for improving psychosocial well-being after stroke: a systematic review. *Int J Nurs Stud*. 2023;142:104492. doi:10.1016/j.ijnurstu.2023.104492
75. Saceleanu VM, Toader C, Ples H, et al. Integrative approaches in acute ischemic stroke: from symptom recognition to future innovations. *Biomedicines*. 2023;11(10):2617. doi:10.3390/biomedicines11102617
76. Wu YC, Shen SF, Chen LK, Tung HH. A web-based resilience-enhancing program to improve resilience, physical activity, and well-being in geriatric population: randomized controlled trial. *J Med Internet Res*. 2024;26:e53450. doi:10.2196/53450
77. Hinwood M, Ilicic M, Gyawali P, et al. Psychological stress management and stress reduction strategies for stroke survivors: a scoping review. *Ann Behav Med*. 2023;57(2):111–130. doi:10.1093/abm/kaac002
78. Shojaei F, Shahabizadeh F, Mousavi-Mirzaei SM, Firoozabadi MD, Esmaeili A. Comparing the effectiveness of mindfulness-based stress reduction training and Powell's cognitive rehabilitation on improving the quality of life of stroke patients. *Mod Care J*. 2024;21(3):e142817. doi:10.5812/mcj-142817

79. Nordin NAM, Vasu DT, Ghazali SE. Effectiveness of autogenic relaxation training as an adjunct to usual physiotherapy in enhancing emotional well-being and functional Independence in stroke survivors: a randomized controlled study. *Top Stroke Rehabil*. 2024;1–13. doi:10.1080/10749357.2024.2444117
80. Fernandes JB, Fernandes S, Domingos J, et al. Motivational strategies used by health care professionals in stroke survivors in rehabilitation: a scoping review of experimental studies. *Front Med Lausanne*. 2024;11:1384414. doi:10.3389/fmed.2024.1384414
81. Wen X, Song S, Tian H, et al. Intervention of computer-assisted cognitive training combined with occupational therapy in people with mild cognitive impairment: a randomized controlled trial. *Front Aging Neurosci*. 2024;16:1384318. doi:10.3389/fnagi.2024.1384318
82. Rushing J, Capilouto G, Dressler EV, Gooding LF, Lee J, Olson A. Active music therapy following acute stroke: a single-arm repeated measures study. *J Music Ther*. 2022;59(1):36–61. doi:10.1093/jmt/thab017
83. Lin S, Wang C, Wang Q, et al. The experience of stroke survivors and caregivers during hospital-to-home transitional care: a qualitative longitudinal study. *Int J Nurs Stud*. 2022;130:104213. doi:10.1016/j.ijnurstu.2022.104213
84. Takil M, Ç Ö. The relationship of functional status with self-efficacy and resilience in stroke patients. *Arch Health Sci Res*. 2023;10(2):101–107. doi:10.5152/ArcHealthSciRes.2023.0137
85. Hancock SL, Thayabaranathan T, Cameron J, Stolwyk R, Lawrence M, Johnson L. Comparisons between group- and individual-based interventions to support recovery from stroke and ischaemic heart disease in the community: a scoping review. *Disabil Rehabil*. 2024;46(23):5432–5441. doi:10.1080/09638288.2024.2305300
86. Liu YE, Lv J, Sun FZ, et al. Effectiveness of group acceptance and commitment therapy in treating depression for acute stroke patients. *Brain Behav*. 2023;13(12):e3260. doi:10.1002/brb3.3260
87. Wang X, Thiel L, Graff N. Mindfulness and relaxation techniques for stroke survivors with aphasia: a feasibility and acceptability study. *Healthcare*. 2022;10(8):1409. doi:10.3390/healthcare10081409
88. Zhang Y, Mou Y, Zhang Y, Wang J, Kong F. Psychological experience and social reintegration needs of young stroke patients: a systematic review and meta-aggregation of qualitative studies. *J Community Health Nurs*. 2022;39:150–169. doi:10.1080/07370016.2022.2077074
89. Masterson-Algar P, Williams S, Burton C, et al. Getting back to life after stroke: co-designing a peer-led coaching intervention to enable stroke survivors to rebuild a meaningful life after stroke. *Disabil Rehabil*. 2018;42(10):1359–1372. doi:10.1080/09638288.2018.1524521
90. Ramadia AR, Keliat BAK, Wardani IYW. Effect of cognitive therapy and family psychoeducation in stroke clients with depression and disability. *J Keperawatan Komprehensif*. 2021;7(2):43–56. doi:10.33755/jkk.v7i2.222
91. Norlander A, Iwarsson S, Jönsson AC, Lindgren A, Lexell EM. Participation in social and leisure activities while reconstructing the self: understanding strategies used by stroke survivors from a long-term perspective. *Disabil Rehabil*. 2022;44(16):4284–4292. doi:10.1080/09638288.2021.1900418