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Editorial Board Member of *World Journal of Psychiatry*, Peer Reviewer, Vijaya Anand Arumugam, PhD, Professor, Department of Human Genetics and Molecular Biology, Bharathiar University, Coimbatore 641046, Tamil Nadu, India. avahgmb@buc.edu.in

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Current global research landscape on COVID-19 and depressive disorders: Bibliometric and visualization analysis

Samah W Al-Jabi

ORCID number: Samah W Al-Jabi
0000-0002-4414-9427.

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Samah W Al-Jabi, Department of Clinical and Community Pharmacy, College of Medicine and Health Sciences, An-Najah National University, Nablus 44839, West Bank, Palestine

Corresponding author: Samah W Al-Jabi, PhD, Associate Professor, Department of Clinical and Community Pharmacy, College of Medicine and Health Sciences, An-Najah National University, Academic Street, Nablus 44839, West Bank, Palestine. samahjabi@yahoo.com

Abstract

BACKGROUND

Coronavirus disease 2019 (COVID-19) has affected daily life globally dramatically over the last year. The impact of the COVID-19 epidemic on mental health is expected to be immense and likely to be long-lasting, raising a range of global problems that need to be addressed accordingly.

AIM

To analyze the Scopus-based depression research and COVID-19, explain the advancement of research nowadays, and comment on the possible hotspots of depression research and COVID-19 to obtain a more global perspective.

METHODS

In this report, bibliometric analysis and visualization are used to explain COVID-19's global research status on depression and provide researchers with a guide to identify future research directions. Relevant studies on depression and COVID-19 were retrieved from the Scopus database. Visualization maps were produced using the VOSviewer software, including research collaboration.

RESULTS

At the time of data collection (November 18, 2020), 77217 documents were released by Scopus to COVID-19 in all areas of research. By limiting the search to depression and COVID-19 (January 2020 up until November 18, 2020), there are 1274 published articles on depression and COVID-19 in the Scopus. The great majority of which are original articles ($n = 1049$, 82.34%), followed by 118 review articles (9.26%), 66 letters (5.18%). The United States had the highest number of publications at 282 (22.14%), followed by China (19.07%) at 243 and Italy at 121 (9.5%). The major two clusters are signified by mental health outcomes among the general population and mental health outcomes among health care workers.

CONCLUSION

The evidence from this study found that many articles focused on mental health

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outcomes among the general population and health care workers. With adequate psychological support offered by the government or community agencies, mental health in various communities should be put within the local and global public health agenda. This changing situation involves the scientific community's collaborative efforts to contribute to population monitoring during quarantine and COVID-19 outbreaks and to examine the short- and long-term adverse effects on psychological well-being.

Key Words: Depression; COVID-19; Bibliometric; Scopus; Psychological distress

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Core Tip: This is the first study to describe and visualize scientific research on coronavirus disease 2019 (COVID-19) and its effect on depression. Therefore, the current study would enable professionals, psychiatrists, and experts from other fields of medicine, in addition to local authorities and community health staff, to obtain an empirical view of the evolution of this topic because current knowledge on the main psychological distress effects of COVID-19 is scarce and little is known in the development of research on this topic.

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INTRODUCTION

In December 2019, new cases of pneumonia of unknown causes were detected in Wuhan city. In Jan 2020, Chinese authors identified a novel coronavirus, which was later known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or coronavirus disease 2019 (COVID-19). After that incidence, COVID-19 was spread in several places in the world, then the World Health Organization considered the SARS-CoV-2 virus as a pandemic disease on March 11, 2020[1]. Like other coronaviruses, COVID-19 is transmitted by respiratory droplets or contact routes. Most people affected by this novel virus experienced mild to moderate symptoms such as dry cough, fever, sputum production, shortness of breathing, headache, chills, sore throat, joint and muscle itches, etc. Symptoms become serious and severe in elderly patients and in people who have chronic diseases[2]. As of November 21, 2020, more than 56.9 million COVID-19 cases and more than 1.3 million death cases from the disease have been reported worldwide[3].

A condition of socio-economic crisis and deep psychological trauma rapidly emerged worldwide as a result of the advent of the COVID-19 epidemic[4]. The current COVID-19 pandemic may have psychological implications for many reasons [5]. Some of these reasons, including physical distance, fear of infection, inadequate information, stigma, quarantine measures, contribute to the pandemic, and government response[6]. As a result of such experiences, such as social isolation, widespread anxiety; unemployment, and financial difficulties; and stress in health-care workers, both the infected and noninfected population may be susceptible[5]. These major stressors have anticipated that lead to an elevated risk of psychopathology, such as depression or anxiety[7,8]. A recent meta-analysis study was designed to review community-based depression studies performed during the COVID-19 epidemic and found that depression rates may be seven times higher in the general population in the COVID-19 outbreak[9]. Another United States study found that the prevalence of depressive symptoms among adults during the COVID-19 pandemic was more than three times higher than the most recent population-based mental health estimates in the United States[10]. In China, 50.4% of health care workers who were exposed to COVID-19 patients reported symptoms of depression[11].

Several systematic reviews or meta-analysis studies show the increasing number of publications addressing the effect of COVID-19 on mental health published from

numerous countries during the outbreak[5,8,12-16]. To date, there is not a bibliometric study assessing depression research and COVID-19 at the global level. In several studies in virology[17-22], more specifically on the COVID-19 outbreak[23-29], bibliometric analysis means evaluating the research output of authors, countries, journals, and institutions[30,31]. Capturing the relevant literature is essential and promotes the comprehension of a particular focus area's characteristics and patterns. It can also rapidly and reliably present the most relevant study, which provides the theoretical foundation for further research. Therefore, we performed the bibliometric analysis to analyze the Scopus-based depression research and COVID-19, explain the advancement of research nowadays, and comment on the possible hotspots of depression research and COVID-19 to obtain a more global perspective. Because current knowledge on the key psychological distress impacts of COVID-19 is scarce and little is known in the production of reports on this subject, a descriptive and visual quantification of scientific research on COVID-19 and its impact on depression will allow information professionals, psychiatrists, and experts from other fields of medicine, in addition to local authorities and community health staff, to obtain an empirical view of evolution, current scope, and depression.

MATERIALS AND METHODS

Data source

Scopus is known for bibliometric research as one of the most appropriate online databases. In the Scopus online database, we pick the 'Advanced search' feature and insert keywords to obtain all publications related to COVID-19 and depression literature between January 1, 2020, and November 18, 2020.

Search strategies

To avoid possible bias produced by continuous database update, the retrieval and export of publications should be created within one day (November 18, 2020). The retrieval and export of documents should be done within one day to prevent any bias in data collection that might be caused by constant updating of the database. This research's retrieval method was as follows: Step 1: The terms related to COVID-19 entered into the Scopus engine were chosen from the related studies on COVID-19 to achieve the goals of this study. All following "terms" were entered as "Article Title/Abstract/Keywords": "COVID 19" OR "coronavirus 2019" OR "2019 novel coronavirus" OR "2019-novel CoV" OR "coronavirus disease 2019" OR "2019 ncov" OR COVID19 OR "COVID 2019" OR "corona virus 2019" nCoV2019 OR "nCoV-2019" OR "nCoV 2019" OR COVID-19 OR 2019-ncov OR "SARS-CoV-2" OR "Severe acute respiratory syndrome coronavirus 2". Step 2: We then restricted our collected publications in step 1 to all those included in their title or/And Abstract depression and related terms. The terms related to depression entered into the Scopus engine were chosen from previous related studies on depression[32,33]. All the following "terms" were entered as "Article Title/Abstract": depression OR depressive OR "seasonal affective" OR "dysthymia" OR "affective disorder" OR "mood disorder" OR "bipolar disorder". Step 3: We omitted publications that had been indexed as an erratum. No language restriction was imposed on the literature search.

Bibliometric analysis

The following bibliometric parameters were assessed: Publication count, authorship, citation count, institution, country/region, journal, document type, and *h*-index.

Visualise analysis

To evaluate the collaborative relationships between countries/regions, VOSviewer 1.6.15 software was used to construct network visualization maps[34]. In addition, VOSviewer will identify terms with high frequencies of co-occurrence into many clusters and color them simultaneously. The co-occurrence analysis of terms is a significant method to determine the hotspots related to COVID-19 and depression research. By counting the number of times that terms frequently appear in both titles and abstracts of the selected publications, the principle is to determine the value of terms. The minimum number of recurring terms is 20 by setting the counting method to binary counting.

RESULTS

At the time of data collection, 77217 documents were released by Scopus to COVID-19 in all areas of research. By limiting the search to depression and COVID-19 (January 2020 up until November 18, 2020), there are 1274 published articles on depression and COVID-19 in the Scopus. The great majority of which are original articles ($n = 1049$, 82.34%), followed by 118 review articles (9.26%), 66 letters (5.18%), and 41 (3.22%) were others.

Publications analyzed in this study were authored by researchers from 95 countries. Of the overall publications, the top 10 countries accounted for 88.93% (1133 documents) (Table 1). The United States had the highest number of research outputs at 282 (22.14%), followed by China (19.07%) at 243 and Italy at 121 (9.5%). International research collaboration among active countries was assessed in countries with a minimum contribution of 10 publications (Figure 1). The United States, followed by China and Italy are at the heart of collaboration and have the strongest alliance partnerships in research with other countries.

Table 2 shows the ten institutions that have contributed the most in the field of depression and COVID-19. Among them, the Huazhong University of Science and Technology in China published the most documents (29 publications). This was followed by Tongji Medical College from China (28 publications), the University of Toronto from Canada (23 publications), and Università Degli Studi di Roma La Sapienza from Italy (23 publications).

Table 3 illustrates the top 10 most popular journals for publishing articles linking COVID-19 and depression. The International Journal of Environmental Research and Public Health had the largest number of published articles (61 publications, 4.79% of all documents), followed by Psychiatry Research (48, 3.77%), Journal of Affective Disorders (46, 3.61%), and Frontiers in Psychiatry (33, 2.59%).

The ten most cited publications have been listed in Table 4 along with the total number of citations per document. There were 8206 citations for 569 documents, with 16 documents having a minimum of 100 citations. The h-index was 35, and, on average, each paper earned 6.44 citations. The citation counts for the top 10 most cited articles in the range of 151 to 887[11,15,35-42].

We analyzed all included 1274 publications using the VOSviewer. In Figure 2, among the 22839 terms, only 399 terms (defined as terms that occurred more than 20 times appeared in titles and abstracts in all publications) were divided into 3 clusters. The major two clusters are represented by two colored clusters. Cluster number 1 (red color) contained terms such as "economy", "isolation", "home order", "home", "physical activity", "daily life", "lockdown", "citizens' wellbeing", "child", or "social distancing" linked to mental health outcomes in the general population. While Cluster number 2 (green color) contained terms such as "health care worker", "medical staff", "depression scale", "insomnia severity index", "severe depression", or "depression symptoms" linked to mental health outcomes amongst health care workers.

DISCUSSION

This research is the first bibliometric analysis of depression-related publications following the pandemic of COVID-19. The appropriate bibliometric indicators for analyzing 1274 relevant research works have been followed in this study. Our rapid review of available studies demonstrated that the COVID-19 pandemic had produced a global emergency in less than a couple of months. This infectious virus does not only pose concerns about public health in general but also causes several psychological and behavioral diseases.

High-income countries, including the United States, China, Italy, United Kingdom, and Canada, are the leaders in the world in depression-related publications following the COVID-19 pandemic, which contribute to more than 65% of the total publications. The high prevalence of COVID-19 in those experiencing the first outbreak is a possible explanation for these results[43-49]. Most studies were carried out within populations from highly educated, high-income, and Western nations in particular. These settings can make successful mental health treatment much more imperative and give more attention to non-Western environments, which characterize by the higher population density[50]. There is still limited information available on the COVID-19 pandemic's mental health impact in low- and middle-income countries[51]. The prevalence of depression symptoms in low- and middle-income countries is close to that recorded during the pandemic in most high-income countries[51]. People with low socioeco-

Table 1 List of the top 10 countries with the highest coronavirus disease 2019 studies related to depression between January 1, 2020, and November 18, 2020

Ranking	Country	Number of documents	%
1 st	United States	282	22.14
2 nd	China	243	19.07
3 rd	Italy	121	9.50
4 th	United Kingdom	103	8.08
5 th	Canada	82	6.44
6 th	India	81	6.36
7 th	Spain	76	5.97
8 th	Australia	56	4.40
9 th	Brazil	45	3.53
10 th	Germany	44	3.45

Table 2 List of the top 10 institutions with the highest coronavirus disease 2019 studies related to depression between January 1, 2020, and November 18, 2020

Ranking	Institution	Country	n	%
1 st	Huazhong University of Science and Technology	China	29	2.28
2 nd	Tongji Medical College	China	28	2.20
3 rd	University of Toronto	Canada	23	1.81
3 rd	Università degli Studi di Roma La Sapienza	Italy	23	1.81
5 th	Central South University	China	21	1.65
5 th	Mental Health Center	China	21	1.65
7 th	Harvard Medical School	United States	16	1.26
7 th	King's College London	United Kingdom	16	1.26
7 th	Fondazione Policlinico Universitario Agostino Gemelli	Italy	16	1.26
10 th	National University of Singapore	Singapore	15	1.18
10 th	Renmin Hospital of Wuhan University	China	15	1.18

conomic status are also at a higher risk of contracting COVID-19 and its complications, which include death as well as mental health concerns[52,53]. Notably, clinically relevant post-traumatic stress disorder symptoms were identified in about 30% of COVID-19-infected patients who required hospitalization at the early stage of infection or months later[5,54]. Immunological mechanisms and inflammatory biomarkers, fear of disease, anxiety about the future, stigma, traumatic memories of serious illness, and social alienation encountered by patients during the COVID-19 are all important psychological stressors that may interact in determining psychopathological outcome [55,56].

Our study showed that the United States was the most prolific country in research output in the depression-related COVID-19 pandemic, leading to more than 20 percent of the topic's publications. Perhaps this United States research production is because of the large size of the economic power or population. In addition, most of the social networking sites in the United States were developed and built. These results are close to earlier bibliometric studies in various fields[57-61], primarily because the United States has the highest activity in the worldwide development of scientific research and international cooperation networks[62,63].

This study has found that, generally, many articles focused on mental health outcomes among the general population and health care workers. A clear theme to arise from the findings is that the most widely cited depression-related publications following the COVID-19 pandemic illustrated a variety of subtopics as well as hot research topics. The most cited article was by Wang *et al*[41] and published in the

Table 3 List of the top 10 journals with the highest number of coronavirus disease 2019 studies related to depression between January 1, 2020, and November 18, 2020

Ranking	Journal	n	%	IF
1 st	<i>International Journal of Environmental Research and Public Health</i>	61	4.79	2.849
2 nd	<i>Psychiatry Research</i>	48	3.77	2.118
3 rd	<i>Journal of Affective Disorder</i>	46	3.61	3.892
4 th	<i>Frontiers in Psychiatry</i>	33	2.59	2.849
5 th	<i>Frontiers in Psychology</i>	29	2.28	2.067
6 th	<i>PLoS One</i>	27	2.12	2.740
7 th	<i>Brain Behavior and Immunity</i>	20	1.57	6.633
7 th	<i>International Journal of Social Psychiatry</i>	20	1.57	1.439
9 th	<i>American Journal of Geriatric Psychiatry</i>	15	1.18	3.393
9 th	<i>Journal of Medical Internet Research</i>	15	1.18	5.034

Impact factor is the impact factor for 2019 journals listed in Clarivate Analytics, Incites Journal Citation Reports. IF: Impact factor.

Table 4 List of the top 10 cited articles for coronavirus disease 2019 studies related to depression between January 1, 2020, and November 18, 2020

Ranking	Ref.	Source title	Cited by
1 st	Wang <i>et al</i> [41], 2020	<i>International Journal of Environmental Research and Public Health</i>	887
2 nd	Lai <i>et al</i> [11], 2020	<i>JAMA network open</i>	719
3 rd	Qiu <i>et al</i> [39], 2020	<i>General Psychiatry</i>	390
4 th	Rajkumar[15], 20200	<i>Asian Journal of Psychiatry</i>	264
5 th	Wang <i>et al</i> [42], 20200	<i>Brain, Behavior, and Immunity</i>	213
6 th	Ahorsu <i>et al</i> [35], 20200	<i>International Journal of Mental Health and Addiction</i>	206
7 th	Torales <i>et al</i> [40], 20200	<i>International Journal of Social Psychiatry</i>	200
8 th	Huang and Zhao[37], 20200	<i>Psychiatry Research</i>	197
9 th	Gao <i>et al</i> [36], 20200	<i>PLoS One</i>	152
10 th	Li <i>et al</i> [38], 20200	<i>International Journal of Environmental Research and Public Health</i>	151

International Journal of Environmental Research and Public Health, which was cited 887 times. This China study demonstrated that over fifty percent of the respondents rated their psychological effects as mild to extreme during the initial phase of the COVID-19 outbreak. A greater psychological effect of the outbreak and higher levels of depression were correlated with female gender, student, and particular physical symptoms. The higher negative psychological impact was associated with longer quarantine periods, fear of infection, insufficient knowledge, stigma, or financial loss. It is expected that these significant stressors will contribute to an increased risk of depression[9].

The second most cited article was by Lai *et al*[11] and published in *JAMA network open*, was cited 719 times. This is also a Chinese study that found that in hospitals with COVID-19 patients, health care staff reacting to the spread of COVID-19 recorded high rates of depression symptoms and distress. Faced with this critical situation; health care staff who are at the front-line and are actively involved in the diagnosis, recovery, and care of COVID-19 patients are at risk of experiencing psychiatric depression and other signs of mental health. The ever-increasing number of COVID-19 cases, disproportionate workload, few personal security services, extensive media attention, lack of specific medications, and feelings of insufficient help can all add to these stressors, which leads to the mental burden of health professionals[11,64-66]. Therefore, mental health issues must also be incorporated into COVID-19 management, including psychiatric symptoms (*e.g.*, depression or anxiety) monitoring, and social requirements

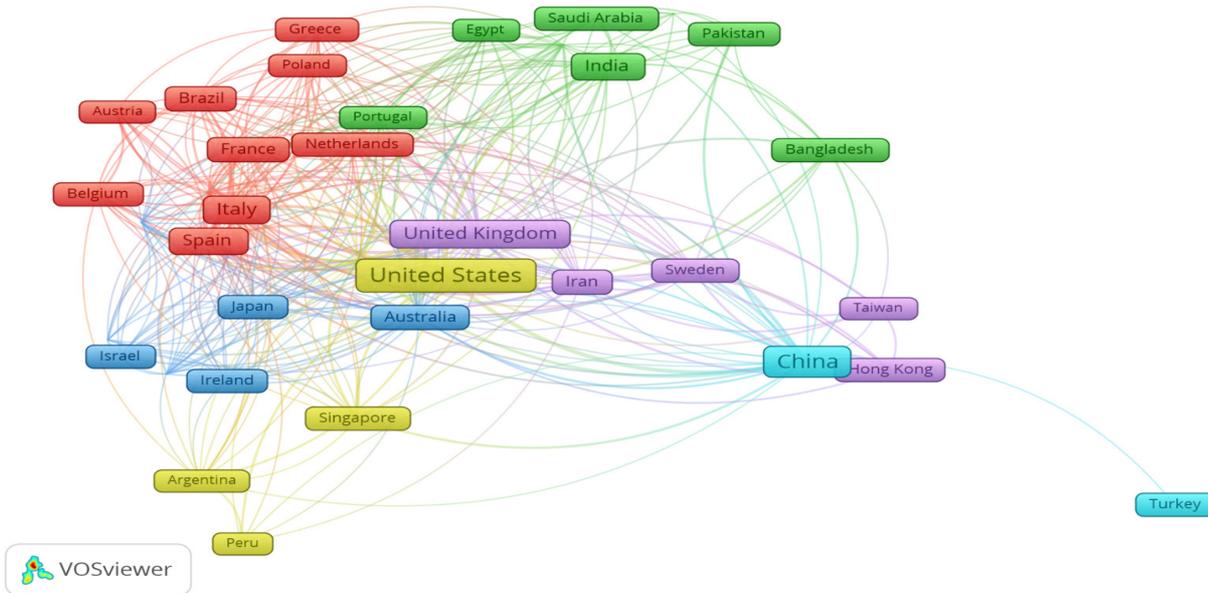


Figure 1 Network visualization map for international collaboration on for publishing articles linking coronavirus disease 2019 and depression.

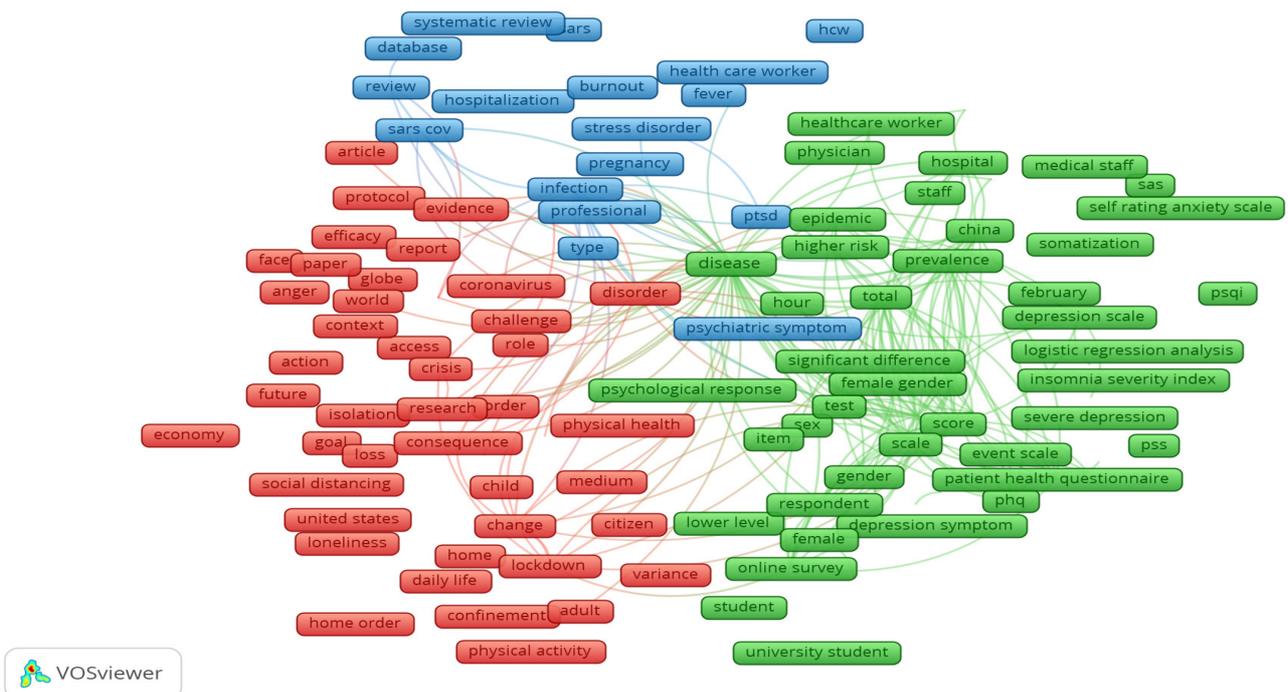


Figure 2 Network visualization map of the most common terms in the retrieved literature's titles/abstracts that refer to coronavirus disease 2019 and depression. The three clusters represent the major research themes in the retrieved literature.

within the general population[8,67].

This bibliometric review represents the first concise overview of global depression-related publications following the COVID-19 pandemic. It illustrates the advantages of bibliometric analysis in a structured manner for assessing research productivity. There were some limitations that we should explain. First, the publications are only derived from Scopus. Second, due to the online database's continuous updating, there is a certain deviation between our bibliometric research outcomes and the actual findings. Regarding this issue, new studies are still being published, and the number of new studies is expected to appear during the upcoming months.

CONCLUSION

During the initial stage of the COVID-19 epidemic, this bibliometric analysis can enable researchers to discover the current status and emerging trends in depression-related publications. High-income countries which include the United States, China, Italy, United Kingdom, and Canada, are the leaders in the world in depression-related publications following the pandemic of COVID-19, contributing to the majority of the total published literature. The United States had the most collaboration with other countries worldwide. The research has also shown that a large number of articles focused on mental health outcomes among the general population and health care workers. With adequate psychological support offered by the government or community agencies, mental health in various communities should be put within the local and global public health agenda. This changing situation involves the scientific community's collaborative efforts to pay attention to population monitoring during quarantine and COVID-19 outbreaks and examine the short- and long-term adverse effects on psychological well-being.

ARTICLE HIGHLIGHTS

Research background

Over the last year, coronavirus disease 2019 (COVID-19) has had a major impact on daily life around the world. The COVID-19 epidemic is predicted to have a massive and long-lasting effect on mental health, resulting in a range of global issues that must be tackled.

Research motivation

To date, there is not a bibliometric study assessing depression research and COVID-19 at the global level. Capturing relevant literature is important for understanding the characteristics and trends of a specific focus area. It can also rapidly and reliably present the most relevant studies regarding depression research and COVID-19, which provides the theoretical foundation for further research.

Research objectives

This bibliometric analysis was conducted to examine Scopus-based depression research and COVID-19, clarify current research progress, and illustrate the potential hotspots in depression research and COVID-19 in order to gain a more global perspective.

Research methods

The Scopus database was used to find relevant research on depression and COVID-19. The VOSviewer program was used to build visualization maps, which included research collaboration.

Research results

During the initial stage of the COVID-19 epidemic, this bibliometric analysis can enable researchers to discover the current status and emerging trends in depression-related publications. High-income countries which include the United States, China, Italy, United Kingdom, and Canada, are the leaders in the world in depression-related publications following the pandemic of COVID-19, contributing to the majority of the total published literature. The United States had the most collaboration with other countries worldwide. The research has also shown that a large number of articles focused on mental health outcomes among the general population and health care workers.

Research conclusions

According to the findings of this report, several articles focused on mental health outcomes in the general population and among health-care staff. Mental health in diverse populations should be included in the local and global public health agenda with sufficient psychological support provided by the government or community organizations.

Research perspectives

Because current knowledge on the key psychological distress impacts of COVID-19 is scarce and little is known in the production of reports on this subject, a descriptive and visual quantification of scientific research on COVID-19 and its impact on depression will allow information professionals, psychiatrists, and experts from other fields of medicine, in addition to local authorities and community health staff, to obtain an empirical view of evolution, current scope, and depression.

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