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ABOUT COVER

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AIMS AND SCOPE

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WJP mainly publishes articles reporting research results and findings obtained in the field of psychiatry and covering a wide range of topics including adolescent psychiatry, biological psychiatry, child psychiatry, community psychiatry, ethnopsychology, psychoanalysis, psychosomatic medicine, *etc*.

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RESPONSIBLE EDITORS FOR THIS ISSUE

Emerging global interest: Unraveling the link between diabetes mellitus and depression

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Abstract

BACKGROUND
Studies have shown a strong bidirectional association between diabetes and depression, with diabetes increasing the risk of developing depression and vice versa. Depression among patients with diabetes is associated with poor glycemic control, complications, and poor self-care.

AIM
To explore the present state of research globally concerning diabetes and depression, to aid understanding the current research landscape and identify potential future areas of research.

METHODS
A bibliometric approach was used, utilizing the Scopus database to gather pertinent research articles released from 2004 to 2023. Analyses encompassed publication patterns, significant contributors, research focal points, prevalent themes, and the most influential articles, aimed at discerning emerging research subjects.

RESULTS
A total of 3229 publications that met the search criteria were identified. A significant increase in the number of publications related to diabetes and depression has been observed in the past two decades. The most productive nation was the USA (*n* = 1015; 31.43%), followed by China (*n* = 325; 10.07%), the UK (*n* = 236; 7.31%), and Germany (*n* = 218; 6.75%). Three principal themes in research on depression and diabetes were delineated by the analysis. First, the exploration of the elevated prevalence and etiology of this comorbidity; second, the focus on interventions, particularly randomized controlled trials, aimed at enhancing diabetes management among individuals with depression; and finally, the investigation of the involved risk factors and biological mechanisms underlying this bidirectional relationship.

CONCLUSION
There has been a recent surge of interest in the relationship between diabetes and depression. This could aid researchers to identify areas lacking in the literature and shape future research.

Key Words: Diabetes mellitus; Depression; Bibliometric; Visualization; Global

Core Tip: Although there have been numerous studies examining research productivity in diabetes or depression separately, there is a notable absence of a bibliometric analysis concentrating on the intersection of both conditions. Conducting bibliometrics in this regard will enable us to pinpoint the primary countries, institutions, journals, and research themes involved. Such insights will provide more comprehensive understanding of the present research landscape and offer guidance for future inquiries. By analyzing publication patterns across time, we can anticipate burgeoning areas of interest, thereby aiding in research funding allocations, program formulation, and policy development.

INTRODUCTION

Depression and diabetes mellitus (DM) have a complicated link in which one can both cause and predispose patients to the other[1-3]. Studies point to a strong correlation[4,5] between the incidence of diabetes and depression, especially type 2 DM (T2DM). However, the two diseases are negatively correlated. Individuals with severe depression may suffer from diabetes three times more frequently than the general population[6]. Common molecular pathways involving inflammation, autonomic dysfunction, changes to the central nervous system, and hypothalamic–pituitary–adrenal (HPA) axis activation are linked to these disorders[1,5,7,8].

T2DM and depression are inversely related to biological processes, including low-grade inflammation, hyperglycemia, and (micro)vascular dysfunction[8]. Depression and T2DM are related to molecular changes that impact the sympathetic nervous system, the HPA axis, and subclinical inflammation[2].

Patients with diabetes who have comorbid depression are more likely to have poor glycemic control, to use healthcare more frequently, to have more complications, and to die[3]. Patients with T2DM who have poor glycemic control are at risk of experiencing more complications from their disease and becoming depressed[9]. An emotional state brought on by having diabetes and the responsibility of self-management, diabetes distress, on its own, raises complications associated with the disease and is associated with worse health outcomes[6].

Depression and anxiety may arise from the psychological burden of diabetes and from the detrimental effects of problems on quality of life[1,5]. T2DM, depression, and anxiety are complexly related to psychosocial factors, including stress, lifestyle, socioeconomic background, and genetic background[1,5].

In individuals with diabetes, both pharmacological and individual psychological depression therapies are effective; however, the current treatment options are limited and have conflicting effects on glycemic outcomes[1,7]. Improving outcomes associated with diabetes appears to be best achieved by collaborative care programs that simultaneously manage both conditions[3]. It is advised to routinely screen diabetic patients for depression and distress, and psychological therapies tailored to diabetes may help depressed patients better manage their condition[6,10].

While research on diabetes and depression is growing, a gap exists in the bibliometric analysis of this specific link. This comprehensive approach to publication patterns can reveal key trends, influential institutions, and impactful research areas[11,12]. Bibliometrics helps us understand where the field stands and what future directions hold. In contrast, systematic reviews summarize existing research[13,14]. Notably, despite numerous studies on research productivity in either diabetes[15-23] or depression[24-31], a bibliometric analysis focusing on the co-occurrence of both conditions is lacking.

Bibliometrics in this context would allow us to identify leading countries, institutions, journals, and research themes. This knowledge will provide a deeper understanding of the current research landscape and guide future investigations. By analyzing publication trends over time, we can predict emerging areas of interest and inform research funding decisions, and program and policy development.

MATERIALS AND METHODS

Data sources

The research draws upon data retrieved from the Scopus database, which offers distinct advantages over other databases [32-35]. First, Scopus provides broad global and regional coverage of scientific journals, conference proceedings, and books, ensuring the inclusion of high-quality data. Second, Scopus furnishes comprehensive author and institution profiles through advanced profiling algorithms and manual curation, ensuring accuracy and completeness. Third, Scopus serves as a vital bibliometric data source for various large-scale analyses in research evaluations, scientific landscape studies, policy assessments, and university rankings. Fourth, Scopus data are accessible for specific academic research endeavors, facilitating investigations into areas such as researcher mobility, network visualizations, and spatial bibliometrics. Finally, Scopus offers individual profiles for authors, institutions, and publications, making it highly user-friendly for practical applications.

Search strategy

A literature search on depression and DM was conducted on April 13, 2024. The Scopus online advanced search function was utilized to identify relevant studies published between January 2004 and December 2023. Synonyms for both DM and depression were included in the search strategy.

Step 1: Several previous systematic reviews and meta-analyses on DM were consulted to identify relevant search terms [36-43]. These terms were subsequently incorporated into the article title. The title included: diabetic, diabetes, type 2 DM, type 1 DM, T2DM, T1DM, glycemic control, glycaemic control, elevated blood glucose, and elevated blood sugar.

Step 2: The first step involved narrowing the publications to only those containing the terms "depression and linked terms" in their titles. To accomplish this, we utilized several previous systematic reviews and meta-analyses on DM[36-43] to generate keywords, which were then used in the Scopus search engine to fulfill the study objective. The "Article Title" field was populated with the following terms: Depress* OR "seasonal affective" OR dysthym* OR "affective disorder" OR "mood disorder*" OR "bipolar disorder".

   To avoid any misinterpretation, we excluded publications related to depressed heart disease or depressed cardiac disease. Consequently, keywords were used instead of conducting a title/abstract search. The title search yielded a minimal number of false-positive results, rendering it a dependable approach[44-46]. Conversely, a title/abstract search may generate numerous false positives, focusing not primarily on DM and depression but on other subjects.

Step 3: The research limits its scope to peer-reviewed scientific journal articles, excluding books, book chapters, retracted articles, and errata.

Bibliometric analysis

The current research environment was mapped using numerical data from the collected articles. This analysis focused on publication trends, the types of documents included, where they were published (journals), and who produced them (countries, institutions, and funding agencies). Additionally, consideration was given to how often the articles were cited by others to measure their influence.

Visualization analysis

The search approach was utilized, and the collected data were exported to a "CSV" file format in Microsoft Excel. VOSviewer 1.6.20 (Leiden University, Leiden, The Netherlands) was used to illustrate the network characteristics among countries and co-occurring terms found in titles and abstracts, providing a visual representation of the results[47,48]. VOSviewer can be used to construct knowledge networks rooted in scientific principles, illustrating the evolution of research fields and facilitating the anticipation of future research trends and international collaborations. The co-occurrence analysis of VOSviewer categorizes terms into distinct clusters, each represented by a unique color. Through a term co-occurrence network, maps were generated to identify the most frequently occurring terms in titles and abstracts, thereby delineating research hotspots as thematic clusters.

Statistical analysis

After being exported from Scopus, the data were imported into Microsoft Word from Microsoft Office Excel. VOSviewer version 1.6.20 and Microsoft Excel 2013 were used to create the figures. Frequencies and percentages were used to present descriptive statistics. The top 10 rankings in each category were taken into consideration after bibliometric analysis was transformed into rankings incorporating countries, cited publications, funding agencies, journals, and institutions. A space was added between ranking numbers when bibliometric analysis produced the same ranking number.

RESULTS

Evolution and growth of publications

Between 2004 and 2023, 3229 publications that met the search criteria were identified. Of these, 2711 (83.96%) were original research articles, 286 (8.86%) reviews, 90 (2.79%) letters to the editor, and 142 (4.40%) were categorized under other classifications, such as notes or editorials. Over the past decade, there has been a notable surge in publications

concerning the correlation between DM and depression. In 2004, there were 45 articles published on this topic, which escalated to 268 by 2023. Particularly since 2010, the rate of publication growth has accelerated significantly, with an average of over 195 articles being published each year (Figure 1). Linear regression analysis confirmed this pattern, revealing a modest positive correlation (R^2 = 0.8823, P < 0.001) between the yearly count of publications and their respective publication years.

Top active countries

Scientific research on DM and depression has involved the participation of 160 countries. The top 10 countries in this research generated a combined total of 2249 publications, constituting 69.65% of all analyzed publications (Table 1). The findings showed that the USA (n = 1015; 31.43%) was the most productive nation, followed by China (n = 325; 10.07%), the UK (n = 236; 7.31%), and Germany (n = 218; 6.75%). Figure 2 illustrates a network visualization map that depicts research collaborations among 24 countries, each contributing a minimum of 30 articles. The size of the nodes and the thickness of the connecting lines signify the extent of cross-country collaboration, with the USA demonstrating the most robust collaboration.

Contributed institutions

Table 2 presents a comprehensive compilation of the top 10 most productive institutions engaged in research on DM and depression from 2004 to 2023. These distinguished academic and research entities collectively made significant contributions, constituting 12.54% of the total number of published articles (n = 405) within this domain. The University of Washington in the USA showcased its prominence as the foremost contributor, generating 87 articles (2.69%). Tilburg University in Netherlands contributed 63 articles (1.95%), while McGill University in Canada produced 54 articles (1.67%). Notably, the USA had four listed institutions, the Netherlands three, Canada two, and the UK one institution among the top-ranked contributors.

Top 10 funding agencies

A total of 1302 publications, representing 40.32% of the retrieved articles, received financial support. Table 3 lists the top 10 funding agencies associated with publications relevant to DM and depression. These agencies contributed 20.04% (n = 647) of the articles. The National Institute of Diabetes and Digestive and Kidney Diseases in the United States (n = 189; 5.85%) emerged as the foremost funding source, followed by the National Institutes of Health in the USA (n = 153; 4.74%) and the National Institute of Mental Health in the USA (n = 125; 3.87%). The USA featured prominently with five funding agencies on the list, while China, Canada, Germany, Australia, and Brazil each had one agency represented in this list.

Active journals

The top 10 most active journals together published 595 articles related to DM and depression, constituting 18.43% of all publications (Table 4). *Diabetes Care* emerged as the primary contributor, publishing the greatest number of papers (n = 139), accounting for 4.30% of the total publications. Similarly, *Diabetic Medicine* secured the second position with 96 papers (2.97%), followed by the *Journal of Affective Disorders* with 67 papers (2.07%) and *Diabetes Research and Clinical Practice* with 65 papers (2.01%).

Highly cited publications

A citation analysis of the retrieved publications revealed an average of 26.74 citations per article. The overall citation impact was further characterized by an h-index of 126 and a total cumulative citation count of 86355. The citation distribution was uneven. While 472 (14.6%) of the articles received no citations, 165 (5.11%) were highly cited, receiving > 100 citations each. The citation counts ranged from 0 to 1179. Table 5 details the top 10 publications associated with DM and depression, which together garnered 7632 citations. These top publications had citation counts ranging from 546 to 1179 [49-58].

Research hotspots and research themes

A visualization map based on frequent terms in the retrieved articles revealed three main research themes (Figure 3). The red cluster highlights a focus on understanding how depression and diabetes cooccur, with a growing interest in prevalence and contributing factors. This finding aligns with the emphasis on epidemiology and risk factors observed in this cluster. The green cluster centers on randomized controlled trials (RCTs) investigating how depression hinders diabetes management. These RCTs tested interventions such as psychotherapy, medication, or lifestyle changes to improve depression symptoms in diabetic patients, aiming for better diabetes control. Finally, the blue cluster explores the interplay of risk factors and mechanisms. This research examined how factors such as self-care decline, shared risk factors (obesity, inactivity), and potential biological and social mechanisms influence the two-way relationship between diabetes and depression.

DISCUSSION

The purpose of this study was to use bibliometric analysis to clarify the trends in research on depression and diabetes from 2004 to 2023. A total of 3229 relevant publications were obtained from Scopus. Subsequently, the bibliometric mapping program VOSviewer was used to show the primary characteristics and general landscape of the field's

Table 1 Top 10 countries publishing research on diabetes mellitus and depression from 2004 to 2023

Ranking	Country	No. of documents	%
1st	USA	1015	31.43
2nd	China	325	10.07
3rd	UK	236	7.31
4th	Germany	218	6.75
5th	Canada	175	5.42
6th	Netherlands	153	4.74
7th	Australia	150	4.65
8th	India	130	4.03
9th	Iran	102	3.16
10th	Brazil	98	3.03

Table 2 Top 10 active institutions in research related to the links between diabetes mellitus and depression from 2004 to 2023

Ranking	Institute	Country	No. of documents	%
1st	University of Washington	USA	87	2.69
2nd	Tilburg University	Netherlands	63	1.95
3rd	Université McGill	Canada	54	1.67
4th	Universiteit van Amsterdam	Netherlands	53	1.64
5th	VA Medical Center	USA	52	1.61
6th	Harvard Medical School	USA	51	1.58
7th	Amsterdam UMC - Vrije Universiteit Amsterdam	Netherlands	50	1.55
8th	King's College London	UK	44	1.36
9th	University of Michigan, Ann Arbor	USA	43	1.33
10th	Institut Universitaire en Santé Mentale Douglas	Canada	42	1.30

Table 3 Top 10 active funding agencies in research related to the links between diabetes mellitus and depression from 2004 to 2023

Ranking	Funding agency	Country	No. of documents	%
1st	National Institute of Diabetes and Digestive and Kidney Diseases	USA	189	5.85
2nd	National Institutes of Health	USA	153	4.74
3rd	National Institute of Mental Health	USA	125	3.87
4th	National Natural Science Foundation of China	China	91	2.82
5th	National Institute on Aging	USA	70	2.17
6th	Canadian Institutes of Health Research	Canada	44	1.36
7th	Bundesministerium für Bildung und Forschung	Germany	31	0.96
7th	National Heart, Lung, and Blood Institute	USA	31	0.96
9th	National Health and Medical Research Council	Australia	27	0.84
10th	Conselho Nacional de Desenvolvimento Científico e Tecnológico	Brazil	26	0.81

Table 4 Top 10 active journals in research related to the links between diabetes mellitus and depression from 2004 to 2023

Ranking	Journal	Frequency	%	IF[1]
1st	*Diabetes Care*	139	4.30	16.2
2nd	*Diabetic Medicine*	96	2.97	3.5
3rd	*Journal of Affective Disorders*	67	2.07	6.6
4th	*Diabetes Research and Clinical Practice*	65	2.01	5.1
5th	*Journal of Diabetes and Its Complications*	47	1.46	3.0
5th	*Plos One*	47	1.46	3.7
7th	*Diabetologia*	35	1.08	8.2
8th	*Journal of Psychosomatic Research*	34	1.05	4.7
9th	*General Hospital Psychiatry*	33	1.02	7.0
10th	*BMC Psychiatry*	32	0.99	4.4

[1]Impact factor based on Clarivate Analytics Journal Citation Reports 2022.

IF: Impact factor.

Table 5 The 10 most cited publications related to the links between diabetes mellitus and depression from 2004 to 2023

Ref.	Title	Year	Source title	Cited by
Mezuk *et al*[54]	Depression and type 2 diabetes over the lifespan: A meta-analysis	2008	*Diabetes Care*	1179
Ali *et al*[57]	The prevalence of co-morbid depression in adults with Type 2 diabetes: A systematic review and meta-analysis	2006	*Diabetic Medicine*	935
Roy and Lloyd [51]	Epidemiology of depression and diabetes: A systematic review	2012	*Journal of Affective Disorders*	809
Lin *et al*[55]	Relationship of depression and diabetes self-care, medication adherence, and preventive care	2004	*Diabetes Care*	795
Knol *et al*[53]	Depression as a risk factor for the onset of type 2 diabetes mellitus. A meta-analysis	2006	*Diabetologia*	751
Gonzalez *et al* [56]	Depression and diabetes treatment nonadherence: A meta-analysis	2008	*Diabetes Care*	743
Golden *et al* [49]	Examining a bidirectional association between depressive symptoms and diabetes	2008	*JAMA*	694
Katon *et al*[58]	The pathways study: A randomized trial of collaborative care in patients with diabetes and depression	2004	*Archives of General Psychiatry*	609
Bixler *et al*[50]	Excessive daytime sleepiness in a general population sample: The role of sleep apnea, age, obesity, diabetes, and depression	2005	*Journal of Clinical Endocrinology and Metabolism*	571
Nouwen *et al* [52]	Type 2 diabetes mellitus as a risk factor for the onset of depression: A systematic review and meta-analysis	2010	*Diabetologia*	546

evolution. The overall publication output during the previous 20 years showed a dynamic trend that peaked in 2023. Additionally, we examined global collaboration, contributions to organizations, financing sources, journal publishing, and citations. Future directions for diabetes and depression research are also considered in the discussion.

The primary causes of the upward trend in the number of articles describing the links between depression and diabetes were as follows. The bidirectional relationship between depression and diabetes is a significant area of research that has contributed to the increasing trend of publications[4,59-62]. Several factors, such as a decrease in self-care, obesity and sedentary lifestyles, which are common risk factors, and the impact of depression on diabetes treatment have been related to depression and diabetes[60,61,63]. The bidirectional relationship between T2DM and depression has prompted interest in understanding the shared molecular processes of hyperglycemia, vascular dysfunction, and low-grade inflammation [8]. Clinical trials with large sample sizes, meta-analyses, and extensive national and cross-country clinical investigations are a few examples of how research methodologies have progressed to support the increase in publications[60]. The conditions of research in this field have been revealed through the use of bibliometric and visual analysis, highlighting popular topics and potential future research directions[64].
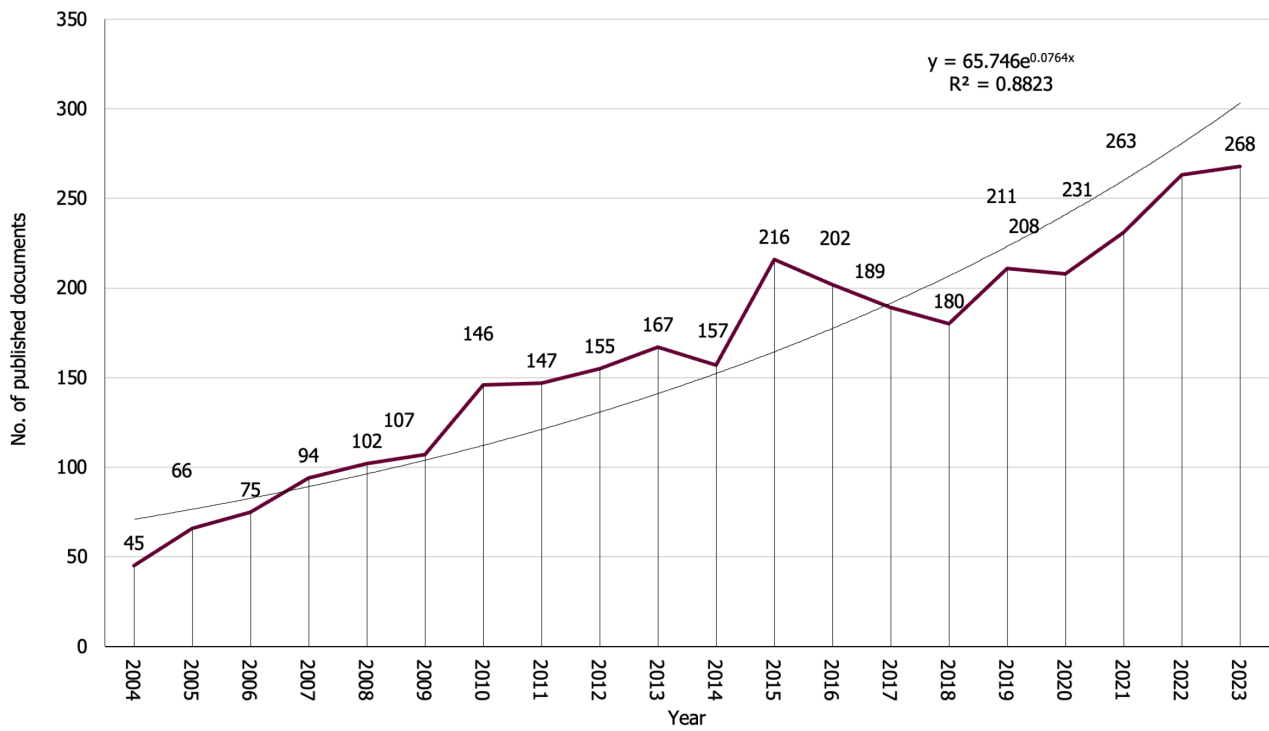
Figure 1 Annual growth of publications on the link between diabetes mellitus and depression.
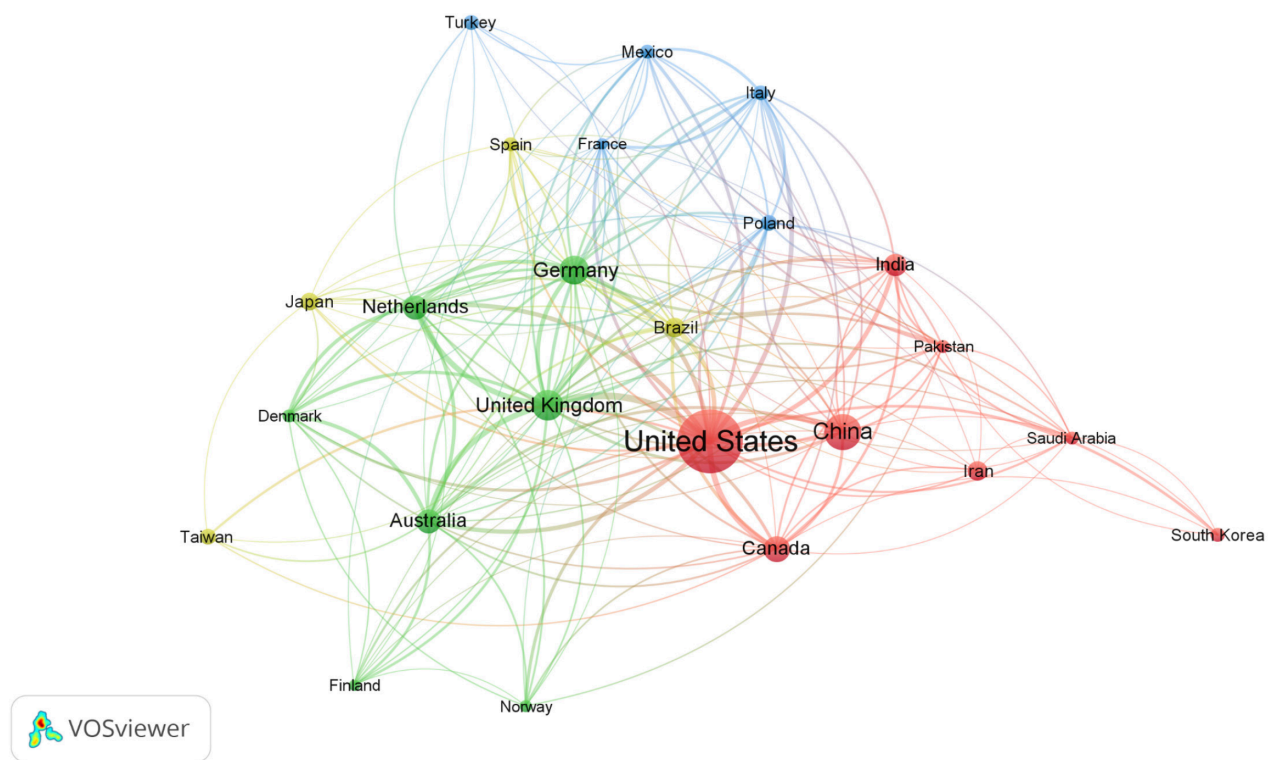
$$y = 65.746e^{0.0764x}$$
$$R^2 = 0.8823$$

Figure 2 Mapping of international research collaborations on diabetes mellitus and depression from 2004 to 2023. Connections are highlighted with a minimum of 30 publications per country. Out of 160 active countries, 24 exceeded this threshold, with the node size reflecting the number of publications. The data were visualized using VOSviewer software version 1.6.20.
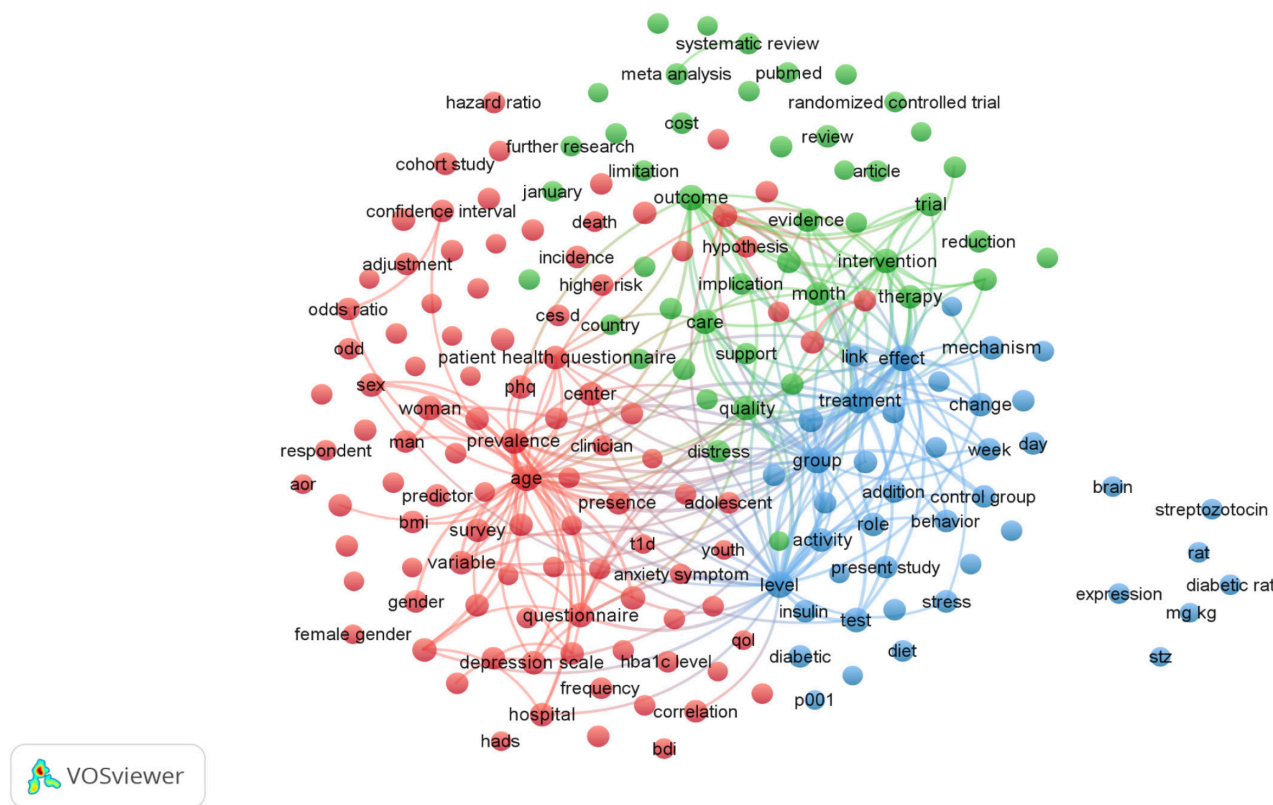
Figure 3 Mapping frequent terms in titles and abstracts to identify research themes in the field of diabetes mellitus and depression. Generated using VOSviewer software version 1.6.20, the map highlights 311 terms identified with a minimum-term occurrence threshold of 50 out of a total of 40 626 terms in the diabetes mellitus and depression domain. The terms are organized into three distinct clusters, each represented by a unique color, and the node size reflects the frequency of term usage across various publications.

We noticed that over time, the countries with the most publications on the links between diabetes and depression were the USA, China, and the UK. The USA had the most citations, field-weighted citation impact, and publications globally concerning endocrinology, diabetes, and metabolism[65]. The USA plays a prominent role in diabetes research and has the most active research facilities and researchers[64]. Diabetes research in China has attracted increasing amounts of attention due to the high prevalence of diabetes worldwide[66,67]. The country has made significant progress in diabetes research, both in terms of volume and publishing effect[68]. Additionally, the UK is significantly adding to the corpus of research in the fields of endocrinology, diabetes, and metabolism[65]. It is one of the countries with the greatest number of publications and citations in this field[65].

Actively studied topics can be identified *via* term clustering and co-occurrence analysis. Three subjects have been thoroughly researched during the last 20 years. The first cluster emphasizes the growing attention given to the prevalence and contributing factors of the coexistence of depression and diabetes. This result supports the focus on epidemiology and risk factors that this cluster identified. RCTs examining how depression affects diabetes management made up the second cluster. These RCTs aimed for better diabetes control and assessed treatments, including psychotherapy, medication, or lifestyle modifications, for minimizing depression symptoms in diabetic patients. The third cluster investigated how risk factors and mechanisms interact. The present study investigated the possible biological and social mechanisms affecting the two-way relationship between diabetes and depression, as well as shared risk factors (obesity and inactivity).

The co-occurrence of depression and diabetes is an important issue, and there is increasing interest in their prevalence and contributing risk factors. There is evidence pointing to common biological processes between T2D and depression, and depression is twice as common in those with this disease as in the general public[8,60]. In those with T2DM, comorbid conditions, dysglycemia, gender, anxiety, educational level, socioeconomic status, and pharmaceutical treatments are among the factors that contribute to the onset of cognitive impairments, depression, and psychosocial problems[69]. Lifestyle decisions and social factors are important co-occurrence predictors, as are behavioral indicators, life outcomes, and demographic characteristics[70,71].

Another area attracting much interest is RCTs that look at how depression affects diabetes management. Cognitive behavioral therapy (CBT) helps people with T2DM better manage their depressive symptoms and diabetes[72-78]. CBT has been shown to improve glycemic control, quality of life, and self-care behavior in people with T2DM and to greatly decrease depressive symptoms and diabetes-related distress[73-75,77,78]. In adults with type 1 DM (T1DM) or T2DM, CBT-based therapies have been shown to improve glycemic control and depression symptoms in numerous RCTs[74,76-78]. Treatments such as CBT have been demonstrated in RCTs to lower both diabetes control and depressive symptoms, confirming the reciprocal relationship between depression and diabetes[72-78]. Researchers have investigated the longit-

udinal relationships between depression and diabetes regimen distress (RD) through RCTs. The results show a covarying link in which changes in RD and depression symptoms occur together over time[79]. RCTs have shown that CBT improves depressive symptoms, anxiety, stress associated with diabetes, glycemic control, quality of life, and self-care behavior in patients with T1DM or T2DM, advancing our knowledge of the possible advantages of CBT in diabetes[75-78]. We should exercise caution when interpreting RCT findings due to the heterogeneity in CBT delivery methods, follow-up duration, outcomes, and long-term effects[73,75]. Considering the great variety of included studies and other limitations, more studies with a large number of studies are necessary to validate the findings[74]. The feasibility and efficacy of collaborative care models for depression in diabetes patients in low- and middle-income countries are yet unknown, which emphasizes the need for ethical issues while carrying out RCTs in various geographic locations[80]. A multicenter single-blind RCT emphasized the need for ethical issues when carrying out RCTs on comorbid depression and diabetes in diverse populations[80]. Its goal is to determine the efficacy of fluoxetine and mindfulness in primary care settings.

Researchers are currently investigating potential biological and social factors that influence the inverse relationship between diabetes and depression. Numerous studies have demonstrated a bidirectional relationship between diabetes and depression, influenced by both biological and social factors. Biological processes such as hyperglycemia, vascular dysfunction, and inflammation are linked to T2D and depression, with depression being twice as common in T2D patients as in the general population[8,81]. It is possible that inflammation, sleep problems, a sedentary lifestyle, poor eating habits, and activation of the HPA axis are at the root of both disorders[81]. The somatic-affective aspect of depression primarily links diabetes and depression, and the use of somatic health care independently links both disorders [82,83]. Common biological and behavioral processes, such as inflammation, autonomic dysfunction, sleep disturbance, an inactive lifestyle, poor eating habits, environmental and cultural risk factors, and activation of the HPA axis, are linked to depression and diabetes[7].

Future research directions for exploring the links between diabetes and depression are likely to focus on mechanistic studies to understand the molecular mechanisms underlying the bidirectional relationship[59]. To determine whether treating patients with comorbid conditions will enhance their quality of life and medical outcomes, lengthy, outcome-oriented RCTs are required[60]. Future research should focus on identifying promising preventive interventions and creating creative, cost-effective interventions to prevent depression, T2DM, and cardiovascular diseases[84].

This innovative study established the first baseline data on research activities investigating the link between DM and depression. However, some limitations are important to consider. First, relying solely on Scopus for document retrieval may have excluded relevant publications from local, unindexed journals. While Scopus is a vast database, numerous health-related publications, particularly from non-English-speaking countries, might not be indexed. This can introduce bias toward countries with well-represented journals or English-language publications, potentially underestimating overall research productivity. Second, the analysis was restricted to publications retrieved from Scopus, potentially limiting its comprehensiveness. However, Scopus remains the most accessible database for analyzing research activity and identifying hotspots on specific topics. Finally, the search terms were confined to "DM and depression" and related terms within titles only. This approach might have missed relevant publications that used these terms as keywords or within the body of the text.

CONCLUSION

This study examined the development, patterns, and areas of inquiry related to depression in diabetes patients. An examination of 3229 publications released between 2004 and 2023 revealed a significant increase in research efforts during the previous 20 years, highlighting the significance of treating this common psychological disorder in individuals with diabetes. Due to their substantial contributions to diabetes research and the significant influence of their publications in the field, the USA, China, and the UK emerged as the top three countries with the highest volume of publications regarding the relationship between depression and diabetes. The analysis delineated three principal themes in research on depression and diabetes: (1) Exploring the elevated prevalence and etiology of this comorbidity; (2) focusing on interventions, particularly RCTs, aimed at enhancing diabetes management among individuals with depression; and (3) investigating the involved risk factors and biological mechanisms underlying this bidirectional relationship. This research sheds light on the growing recognition of the influence of depression on treatment adherence and health outcomes within this demographic group. This study has contributed to advancing knowledge in this field by charting a course for future research on depression treatments for individuals with diabetes.

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FOOTNOTES

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