

**RESEARCH  
ARTICLE**

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## **Bibliometric Analysis of Studies on Mental Health Status of Health Workers During Covid 19 Outbreak: Inputs for Health Policy and Human Resources Management**

### **ABSTRACT**

**Objective:** The purpose of this research is to reveal the mental problems experienced by healthcare professionals during the Covid 19 Pandemic. It is also intended to provide inputs for health policies and human resource management.

**Methods:** The research was carried out with the bibliometric analysis method. Within the scope of the research, 4043 articles published in the Web of Science Core Collection database between 2020 and 2021 were examined.

**Results:** It was found that the articles examined within the scope of the research were published in 1329 sources (journals, books, etc.), the citation rate per article was 9.97, the number of articles with a single author was 200, and the ratio of articles with a single author to all articles was 0.049. In addition, as a result of the research, the most important effects of the Covid 19 Pandemic on the mental health of healthcare workers; anxiety, depression, stress, insomnia and burnout.

**Conclusions:** In order to reduce or eliminate the negative mental problems experienced by health workers, providing expert support in certain matters such as increasing the psychological resilience of health workers, improving working conditions, improving communication with each other and managers, coping with stress, managing anxiety, etc. is required. In addition, carrying out activities that support morale and motivation will help reduce the negative effects experienced. Improving the mental health of health workers will have a positive effect on the health system and will ensure the correct implementation of human resources policies.

**Keywords:** COVID-19, Pandemic, Health Professional, Mental Health, Health Policies, Human Resources Management, Bibliometric Analysis.

## **Covid 19 Salgını Sırasında Sağlık Çalışanlarının Mental Sağlık Durumlarına İlişkin Çalışmaların Bibliyometrik Analizi: Sağlık Politikası ve İnsan Kaynakları Yönetimi İçin Girdiler**

### **ÖZET**

**Amaç:** Bu araştırmanın amacı, sağlık çalışanlarının Covid 19 Pandemisi sırasında yaşadıkları mental sorunların ortaya konulmasıdır. Ayrıca sağlık politikaları ve insan kaynakları yönetimi için girdiler sağlanması amaçlanmaktadır.

**Gereç ve Yöntem:** Araştırma bibliyometrik analiz yöntemi ile gerçekleştirilmiştir. Araştırma kapsamında Web of Science Core Collection veri tabanında 2020 ile 2021 yıllarında yayınlanan 4043 makale incelenmiştir.

**Bulgular:** Araştırma kapsamında incelenen makalelerin 1329 kaynaktan yayınlandığı (dergi, kitap vb.), makale başına atıf oranının 9,97 olduğu, tek yazarlı makale sayısının 200, tek yazarlı makalelerin tüm makalelere oranı 0.049 olduğu bulunmuştur. Ayrıca araştırma sonucunda, Covid 19 Pandemisinin sağlık çalışanlarının mental sağlığına olan en önemli etkilerinin; *kaygı, depresyon, stres, uykusuzluk, tükenmişlik* olduğu belirlenmiştir.

**Sonuç:** Sağlık çalışanlarının yaşadığı olumsuz mental sorunların azaltılması ya da ortadan kaldırılması için sağlık çalışanlarının psikolojik dayanıklılıklarının artırılması, çalışma koşullarının iyileştirilmesi, birbirleri ve yöneticilerle olan iletişimlerinin geliştirilmesi, stresle başa çıkma, kaygıyı yönetme vb. konularında uzman desteğinin sağlanması gerekmektedir. Ayrıca moral ve motivasyonu destekleyici etkinliklerin yapılması yaşanan olumsuz etkilerin azaltılmasına fayda sağlayacaktır. Sağlık çalışanlarının mental sağlığının iyileştirilmesi sağlık sisteminin üzerinde olumlu etki yaratarak insan kaynakları politikalarının doğru bir şekilde uygulanmasını sağlayacaktır.

**Anahtar Kelimeler:** COVID-19, Pandemi, Sağlık Çalışanı, Ruh Sağlığı, Sağlık Politikaları, İnsan Kaynakları Yönetimi, Bibliyometrik Analiz.

## INTRODUCTION

The Covid-19 virus, which spread all over the world shortly after it started in China, had significant effects on healthcare workers. As healthcare professionals take an active role in stopping the spread of the pandemic and in the recovery of patients, they had to make changes in both their working conditions and their social lives. Since health systems were caught unprepared for the Pandemic, health workers should be prepared to use gloves, masks, glasses, aprons, etc., which they will use in the fight against the virus, especially in the early stages of the Pandemic. They had difficulties in obtaining materials, which caused their stress levels to increase. The fact that health workers could not go home due to the fear of infecting their families and friends during the fight against the pandemic caused significant changes in their living conditions and consequently increased stress levels. However, the stigma of health workers with the fear of infecting the virus by the society has been quite devastating on them.

In this study, which was carried out in order to determine the effects of the Covid 19 Pandemic on the mental health of healthcare workers and to make implications for health policies and human resources management, a literature review was first made. Afterwards, information about the method of the research was given. In the Findings section, the findings obtained from the research are explained. Finally, the research findings were evaluated in the conclusion part.

## LITERATURE REVIEW

**Covid 19 Pandemic:** COVID-19 was first detected in Wuhan, China. On 31 December 2019, China informed the World Health Organization (WHO) about pneumonia cases of unknown cause and rapid spread. It was defined by WHO on 7 January 2020 as a new type of "CoV" that has not been detected in humans before. COVID-19 was first detected outside of China on 13 January 2020 in Thailand. Afterward, many countries, such as Japan and South Korea, reported cases to WHO. The first COVID-19 case in Turkey was detected on March 11, 2020 (1).

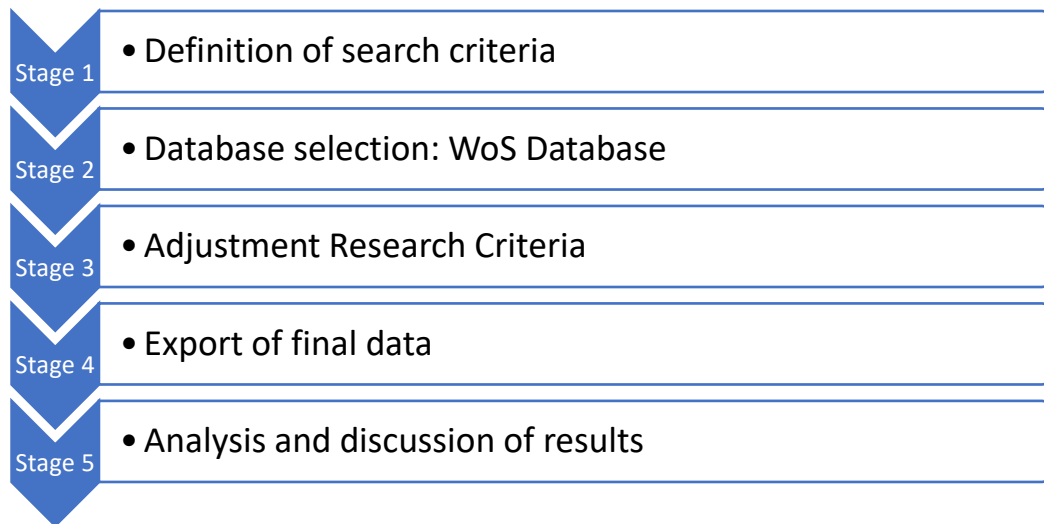
After the COVID-19 Epidemic began to spread all over the world, countries had to take many measures such as social distance, quarantine and isolation to prevent further spread. Many problems such as changes in the living conditions of individuals, the restriction of their freedom with calls to stay at home, not being able to meet with their loved ones, uncertainties and unknowns have caused an increase in the anxiety levels of individuals (2).

**Effects of Pandemic on Mental Health of Healthcare Professionals:** In the pandemic process, which affects the society socioeconomically and spiritually, not only the sick people/society but also the healthcare professionals are affected physically and psychosocially by the process, as they are members of the society and work at the front line under high risk (3). Health workers are the ones who have the closest contact with infected people in epidemics. Health workers who play an active role in the fight against the epidemic have a high risk of disease transmission. For this reason, the mental health of health personnel working in intensive care and emergency services is severely affected (4).

When the literature on the effects of the pandemic on the mental health of healthcare professionals is reviewed, it is seen that many studies have been carried out in literature. For example, Lai et al. (5), found in their study that symptoms of depression (50.4%), anxiety (44.6%), insomnia (34.0%) and distress (71.5%) is a significant proportion in healthcare professionals. Nurses, women, frontline workers, and those in Wuhan also reported experiencing more severe symptoms of depression, anxiety, insomnia, and distress. Chew et al. (6) found that 48 (5.3%) of the healthcare professionals had moderate to very severe depression, 79 (8.7%) had moderate to severe anxiety, 20 (2.2%) had moderate to severe depression. They stated that they were severely depressed. Li et al. (7) showed that the indirect traumatization scores of frontline nurses were significantly lower than non-frontline nurses. Interestingly, the general population's indirect traumatization scores were significantly higher than those of frontline nurses. According to the findings of a meta-analysis study conducted by Luo et al. (8), common risk factors for the effects of the coronavirus on psychological health include being a woman, being a nurse, having a low socioeconomic status, high risk of contracting COVID-19, and social isolation-having adequate medical resources, up-to-date and accurate information, and taking precautions are also protective factors. Also, Zhang et al. (9) found that medical health workers have higher insomnia, anxiety, depression, and obsessive-compulsive symptoms than other health workers. Besides that, they determined the most common risk factors for those mental health disorders are living in rural areas, being a woman, and being at risk of contact with COVID-19 patients.

## MATERIAL AND METHODS

There are five main stages in a typical bibliometric analysis that are shown in Figure 1.



**Figure 1.** Principal stages in a typical bibliometric research. Source: Öztürk (2021) (10)

**Search Strategy and Source of Bibliometric Data:** The articles constituting the data set of the study were obtained from the Web of Science Core Collection database. The search strategy is used as following:

TS= ("COVID-19" OR "coronavirus disease 2019" OR "2019-nCov" OR "2019 novel coronavirus" OR "SARS-CoV-2" OR "Severe acute respiratory syndrome coronavirus 2" OR "novel coronavirus disease 19" OR "novel coronavirus disease-19" OR "SARS2" OR "SARS-2" OR "COVID-2019" OR "COVID19")  
 Refined by: DOCUMENT TYPES: ( ARTICLE OR REVIEW ) AND LANGUAGES: ( ENGLISH ) AND PUBLICATION YEARS: ( 2022 OR 2021 OR 2020 ) AND TOPIC: ("mental" OR "psychological" OR "psychiatry" or "psychiatric" OR "emotional" OR "stress" "stressed" OR "stressful" OR "anxiety" OR "anxious" OR "depression" OR "depressed" OR "depressive" OR "depress" OR "anger" OR "angry" OR "loneliness" OR "lonely" OR "burnout" OR "insomnia" OR "fear" OR "worry" OR "frustration" OR "posttraumatic stress disorder" OR "post-traumatic stress" OR "posttraumatic stress" OR "PTSD") AND TOPIC: ("employee\*" OR "worker\*" OR "physician\*" OR "nurse\*" OR "medical stuff" OR "hospital stuff") AND [excluding] PUBLICATION YEARS: ( 2022 ) AND [excluding] WEB OF SCIENCE INDEX: ( WOS.AHCI OR WOS.ISTP OR WOS.ISSHP OR WOS.BSCI ) AND [excluding] DOCUMENT TYPES: ( PROCEEDINGS PAPER OR RETRACTED PUBLICATION OR DATA PAPER )

Timespan: All years. Indexes: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI.

In line with the given search strategy, 4043 articles were accessed and these articles were downloaded in plain text format. This file was used as raw data in analyzing process

**Bibliometric Analysis:** Bibliometric analysis of the article was made using the R 4.0.3 package program. The units and types of analysis performed are shown in Table 1.

**Table 1.** Analysis unit and sub-components (analysis type) used in the study

Data set	Main Information About Data Annual Average Number of Citations Per Article Three -Fields Plot
Sources	Most Relevant Sources Bradford's Law
Authors	Most Relevant Authors Author Effect Corresponding Author's Country Science Production of Countries Most Cited Countries
Documents	Most Global Cited Documents Most Local Cited Documents Tree Map
Conceptual Structure	Thematic Evolution Map Co-occurrence network Factorial Analysis
Intellectual Structure	Co-citation Network
Social Structure	Collaboration Network Country Collaboration Map

The software used for the bibliometric analysis within the scope of the study is "biblioshiny", which is an R-based library and the web-based interface of "bibliometrix" (11,12). Bibliometrix is an open-source software, has the features of flexibility, rapid upgrade and integration with other statistical R packages. Therefore, it is very useful in an ever-changing science discipline such as bibliometrics (13). Bibliometrix includes all basic bibliometric analysis methods, but is especially used for science mapping (14). It was decided to use the software in question in the analysis of the raw data obtained within the scope of the study, since it is user-friendly and the body of information required for an article can be constructed more easily when the analysis stages are followed.

## RESULTS

The basic information of the articles is shown in Table 2. When Table 2 is examined, it is seen that 4043 articles analyzed in the study cover the years 2020 and 2021. There are 1329 sources (journals, books, etc.) in which these articles are published. The citation rate per article is 9.97. The

### Dataset

**Table 2.** Main information about data

Description	Results
<b>MAIN INFORMATION ABOUT DATA</b>	
Timespan	2020:2021
Sources (Journals, Books, etc)	1329
Documents	4043
Average years from publication	0,321
Average citations per documents	9,97
Average citations per year per doc	6,454
References	97809
<b>DOCUMENT TYPES</b>	
article	3193
article; early access	452
review	370
review; early access	28
<b>DOCUMENT CONTENTS</b>	
Keywords Plus (ID)	2682
Author's Keywords (DE)	6228
<b>AUTHORS</b>	
Authors	20395
Author Appearances	24913
Authors of single-authored documents	194
Authors of multi-authored documents	20201
<b>AUTHORS COLLABORATION</b>	
Single-authored documents	200
Documents per Author	0,198
Authors per Document	5,04
Co-Authors per Documents	6,16
Collaboration Index	5,26

number of single-authored articles is 200, and the ratio of single-authored articles to all articles is 0.049. Alongside of the authors' collaboration index is 5.26, this rate is quite high. That collaboration index shows that the field is a suitable field for different authors to work together.

We observe the publication process started in 2020 (1145 article) and peaked in 2021 (2418 article). The Annual growth rate increased by

111.18% and the average number of citations per article which was 29.42 in 2020, decreased to 2.54 in 2021.

**Table 3.** Annual Average Number of Citations Per Article

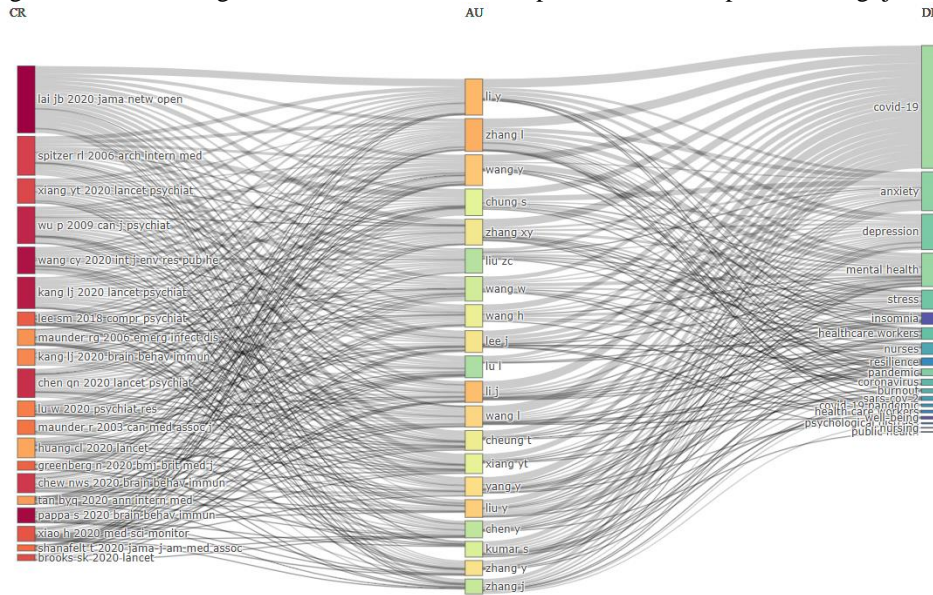
Year	N	MeanTCperArt	MeanTCperYear	CitableYears
2020	1145	29,42445415	29,42445415	1
2021	2418	2,543837883		0

A three-field plot built upon a Sankey diagram depicting the connections from cited references to authors and themes is displayed in

Figure 2. The authors in the middle part of the figure have expanded the concepts on the right by referring to the references on the left. Apart from

Covid 19, it is seen that main concepts such as anxiety, depression, stress, insomnia, burnout, resilience, etc. come to the fore along with mental health. Zhang I, Li Y and Wang Y are the authors

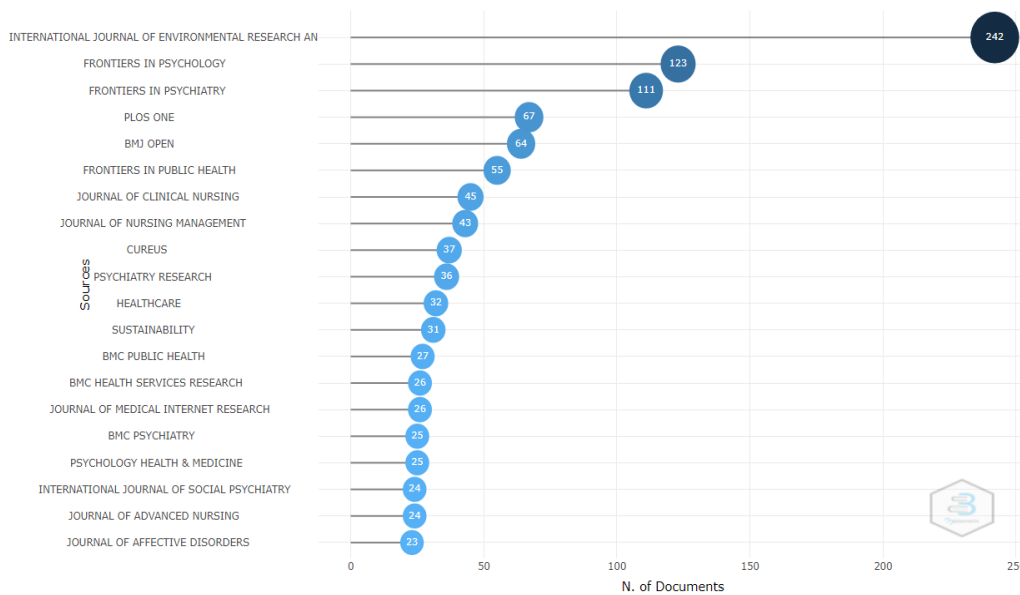
who feed these concepts the most. The references that these authors refer to the most while feeding these concepts can be observed as lai jb 2000, spitzer rl 2006, wup 2009, Kang lj 2020.



**Figure 2.** Three-field plot showing the network between authors (middle), cited references (left) and themes (right)

**Sources:** The top 20 most relevant resources are as shown in Graph 1. The journal that publishes the most articles on the subject is International Journal of Environmental Research and Public Health, and

242 articles on the subject have been published in the journal 22% of the articles published in the first 20 journals.

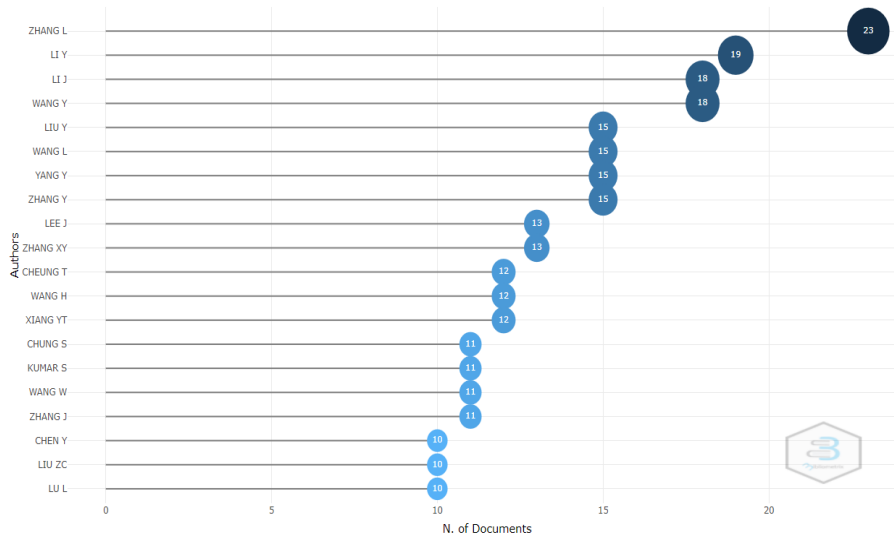


**Graph 1.** Most relevant sources

According to the Bradford's Law, a small number of journals in a particular subject area cover a significant portion of the total articles in a given area, while an increasing number of journals publish fewer articles in that area (15). When the sources are sorted in descending order according to the number of publications, the sources can be classified into three groups, each of which covers

one-third of the publications. The first group formed as a result of this classification is the core resources (16). Therefore 33 journals can be seen in the Zone1 as core resources.

**Authors:** After the sources, the most relevant authors were analyzed. Graph 2, which is the most relevant authors are shown in proves that Zhang L. is the most contributed to the field with 23 articles.



**Graph 2.** Most relevant authors

h, g and m index values of the authors and the total number of citations are analyzed in Table 4. It is seen that the authors with the highest index

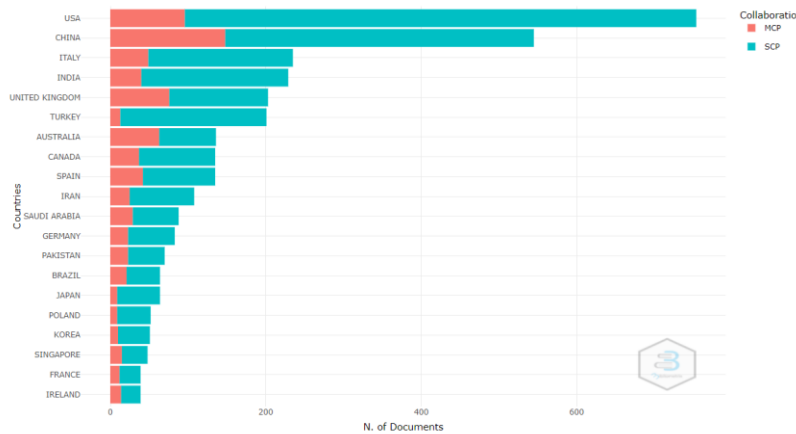
values are Wang Y (h index: 9), Zhang L with (g index: 18) and again Wang Y (m index: 4.5).

**Table 4.** Author Effect

Element	h_index	g_index	m_index	TC	NP	PY_start
WANG Y	9	15	4,5	3436	15	2020
YANG Y	8	14	4	549	14	2020
LIU ZC	7	8	3,5	3143	8	2020
ZHANG L	7	18	3,5	580	18	2020
BARELLO S	6	7	3	279	7	2020
CAI ZX	6	7	3	2807	7	2020
GRAFFIGNA G	6	6	3	278	6	2020
LU L	6	7		203	7	
SHI L	6	6		214	6	
WANG GH	6	6	3	2591	6	2020

Graph 3 depicts Corresponding Author's Country. After examining them together, it is seen that USA, China, Italy, India and UK are the first 5 countries respectively and Turkey comes 6th in ranks. But MCP (Multiple Country Production) and SCP (Multiple Country Production) ratios are important here. If we realign countries by their MCP ratios, the first five countries would be like

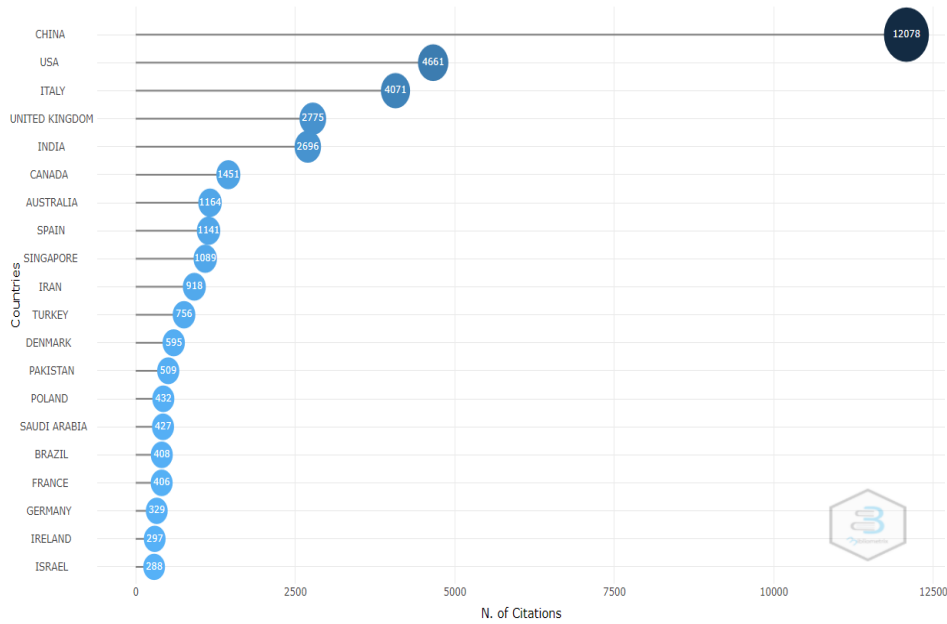
Australia (0,4632), United Kingdom (0,3744), Ireland (0,3590), Saudi Arabia (0,3295), Pakistan (0,3286). Authors from these countries in the field would be interpreted as the most inclined to international cooperation. And the last three countries whose authors are the least inclined to make international cooperation would be like Japan (0,1406), USA (0,1273) and Turkey (0,0647).



**Graph 3.** Corresponding author's country

When Graph 4 is analyzed, it is seen that China is the most cited country with 12078 citations, almost three times more than the USA, which is in the second place. From this point of view, it can be stated that it will be beneficial for those concerned to follow China in the studies

conducted on the subject or in the decisions taken by policy makers. On the other hand, in the analysis of the countries' science production in Figure 3, it is noteworthy that the USA (with 3024 articles) publishes approximately 30% more than China (with 2343 articles).



Graph 4. Most cited countries

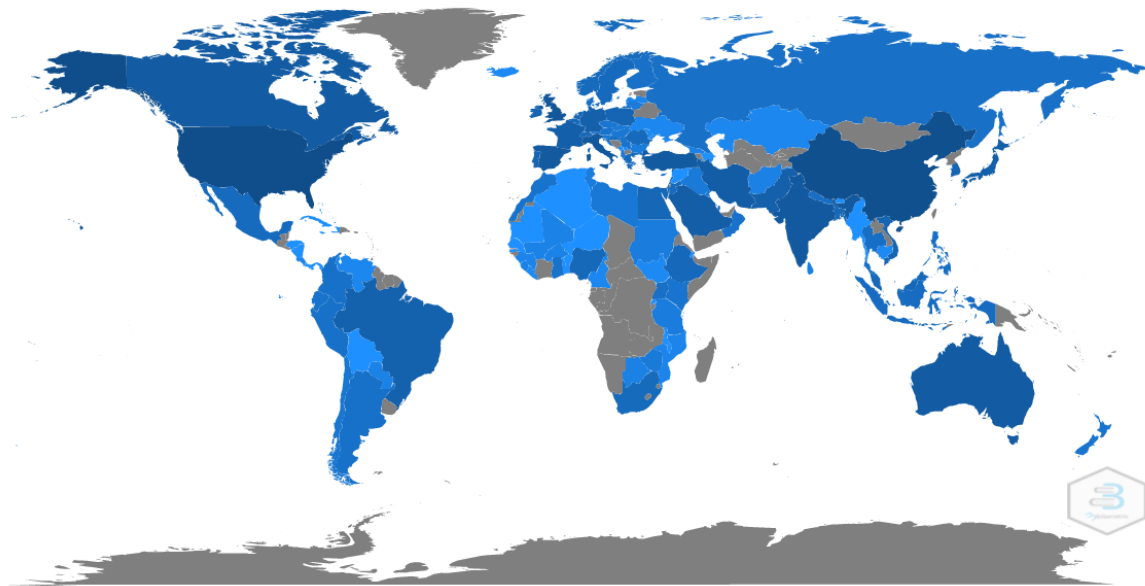
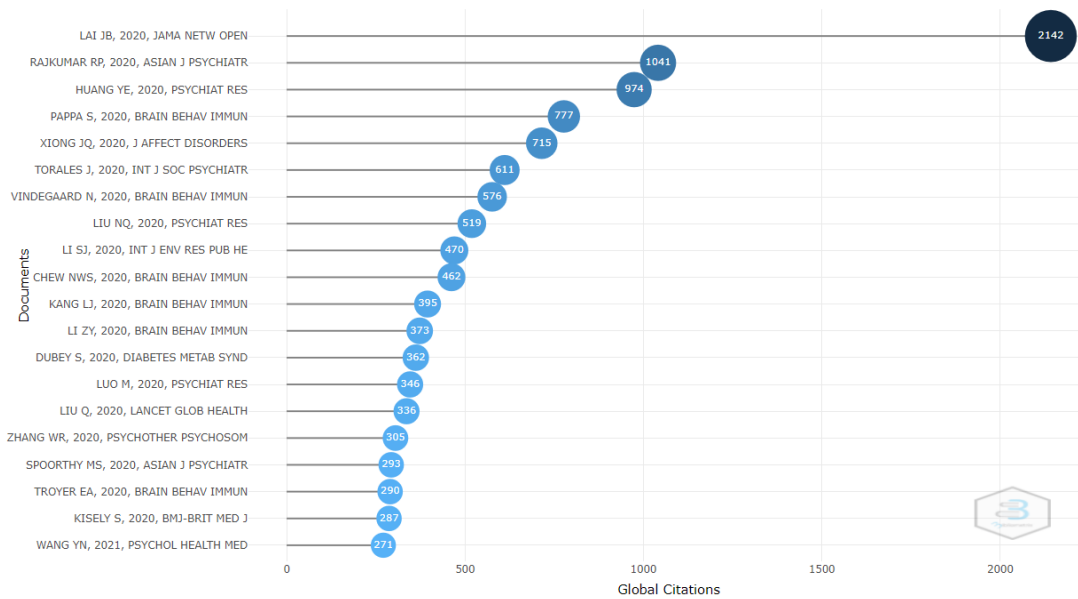


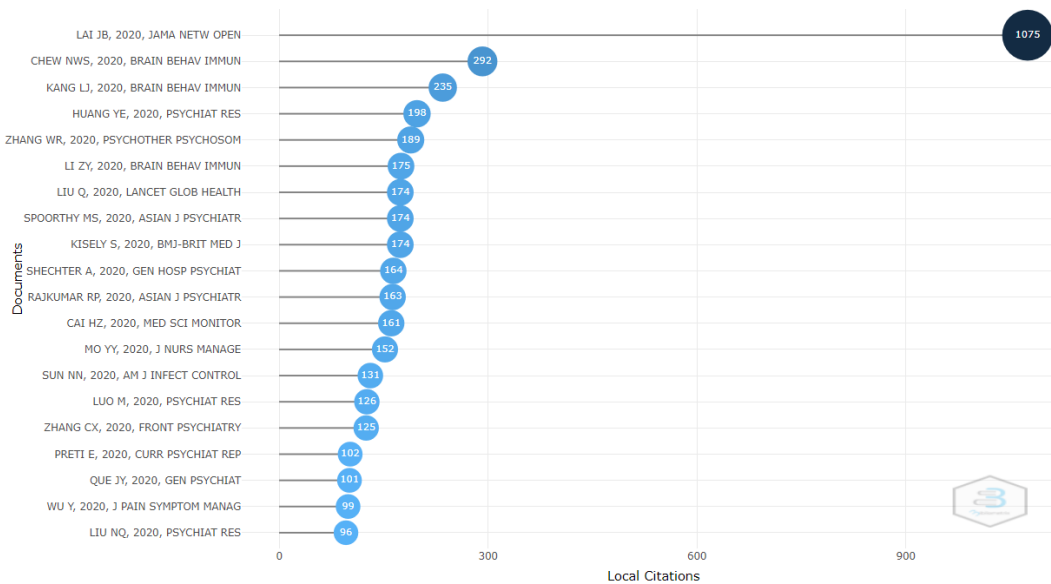
Figure 3. Country scientific production

**Documents:** The most cited documents at global and local level are given in Graph 5 and Graph 6, respectively. It is seen that the Lai JB 2000 study received 2142 citations globally which

is more than twofold of the second study and 1075 citations locally which is more than 3.5 times of the second study.



Graph 5. Most global cited documents

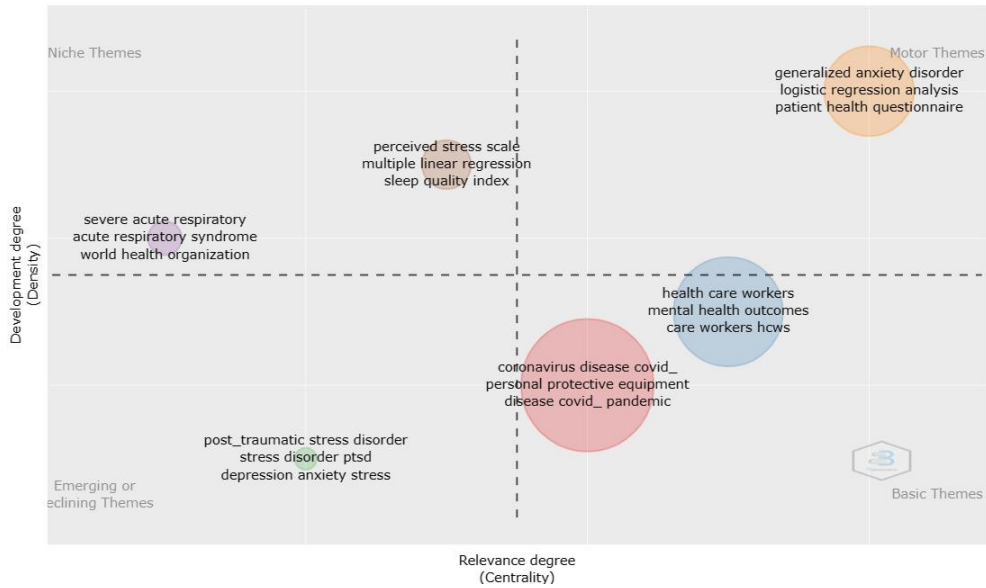


Graph 6. Most local cited documents

**Conceptual Structure:** The thematic evolution of the field showed the main changes in the Keywords Plus is presented in Figure 4. It is seen that the generalized anxiety disorder theme is the most studied among the motor themes with highest centrality and impact. It is noteworthy that sleep quality is studied as a niche theme. This situation can be interpreted in the context of anxiety disorder impairing sleep quality. Post-traumatic stress disorder, depression anxiety stress themes can be interpreted as a trend that has been the

subject of new analyzes compared to the previous year, considering the long-term consequences of Covid-19 outbreak on the mental health of healthcare professionals. In the lower right part of the thematic map, there are themes with a high degree of centrality but with a low degree of intensity. In other words, it can be said that although they are in the center of the field, there are themes that are likely to become motor themes when more publications are made.

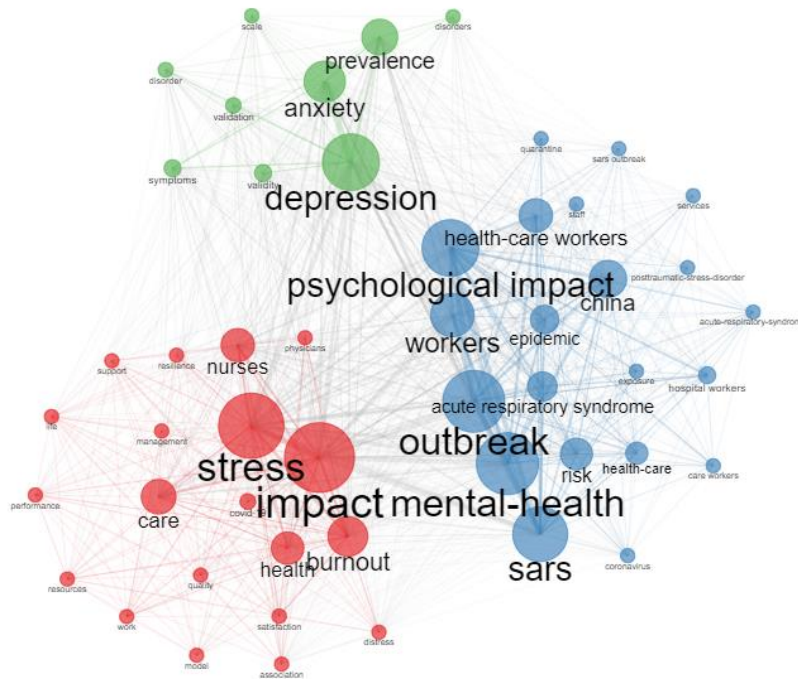




**Figure 4.** Thematic evolution map (keywords plus)

Figure 5 depicts the co-occurrence network by Keywords Plus. The purpose of co-occurrence network analysis is to access the relations of items based on the number of documents in which they occur together. According to analysis, it is seen that

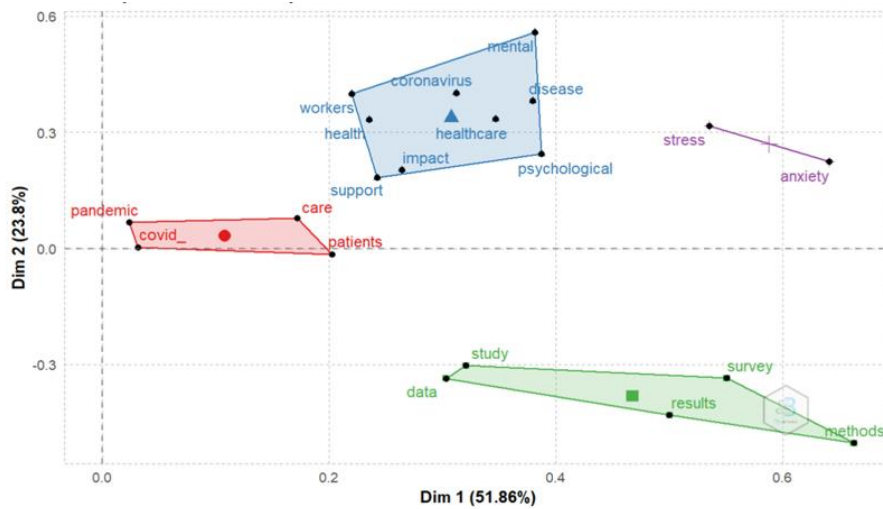
the words are gathered under three main cluster. Blue cluster which is the biggest one can be characterized as mental health during Covid 19 outbreak, green cluster, depression and anxiety and red cluster stress and impact.



**Figure 5.** Co-occurrence network (keyword plus) analysis

Conceptual structural map, given in Figure 6, depicts four different compositions shown in blue, red, green and purple colors. It is obtained by examining the abstracts of the articles by Multiple Correspondence Analysis (MCA). Green cluster corresponds to research aspects of mental health. It also can be entitled as measurement theme of mental health. The purple one is stress and anxiety,

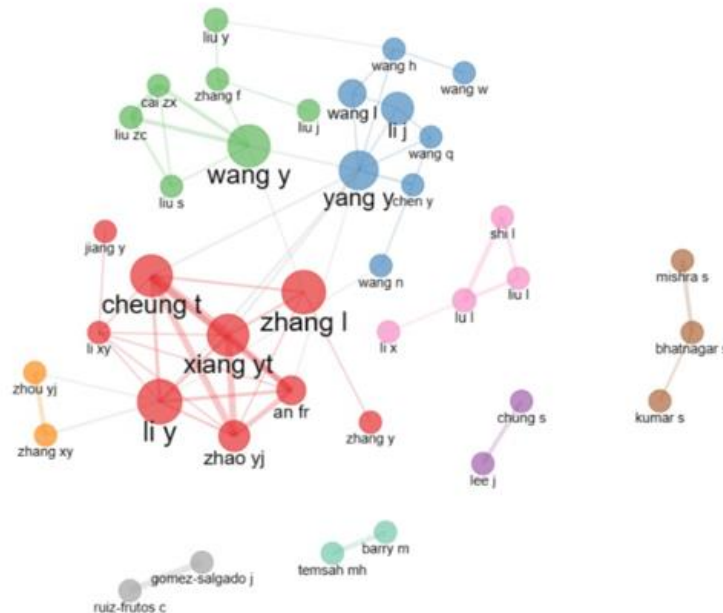
an independent and weak theme. In the red cluster, it can be stated that there are more studies that precede the Covid 19 outbreak. It can be stated that the blue cluster, which examines the mental health of healthcare professionals especially in the context of supporting, is a theme of providing support to reduce the effects of the Covid 19 outbreak on the mental health of healthcare professionals.



**Figure 6.** Factorial analysis (conceptual structural map, method: MCA)

**Social Structure:** Figure 7 depicts the collaboration network of authors. The red cluster is the densest at the point of cooperation. Because it is

seen that there is more interaction between them. Then the blue cluster, and the green cluster can be seen as the most cooperating clusters in themselves.



**Figure 7.** Collaboration network

**DISCUSSION AND CONCLUSIONS**

The bibliometric analysis method was used in this study, which was carried out with the aim of determining the effects of the Covid 19 Pandemic on the mental health of healthcare workers and making inferences for health policies and human resources management. Within the scope of the research, 4043 articles published in the Web of Science Core Collection database between 2020 and 2021 were examined.

According to the Sankey diagram, which shows the links from the references to the authors and themes, it is seen that apart from Covid 19, main concepts such as *anxiety*, *depression*, *stress*, *insomnia*, *burnout*, *resilience*, along with mental health, come to the fore. This finding is similar to the studies in

the literature. Lai et al. (5) found symptoms of depression, anxiety, insomnia, and distress in a significant proportion of healthcare professionals. Chew et al. (6) found that health care workers experienced moderate to very severe depression, moderate to severe anxiety, moderate to severe depression and Mo (17), determined that nurses struggling with COVID-19 are generally under stress.

According to the findings obtained from the research, it was seen that the author most relevant to the research topic was Zhang L. The author has 23 articles that contribute to the field. Others of the 5 most relevant authors are Li Y., Li J., Wang Y., and Liu Y. According to the results obtained from the research, China is the most cited country. It is

seen that China is the country that receives almost three times more citations than the USA, which is in second place. In this case, it can be said that it would be beneficial to follow the publications originating from China in the studies conducted on the subject or in the decisions taken by policymakers. However, it is remarkable that the USA publishes about 30% more than China regarding scientific production.

When the most frequently used keywords by the authors regarding the mental health status of healthcare professionals in the context of Covid 19 are examined; it is seen that these are mental health anxiety, pandemic depression, stress, health workers, coronavirus, burnout, resilience, health workers, psychological distress, public health, nursing, pandemic insomnia and well-being. This result shows us that healthcare professionals have the most problems in these matters during the Pandemic period. Health policymakers and managers need to develop solutions for these issues. The measures to be taken in this regard will contribute to less anxiety of health workers.

According to the results of the research, when the thematic evolution of the field is examined, it is seen that the theme of generalized anxiety disorder is the most studied among the motor themes with the highest centrality and impact. It is noteworthy that sleep quality is studied as a niche theme. This situation can be interpreted in the context of anxiety disorder that impairs sleep quality. The themes of post-traumatic stress disorder, depression anxiety, and stress can be interpreted as a trend that is subject to new analyzes compared to the previous year, considering the long-term consequences of the

Covid-19 outbreak on the mental health of healthcare professionals.

As a result of the the research conducted, it can be said that the most important effects of the Covid 19 Pandemic on the mental health of healthcare workers are *anxiety, depression, stress, insomnia, burnout*. In order to reduce or eliminate the negative mental problems experienced by health workers, providing expert support in certain matters such as increasing the psychological resilience of health workers, improving working conditions, improving communication with each other and managers, coping with stress, managing anxiety, etc. is required. In addition, carrying out activities that support morale and motivation will help reduce the negative effects experienced. Improving the mental health of health workers will have a positive effect on the health system and will ensure the correct implementation of human resources policies.

The main limitation of the study is that only the Web of Science Core Collection database is used as the database from which raw data is downloaded. Only studies written in English and defined as articles and reviews were included in the analysis, and only these records were evaluated in the citation analysis. In addition, some limitations arising from bibliometric analysis can be mentioned in the study. Data were visualized to the extent allowed by the R 4.0.3 software, and no outputs could be obtained from the analyzes in which the program gave an error.

Conflict of Interest: None

Financial Support: None

Ethics Statement: None

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