

*Bibliometric Analysis*

**Mapping the Palette: A Bibliometric Journey into Art in Health Research**

Muhammad Asyraf Mohd Bakri<sup>1</sup>, Mohammad Kamal Sabran<sup>1\*</sup> & Asrenee Ab Razak<sup>2</sup>

<sup>1</sup>Department of New Media Design and Technology, School of The Arts, Universiti Sains Malaysia, 11800 USM, Pulau Pinang, Malaysia

<sup>2</sup>Department of Psychiatry, School of Medical Sciences, Universiti Sains Malaysia, Health Campus Kubang Kerian, 16150 Kota Bharu, Kelantan, Malaysia.

\*Corresponding Author: [kamalsabran@gmail.com](mailto:kamalsabran@gmail.com)

Received: 03 January 2024

Accepted: 13 May 2024

**Abstract:** Arts in healthcare is a broad worldwide movement that includes how the arts influence patient care, hospital surrounds. Art in health research is crucial to prove its effectiveness and guide its practical application in healthcare, addressing current gaps in knowledge and ensuring optimal integration into patient care. The objective of this article is to present a literature review and bibliometric analysis of the mapping art in health research from 2018 to 2023. Text queries on Scopus (1, 670 documents) and PubMed (550 documents) using the term (“art therapy” OR “art in medicine” OR “arts-based interventions” OR “creative arts therapies” OR “Art in Health”) have done on 15 October 2023 obtaining 2220 documents for in-depth analysis. Rstudio 4.2.1 and biblioshiny for bibliometrix were used to analyze research trends. The most popular journal in Scopus is the journal Arts in Psychotherapy while the journal Frontiers in Psychology in PubMed. In Scopus, the most frequently used author keywords and add keywords are “art therapy” while in PubMed it shows “humans” REGEV D., (Scopus) and TESTONI I., (PubMed) are the most popular authors. The United States of America produces the most scientific articles in Scopus and PubMed. The most notable affiliations from Scopus and PubMed is University of Haifa. In conclusion, PubMed and Scopus databases, it can be observed that a significant proportion of European researchers exhibit a broader range of research interests in the field of art in health.

**Keywords:** Art in health; art therapy; art-based intervention; bibliometric analysis; RStudio

## Introduction

The field of arts in health, often known as arts in medicine or arts in healthcare, encompasses a wide range of disciplines and is committed to utilising the arts to bring about positive changes in health and the healthcare environment (National Organisation for Arts in Health, 2017). Furthermore, the field of arts in healthcare encompasses a wide range of disciplines and approaches, with the primary objective of enhancing the healthcare journey by facilitating meaningful connections between individuals and the arts during pivotal moments in their lives. The subject of arts integration in healthcare and community settings is experiencing significant growth. This interdisciplinary approach incorporates various art forms, such as literature, performing arts, visual arts, and design, to serve therapeutic, educational, and expressive objectives (Goodman & Sims, 2009).

The primary aim of art in health is to facilitate health promotion and prevent sickness by employing interventions that are rooted in the arts (Arts & Health, 2023). Engaging in artistic activities has the potential to facilitate individuals in coping with a diverse array of mental health disorders and psychological suffering.

One notable advantage is its capacity to enhance individuals' mental well-being by means of fostering creativity. The act of creating art has proven to be a valuable means of self-expression for individuals, offering an alternative mode of communication that transcends the limitations of verbal language (Fancourt et al., 2016; Ockelford, 2012). Various art forms, such as music, literature, painting, and dance, are employed within healthcare settings, particularly in hospitals and palliative care, with the aim of mitigating pain and anxiety among patients. These art forms also serve to facilitate the healing process and improve the overall care experience for individuals receiving treatment (Goodman & Sims, 2009).

The integration of art within the context of health has a significant impact, particularly in relation to the generation and appreciation of artistic expressions. This integration serves to foster a comprehensive state of well-being and can serve as a catalyst for individuals' recuperation process. The integration of artistic practises within the provision of healthcare services has been advocated by the World Health Organisation (2023). According to Armstrong (2021), art possesses the capacity to tap into the inherent healing potential that resides within individuals, facilitating their integration into communal settings. The Art Impact for Health initiative, as documented by Smile Train (2023), represents a noteworthy collaboration that has successfully united the community associated with Smile Train. This initiative employs art as a means of promoting healing, self-expression, self-assurance, and resilience, with a specific emphasis on the overall health and psychosocial well-being of all patients involved. Additionally, its objective is to foster heightened consciousness and mobilisation towards the attainment of the Sustainable Development Goals (SDGs) as set forth by the World Health Organisation (WHO).

The integration of art into the realm of healthcare represents a non-pharmacological approach. Non-pharmacological pain therapy encompasses therapies that do not rely on the administration of drugs for the purpose of pain management. The primary objectives of non-pharmacological therapies encompass the reduction of fear, distress, and anxiety, as well as the alleviation of pain, while concurrently fostering a sense of control among patients (El Geziry et al., 2018). Non-pharmacological therapies, often known as non-medication treatments, encompass therapeutic interventions that do not rely on pharmaceutical substances, as defined by the University of Michigan Injury Prevention Centre (2023).

Creative activities have been an essential therapeutic medium in the field of occupational therapy, particularly in their application within mental health settings, as observed from a historical standpoint (Harris, 2008). Occupational therapists employ vocations and engagement in meaningful activities to support clients in improving their holistic health, well-being, and general quality of life (Townsend & Polatajko, 2013). Engaging in creative activities as a form of occupation can facilitate the expression of one's thoughts and emotions, foster a deeper understanding of oneself, and establish significant roles and relationships within the individual's biopsychosocial context, including their peers and school community (Green & Ziviani, 2017).

Art therapists are professionals who possess advanced degrees, typically at the master's level or higher, and have received specialised training in both art and therapy. They provide their services to a wide range of populations in various settings, including medical institutions, wellness centres, schools, and independent practises (American Art Therapy Association, 2023). Art therapy has the potential to facilitate enhanced self-expression, promote mental well-being, and foster improved interpersonal connections. The foundation of art therapy is predicated upon the notion that individuals can achieve healing and improved well-being through the medium of artistic expression (Shukla et al., 2022). In order to pursue a career as an art therapist in Malaysia, individuals are required to successfully get a bachelor's degree in a relevant discipline, such as psychology, social work, or fine arts. Furthermore, it is important to successfully obtain a postgraduate degree or certificate in Art Therapy that is officially recognised by the Malaysian Association of Psychotherapy (MAP) (Jobstreet, 2023).

Mohd Bakri and Sabran (2022) assert that the use of art in healthcare yields positive outcomes. However, the current body of research exploring the integration of art in healthcare within the Malaysian context remains limited. A study was conducted in Malaysia by researchers Dr. Vincent from the School of Medical Sciences, Universiti Sains Malaysia, and Dr. Kamal Sabran from the School of Art, Universiti Sains Malaysia. The study focused on the development of culturally specific guided imagery and progressive muscle relaxation therapy for the treatment of functional bloating. The background music or soundscape produced by Dr. Kamal Sabran was incorporated into my therapeutic audio script. The auditory environment is constructed

by incorporating conventional Malay musical instruments such as the gambus and seruling, alongside organic sounds such as the gentle rustling of foliage, melodious bird songs, and the tranquil flow of rivers. In addition, the auditory environment is masked by the presence of alpha waves. This practise is implemented with the aim of maximising the patients' sense of calm.

A review of bibliometric analysis gives an overview of the research on a topic that has been looked at in enough publications. Using bibliometric analysis with RStudio and biblioshiny, the goal of this study is to give a review of the literature and an in-depth analysis of the current state of the mapping art in health. Reviewing bibliometrics may assist comprehend research trends. These data will help academics and researchers determine the global status and trends of art in health research. The article has four parts. After the introduction, we evaluate mapping art in health the research literature. Part 2 describes the sources and techniques used to assemble the study's empirical references. Part 3 summarises the key findings and conclusions of the fundamental bibliometric analysis in Part 4. Each part can be separated into subheadings that summarise the experimental data, interpretation, and probable conclusions.

## Methodology

A comprehensive examination of bibliometric analysis provides a comprehensive survey of the scholarly investigation conducted on a subject matter that has garnered a substantial number of publications. This study aims to employ bibliometric analysis using RStudio and biblioshiny to provide a comprehensive literature review and a thorough examination of the existing research trends in the field of art in health. Examining bibliometrics can aid in understanding research patterns. The aforementioned statistics will serve as a valuable resource for scholars and researchers in assessing the worldwide state and patterns of art in health research.

The bibliometric analysis review adhered to the PRISMA standards, an acronym for Preferred Reporting Items for Systematic Reviews and Meta-Analyses. It is customary to evaluate the calibre and dependability of a review based on the pertinent and suitable facts presented in accordance with publication requirements. The PRISMA guidelines propose four distinct approaches for the identification and acquisition of data in the context of a bibliometric analysis review.

### 1. Data Source and Search Strategy (Identification)

To procure the requisite data for this investigation, an extensive search query was executed utilising two prominent online databases, specifically Scopus and PubMed. Notwithstanding the observation that the Scopus database exhibits a substantial quantity of scholarly publications within the realm of social sciences, particularly in the period following 1996 (Thananusak, 2019; Zheng & Kouwenberg, 2019). In addition to the aforementioned information, it is worth noting that PubMed is a freely accessible platform designed to facilitate the exploration and retrieval of scholarly literature in the fields of biomedical and life sciences. Its primary objective is to contribute to the enhancement of global and individual health outcomes (PubMed, 2023).

A thorough search was conducted on October 15, 2023, utilising the internet databases Scopus and PubMed. The search parameters were limited to a certain day in order to mitigate potential bias arising from the regular modifications of the database. As a component of the analysis, the researchers directed their attention towards publications that were published between the timeframe of 2018 to 2023, specifically within the Scopus and PubMed databases. These articles were selected with the purpose of examining the prevailing research patterns pertaining to the intersection of art and health. The subsequent search technique demonstrates the utilisation of BOOLEAN operations (OR, AND) to conduct searches in several databases.

Topic: ("art therapy" OR "art in medicine" OR "arts-based interventions" OR "creative arts therapies" OR "Art in Health").

Refined by: Document types in Scopus and PubMed (there was no restriction on the type).

Criteria: "titles, abstract and keywords (topic area)"

Year Published: 2018-2023.

Language: English.

Table 1. The search string art in health research

Database Search string	Search string strategy Boolean operators	No. Articles
Scopus	TITLE-ABS-KEY ( "art therapy" OR "art in medicine" OR "arts-based interventions" OR "creative arts therapies" OR "Art in Health" ) AND PUBYEAR > 2017 AND PUBYEAR < 2025 AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) ) AND ( LIMIT-TO ( SRCTYPE , "j" ) ) AND ( LIMIT-TO ( PUBSTAGE , "final" ) )	1,670
PubMed	Query ("art therapy"[All Fields] OR "art in medicine"[All Fields] OR "arts-based interventions"[All Fields] OR "creative arts therapies"[All Fields] OR "Art in Health"[All Fields]) AND ((y_5[Filter]) AND (ffrft[Filter]) AND (fft[Filter]) AND (english[Filter]))	550
Scopus & PubMed	Total databases	2220

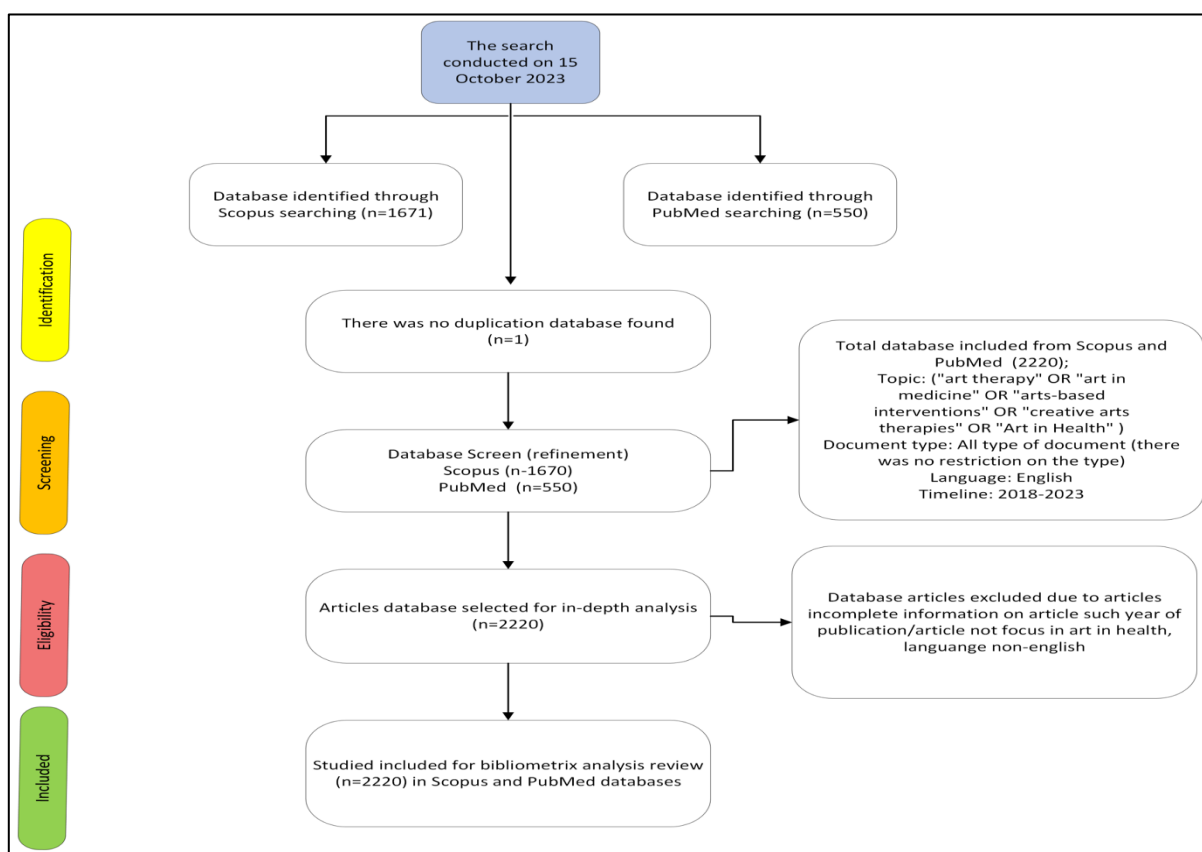


Figure 1. Flowchart for study selection art in health research

In order to conduct a comprehensive analysis of the pertinent data contained within the publishing databases, specifically Scopus and PubMed. In the process of data extraction, researchers meticulously retrieve data from each respective database. The data from PubMed was acquired in the PubMed format, whereas the data from Scopus was downloaded in the CSV format. The dataset comprises many components, including the article title, author names and affiliations, abstract, keywords, journal name, references, and other relevant information. The data collected was examined using RStudio version 2023.09.0+463, sometimes known as "Desert Sunflower," along with the biblioshiny web interface version 4.0. Following the process of database refinement, a total of 1,670 articles were retrieved from Scopus, while 550 articles were acquired from PubMed. The bibliometrix tool, specifically biblioshiny, is employed to effectively show and assess the patterns pertaining to research trends in the field of art in health. The objective of this article is to

analyse the prevailing conditions across the country between 2018 and 2023 and present the research outcomes pertaining to these patterns.

### 2. Eligibility Criteria (Screening Process)

The researchers conducted an analysis of 1670 papers from the Scopus database, while an additional 550 articles were evaluated from the PubMed database. At this juncture, it is imperative to undertake a comprehensive examination of all literature, with particular emphasis on the titles, abstracts, and main contents of the publications, in order to ascertain their adherence to the inclusion criteria, suitability for utilisation in the present study, and alignment with the research objectives. Based on the research conducted on art in health, it is necessary to examine a total of 2220 publications that meet the required criteria. The selection process was restricted to scholarly articles that were published within the timeframe of 2018 to 2023. Furthermore, there were no restrictions imposed on the eligible categories of articles to be displayed, with the sole exception being that they must be written in the English language.

Table 2. The inclusion and exclusion criteria art in health research

<b>Database Criteria Document type</b>	<b>Eligibility All type of document (there was no restriction on the type)</b>	<b>Exclusion Not applicable</b>
Language	English	Non-English
Timeline	2018 - 2023	<2017
Location and Country	Worldwide (there was no restriction on the type)	Not applicable

### 3. Data Analysis

The bibliometric analysis research on art in health research trends was conducted using RStudio and biblioshiny, employing a systematic analysis of literature. Open-source tools, such as the bibliometrix R-package, have been specifically developed for doing bibliometric and scientometric analyses. These tools incorporate the R programming language, which is both relevant and freely available. R is a freely available and versatile software platform that offers open source packages, like the bibliometrix R-package. This software package was specifically designed for the purpose of conducting bibliometric and scientometric research. It is worth noting that this package is one of the open source products available in the R programming language. The utilisation of the bibliometrix R package could enhance the bibliometric analyses of the present research, as it is a sophisticated, all-encompassing, and flexible software tool (Aria & Cuccurullo, 2017).

The researcher utilised RStudio version 2023.09.0+463, named "Desert Sunflower," using an Apple MacBook Air operating on macOS Ventura. In order to install the bibliometric packages, researchers are required to launch RStudio and execute the following command in the command line: `>install.packages("bibliometrix")`. To utilise bibliometrix, it is necessary for the researcher to perform the command `>library(bibliometrix)` and subsequently input `>biblioshiny(bibliometrix)` on the command terminal of RStudio. This will initiate the biblioshiny web-interface (Ab Rashid et al., 2022). The data imported from the Scopus and PubMed databases was analysed by researchers utilising the biblioshiny application. A bibliometric analysis was conducted to examine research trends in the field of art in health. This analysis aimed to provide insights into the annual scientific production and average citation per year, identify the most relevant journals as sources of research, analyse the frequency of words and co-occurrence patterns in documents, identify the most influential authors, and assess the scientific production and top affiliations by country. The diagram presented below illustrates the key features of the biblioshiny web-interface, which may be utilised for data analysis purposes.

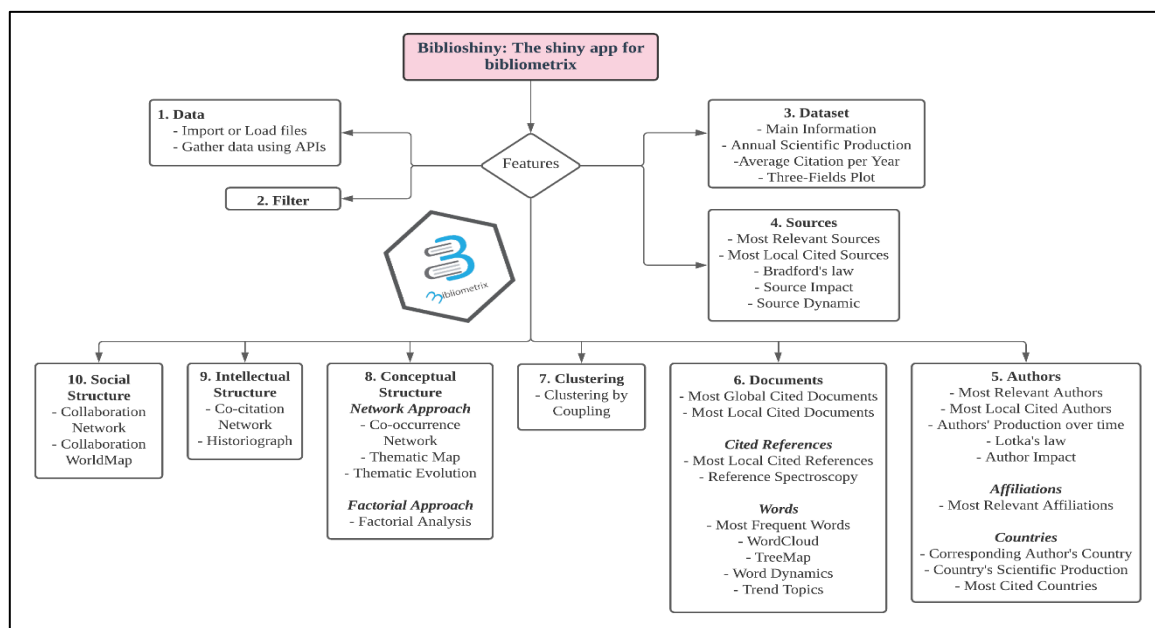


Figure 2. Features of Biblioshiny app for bibliometrix.

**Findings**

The researchers acquired a total of 2220 databases containing publications, including journals, books, book chapters, conference papers, and reviews, that were pertinent to the research trends in the field of art in health. These databases were collected for the period spanning from 2018 to 2023, utilising the search approach previously outlined. The databases utilised in this study were acquired from two distinct sources, both of which were indexed by Scopus and PubMed.

**1. Annual Scientific Production and Average Citation Per Year (Overview)**

During the period spanning from 2018 to 2023, Scopus and PubMed collectively contributed 2,220 research documents pertaining to the investigation of art in health, with Scopus accounting for 1,670 papers and PubMed contributing 550 documents. The Scopus database recorded a total of 1670 documents in the year 2021, with 333 articles being published, making it the year with the highest number of publications.

Table 3. Annual scientific publications and average citation per year from 2018 to 2023

Year	Scopus				PubMed			
	Articles	MeanTCperArt	MeanTCperYear	CitableYears	Articles	MeanTCperArt	MeanTCperYear	CitableYears
2018	253	10.82	1.80	6	13	10.82	1.80	6
2019	251	9.52	1.90	5	77	9.52	1.90	5
2020	294	8.06	2.02	4	95	8.06	2.02	4
2021	333	4.07	1.36	3	137	4.07	1.36	3
2022	305	2.05	1.02	2	130	2.05	1.02	2
2023	234	0.44	0.44	1	98	0.44	0.44	1

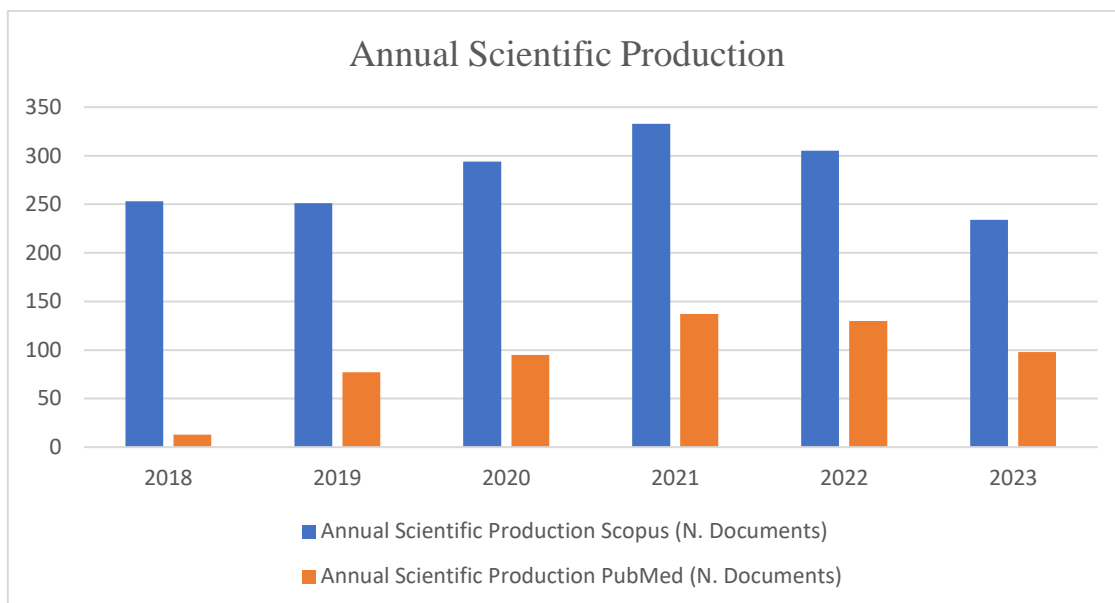


Figure 3. Annual scientific publications from 2018 to 2023

Furthermore, the Scopus database reveals a global pattern of annual scientific output that exhibits a progressive growth trajectory from 2019 to 2021. Based on the annual scientific production data from PubMed, it is observed that in the year 2021, a total of 137 articles were published out of the total 2021 articles, thereby establishing it as the year with the highest number of publications. Furthermore, an examination of global patterns in annual scientific output from 2018 to 2021 indicated a notable increase in the quantity of published works.

## 2. Most Relevant Journals (Sources)

During the period from 2018 to 2023, the Scopus database identified the top 10 most pertinent journals, as depicted in the image below. The table below displays the most pertinent academic journals that have published a substantial quantity of articles pertaining to the current research trends on the intersection of art and health. The findings of the analysis suggest that the arts in psychotherapy journal has the highest publication rate, with a total of 154 articles published. The second greatest number of published journals in the field of art therapy is 114.

Table 4. Top most relevant journals articles in the research trends on art in health (Scopus)

Sources	Years						Total
	2018	2019	2020	2021	2022	2023	
Arts In Psychotherapy	18	36	58	95	122	154	154
Art Therapy	18	33	59	82	97	114	114
International Journal of Art Therapy: Inscap	14	32	50	68	86	95	95
Frontiers In Psychology	12	18	30	48	57	63	63
International Journal of Environmental Research And Public Health	1	3	6	18	27	31	31
Arts And Health	3	12	18	23	26	29	29
Journal Of Applied Arts And Health	0	0	1	10	15	26	26
Medical Humanities	6	8	12	19	22	23	23
Plos One	1	8	10	13	18	21	21
Children	1	2	2	2	12	16	16

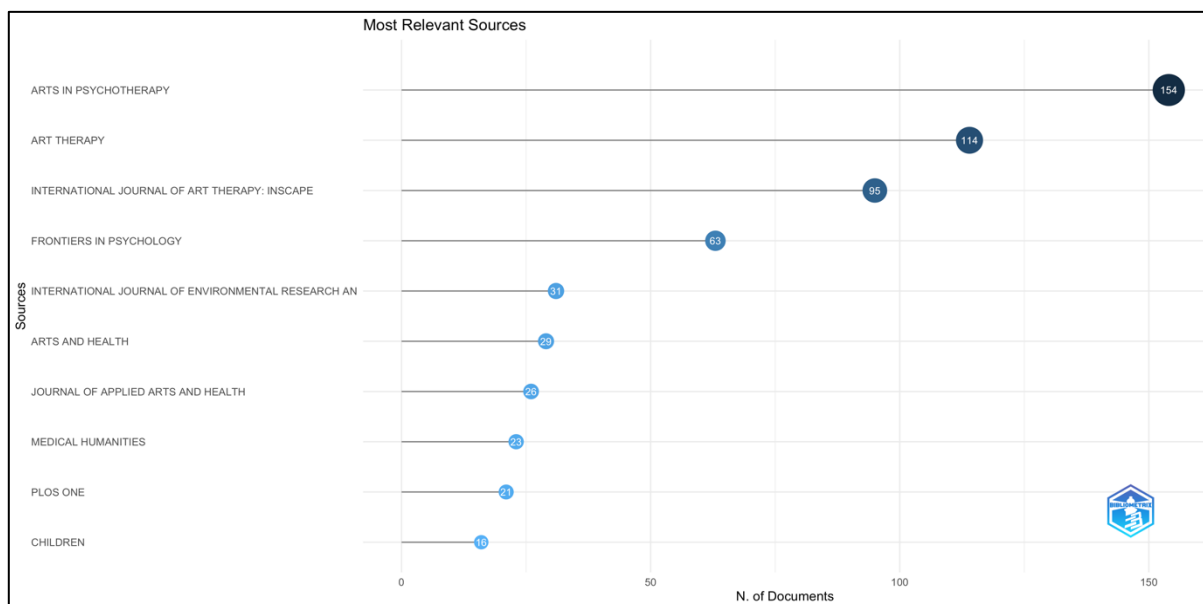


Figure 4. Top most relevant journals articles in the research trends on art in health (Scopus)

During the period from 2018 to 2023, the PubMed database identified the top 10 most pertinent journals, as depicted in the image below. The table below displays the most pertinent academic journals that have published a substantial quantity of articles pertaining to the emerging research trends in the field of art in health. According to the findings of the analysis, the leading journal in terms of publication frequency is "Frontiers in Psychology," with a total count of 105 publications. The International Journal of Environmental Research and Public Health is recognised as one of the leading academic journals in its field, with a total of 35 publications.

Table 5. Top most relevant journals articles in the research trends on art in health (PubMed)

Sources	Years						Total
	2018	2019	2020	2021	2022	2023	
Frontiers In Psychology	9	19	48	76	96	105	105
International Journal Of Environmental Research And Public Health	0	1	5	22	30	35	35
Frontiers In Psychiatry	0	3	4	12	17	27	27
Children (Basel, Switzerland)	1	1	1	2	17	25	25
Plos One	1	8	11	12	14	16	16
Behavioral Sciences (Basel, Switzerland)	0	1	6	9	11	14	14
Epidemiology And Psychiatric Sciences	0	4	9	9	9	9	9
Bmj Open	0	3	6	7	7	8	8
The Arts In Psychotherapy	0	0	1	3	5	8	8
Frontiers In Public Health	0	0	0	2	5	7	7



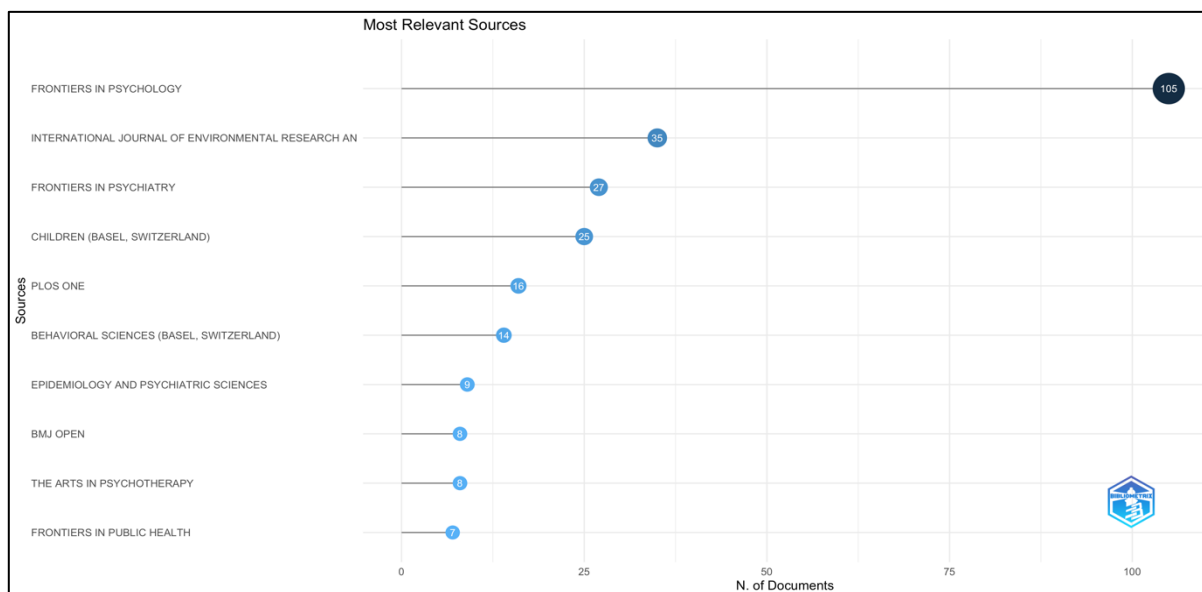


Figure 5. Top most relevant journals articles in the research trends on art in health (PubMed)

### 3. Most Frequent Words and Co-Occurrence Network

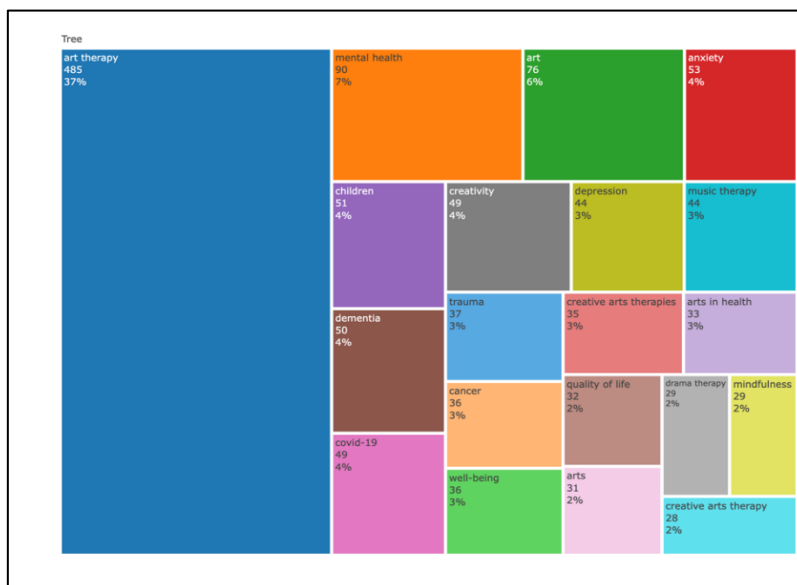
The author's keyword is ranked within the top 20 in the Scopus database, which consists of 1670 documents. Additionally, the number of keywords present within the top 20 in the Scopus database, including 1670 documents, is also considered. The utilisation of these keywords has been observed in the current study trends pertaining to the intersection of art and health, as reported by researchers from various global locations. The following table presents a compilation of the primary author's keywords and keyword plus combinations that exhibit the highest frequency of occurrence in scholarly works pertaining to the current research patterns in the intersection of art and health. The author's most commonly utilised keywords encompass "art therapy" (485 occurrence), "mental health" (90 occurrence), and other related terms. In the interim, the analysis of keywords indicated that the term "art therapy" was utilised most frequently, with a total of 1094 instances. This was closely followed by the term "human," which appeared 1063 times, and so on.

Table 6. The most top 20 frequently utilized author's keywords and keywords plus in the research trends on art in health (Scopus)

Author's keyword		Keywords Plus	
Words	Occurrences	Words	Occurrences
art therapy	485	art therapy	1094
mental health	90	human	1063
art	76	female	927
anxiety	53	article	844
children	51	male	763
dementia	50	adult	659
covid-19	49	humans	642
creativity	49	controlled study	369
depression	44	aged	327
music therapy	44	child	284
trauma	37	middle aged	282
cancer	36	psychology	266
well-being	36	adolescent	263
creative arts therapies	35	quality of life	241
arts in health	33	clinical article	222
quality of life	32	major clinical study	222
arts	31	mental health	194
drama therapy	29	human experiment	179
mindfulness	29	anxiety	175
creative arts therapy	28	procedures	172

Keywords are vital in bibliometric analysis for identifying research trends. This figure shows tree maps of the top 20 frequently used a) author’s keywords and b) Keywords Plus in art and health research from Scopus, highlighting key study objectives and areas of interest.

*Author’s Keyword*



*Keyword Plus*

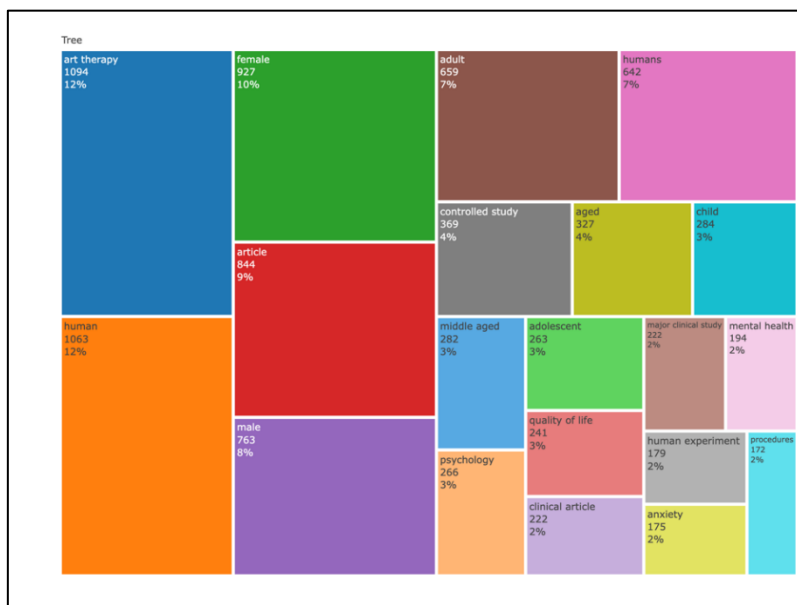


Figure 6. Tree map of top 20 frequently utilized a) author’s keywords and b) keyword plus in the research trends on art in health (Scopus).

Keywords play a crucial role in bibliometric analysis as they help identify the prevailing research trends within a specific topic. The author's chosen terms, referred to as the "keyword" and "keyword plus," can be classified into two distinct categories for the purpose of conducting keyword analysis. The identification of the author's chosen keyword serves as a significant signal of the study's underlying objectives and the researchers' particular areas of interest. The examination of keyword co-occurrence networks will offer a comprehensive understanding of the interconnected relationships among different phrases, as determined by the direction of nodes. The following table presents a compilation of the 20 most often utilised

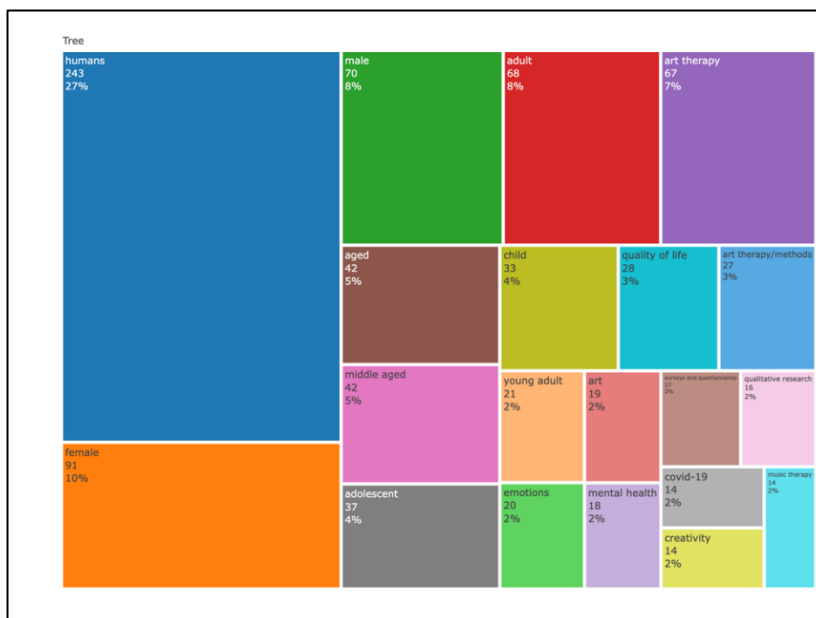
keywords in scholarly articles published on PubMed pertaining to the investigation of research patterns within the intersection of art and health. The aforementioned terms are encompassed within the table provided below. Within the scope of this particular academic discipline, the author frequently employed the phrase "humans" as their primary keyword, which appeared a total of 243 times throughout the text. The second most frequently used term was "female," which occurred 91 times. Additionally, numerous other terms were utilised by the author. The findings from the keyword plus analysis indicated that the term "human" was the most frequently utilised (243 occurrence), followed by "human" (91 occurrence), along with other pertinent keywords.

Table 7. The most top 20 frequently utilized author’s keywords and keywords plus in the research trends on art in health (PubMed)

Author's keyword		Keywords Plus	
Words	Occurrences	Words	Occurrences
humans	243	humans	243
female	91	female	91
male	70	male	70
adult	68	adult	68
art therapy	67	art therapy	67
aged	42	aged	42
middle aged	42	middle aged	42
adolescent	37	adolescent	37
child	33	child	33
quality of life	28	quality of life	28
art therapy/methods	27	art therapy/methods	27
young adult	21	young adult	21
emotions	20	emotions	20
art	19	art	19
mental health	18	mental health	18
surveys and questionnaires	17	surveys and questionnaires	17
qualitative research	16	qualitative research	16
covid-19	14	covid-19	14
creativity	14	creativity	14
music therapy	14	music therapy	14

Keywords are vital in bibliometric analysis for identifying research trends. This figure shows tree maps of the top 20 frequently used a) author’s keywords and b) Keywords Plus in art and health research from PubMed, highlighting key study objectives and areas of interest.

Author’s Keyword



Keyword Plus

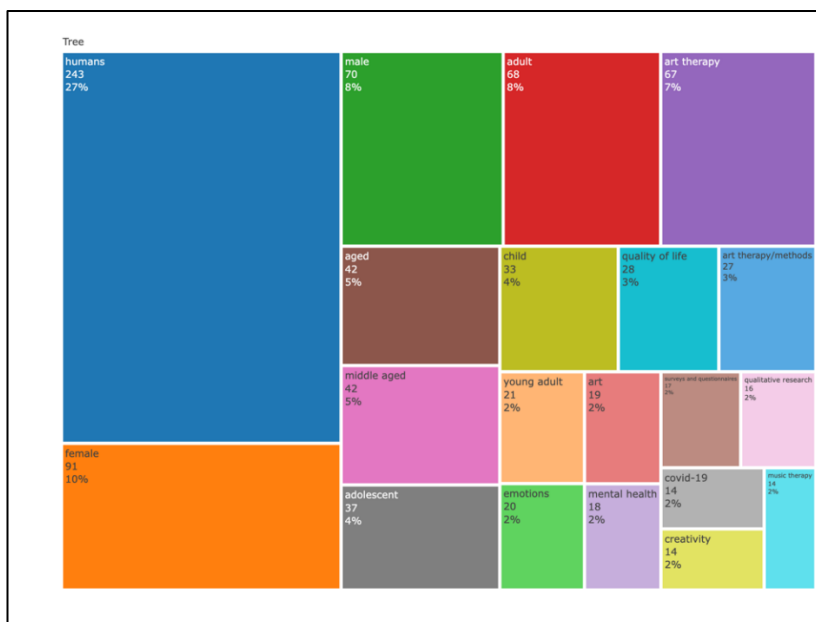


Figure 7. Tree map of top 20 frequently utilized a) author’s keywords and b) keyword plus in the research trends on art in health (PubMed).

4. Most Relevant Authors

The analysis unveiled many authors of research articles pertaining to research trends on the intersection of art and health, as documented in the Scopus database. A compilation of the ten most prominent authors has been curated. The researcher, Regev D, holds the highest document count of 33 within the research field under investigation in this study. The second greatest number of documents is attributed to KAIMAL G, with a total of 24.

Table 8. Top 10 most relevant author in the research trends on art in health (Scopus)

Authors	Articles	Percentage
Regev D	33	10.72
Kaimal G	24	6.24
Snir S	24	6.71
Orkibi H	18	6.08
Haeyen S	16	5.95
Karkou V	14	2.99
Huss E	11	4.50
Van Lith T	11	3.62
Holtum S	10	4.08
Van Hooren S	10	2.38

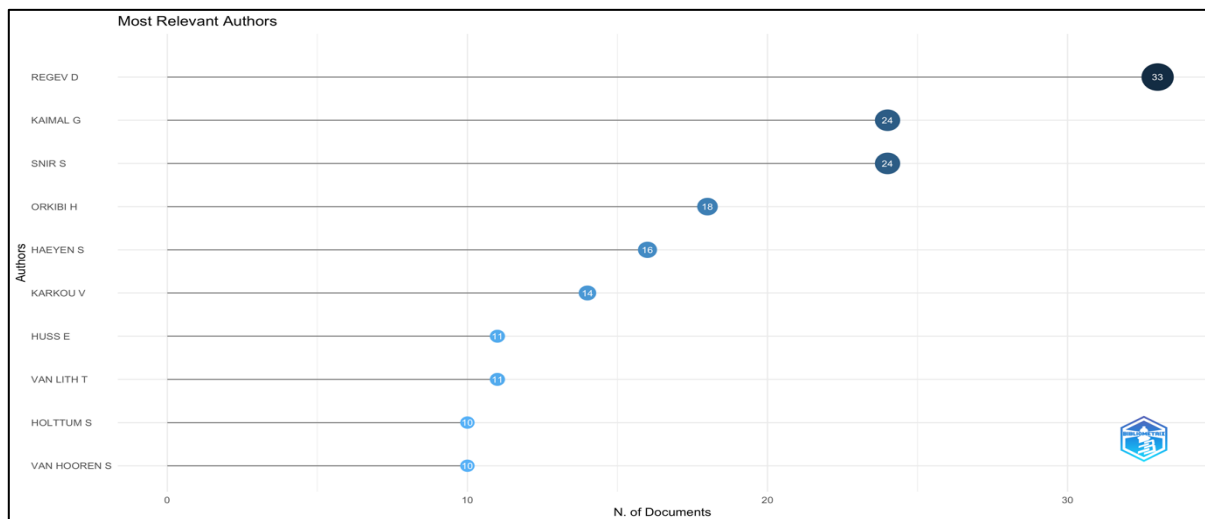


Figure 8. Top 10 most relevant author in the research trends on art in health (Scopus).

A comprehensive analysis of 550 papers indexed in PubMed revealed that the research landscape pertaining to the intersection of art and health has been significantly influenced by the contributions of the top 10 most prolific authors. The following table presents a compilation of the ten most prominent authors. Based on the results, it was observed that a single author, identified as TESTONI I, contributed to a cumulative count of 45 publications within the scope of the aforementioned study. The aforementioned author was thereafter trailed by ORKIBI H, who has a total of 21 publications, followed by KEISARI S, who has recorded 14 publications, and KAIMAL G., with a total of 13 articles.

Table 9. Top 10 most relevant author in the research trends on art in health (PubMed)

Authors	Articles	Percentage
Testoni I	45	8.89
Orkibi H	21	4.43
Keisari S	14	3.10
Kaimal G	13	2.89
Ronconi L	13	2.05
Iacona E	12	1.71
Biancalani G	11	1.71
Regev D	10	3.75
Lev-Wiesel R	9	3.20
Czamanski-Cohen J	8	1.29

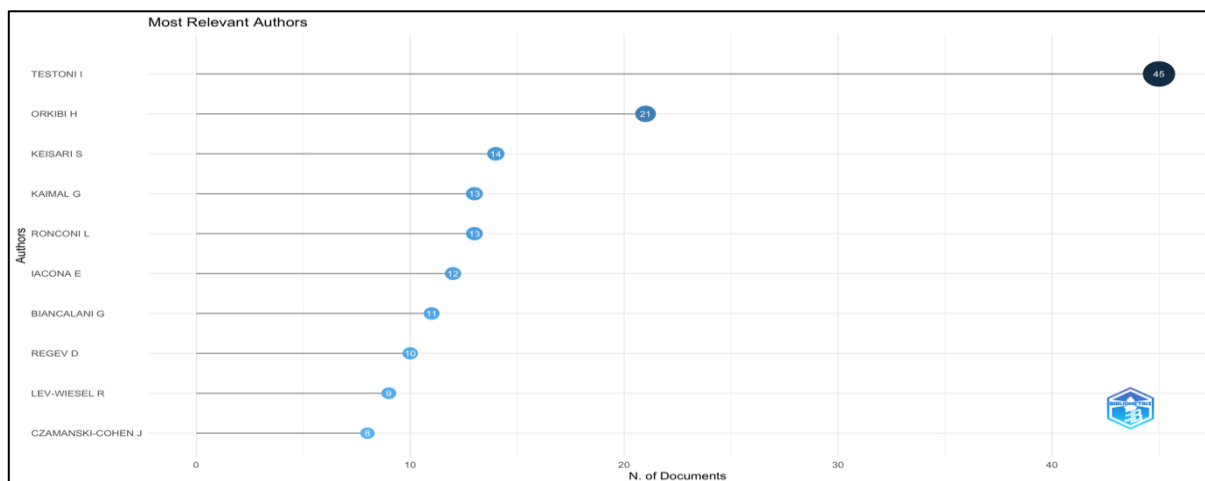


Figure 9. Top 10 most relevant author in the research trends on art in health (PubMed)

### 5. Country Scientific Production and Most Top Affiliations

Upon conducting an analysis of the respective contributions of various countries to the existing body of knowledge within the Scopus database, it has been determined that the United States of America has emerged as the foremost contributor. This conclusion is based on the fact that the United States has a notable total of 1573 documents accredited to its name. The United Kingdom typically exhibits a substantial amount of approximately 777 papers, so securing its position as the second highest contributor. China, with 355 published documents, ranks third in terms of overall publication output. Based on the analysis of prominent affiliations, the University of Haifa has been found to have published a total of 184 papers, whereas Drexel University has published 58 documents, ranking second in terms of publication output.

Table 10. Country scientific production and most top affiliations in the research trends on art in health (Scopus)

Affiliation	No. Documents	Country	No. Documents
University Of Haifa	184	USA	1573
Drexel University	58	UK	777
University of Florida	53	CHINA	355
National And Kapodistrian University of Athens	39	GERMANY	345
University College London	39	ISRAEL	334
Edge Hill University	38	CANADA	306
Florida State University	35	AUSTRALIA	302
The University of Hong Kong	32	ITALY	261
University of California	32	FRANCE	186
Cha University	31	NETHERLANDS	179

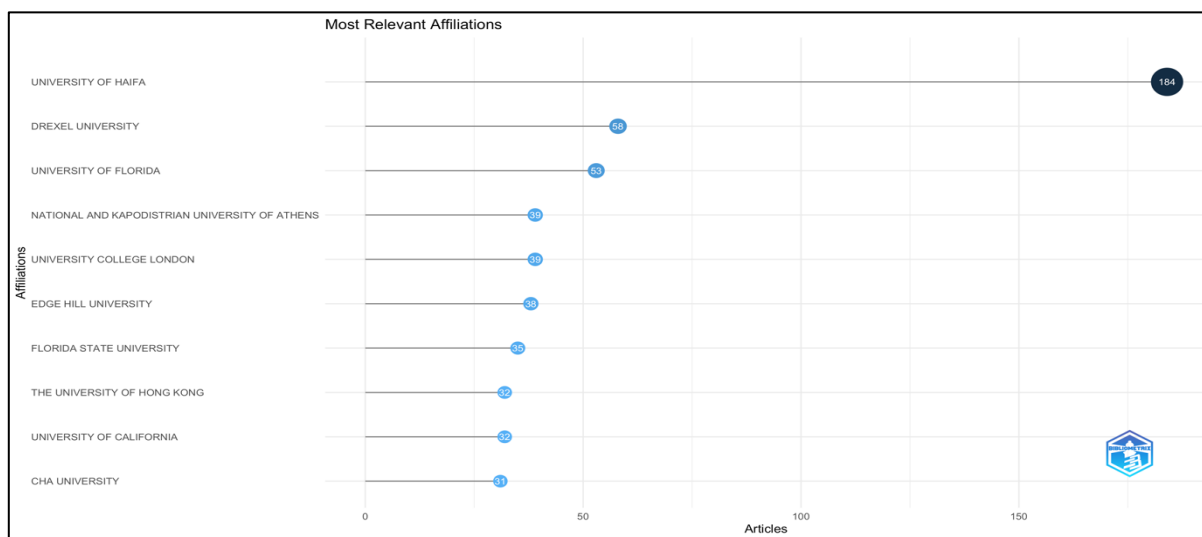


Figure 10. Top 10 most relevant affiliations in the research trends on art in health (Scopus)

In this section, the researchers undertake an analysis of the various patterns of scientific production and most combinations identified inside the PubMed database on a global scale. The United States boasts a total of 1573 papers, positioning it as the leading country in terms of global scientific output. In terms of scholarly output, the United Kingdom is in close pursuit with an approximate count of 777 articles, while China holds the third position with a total of 355 publications. Based on the researcher's investigation, it has been determined that Haifa University exhibits the highest number of combinations, with a total of 261 published papers. Subsequently, Padova University ranks second with 151 documents, and so forth.

Table 11. Country scientific production and most top affiliations in the research trends on art in health (PubMed)

Affiliation	No. Documents	Country	No. Documents
University Of Haifa	261	USA	1573
University Of Padova	151	UK	777
Drexel University	53	CHINA	355
University College London	34	GERMANY	345
University Of Vienna	31	ISRAEL	334
Cha University	28	CANADA	306
The University Of Hong Kong	24	AUSTRALIA	302
University Of Padua	24	ITALY	261
Queen's University Belfast	22	FRANCE	186
University Of Oxford	22	NETHERLANDS	179

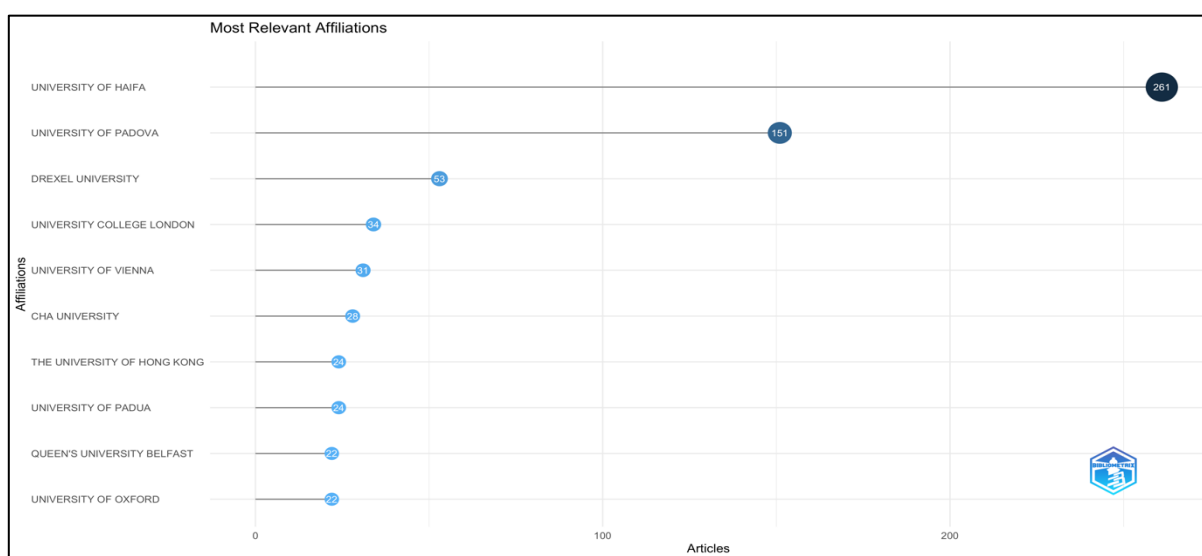


Figure 11. Top 10 most relevant affiliations in the research trends on art in health (PubMed)

### Discussion

The field of arts in healthcare encompasses a wide range of disciplines and is committed to enhancing the healthcare journey by facilitating meaningful engagement with the arts during significant junctures in individuals' lives. The utilisation of art in the realm of healthcare is increasingly gaining traction due to its inherent natural qualities, which stand in stark contrast to the employment of pharmaceutical substances that often entail adverse effects.

The initial bibliometric analysis of research trends on the intersection of art and health was conducted utilising the Scopus and PubMed databases. Bibliometric analysis is a research methodology employed by scholars to establish associations between publications and research patterns through the quantitative examination of scientific articles (Şenel & Demir, 2018). A bibliometric analysis was conducted to examine worldwide patterns in research pertaining to the intersection of art and health from 2018 to 2023, with particular emphasis on specific subject areas within this domain. The analysis encompassed the examination of various aspects, including the yearly scientific output and the average number of citations received per year. Additionally, attention was given to identifying the most significant journals as sources, as well as exploring the frequency of words and the co-occurrence network within the documents. Furthermore, the study aimed to identify the most influential authors and their respective affiliations, while also considering the scientific output of different countries and the top affiliations associated with them. These comprehensive analyses were conducted to yield valuable research findings.

A detailed research summary has been created, encompassing articles published on this subject from 2018 to 2023, which have undergone thorough analysis. Consequently, a thorough bibliometric analysis has been conducted to examine the scholarly production and research endeavours pertaining to the emerging field

of art in health. Based on the present investigation, the researchers have reached the conclusion that there has been a consistent rise in the annual scientific articles indexed in Scopus from 2019 to 2021, indicating a global trend. Similarly, the number of scientific publications in the PubMed database has exhibited an upward trajectory from 2018 to 2021. Despite the decline observed in the second database in 2023, it is important to note that the data collected does not solely pertain to that specific year.

Several reasons played a role in the growth of research pertaining to the emerging trends in the intersection of art and health. One of the contributing elements is the heightened level of awareness within the community regarding the importance of non-pharmacological interventions, which offers numerous advantages. Based on the analysis conducted, it has been determined that the journals with the highest level of popularity are "Arts in Psychotherapy" in Scopus and "Frontiers in Psychology" in PubMed. The author keyword that is most commonly utilised in the disciplinary topic is "art therapy" in the Scopus database. Conversely, in PubMed, the author keyword that is most frequently employed is "humans." Based on the results, it was determined that the author identified as REGEV D holds the highest level of prominence inside the Scopus database. Conversely, within the PubMed database, TESTONI I emerges as the most renowned author. The United States of America holds the distinction of making the most significant contribution to the production of scholarly publications in Scopus and PubMed. The University of Haifa stands out as a prominent example of the integration of Scopus and PubMed. Based on the findings of PubMed and Scopus databases, it can be observed that a significant proportion of European researchers exhibit a broader range of research interests in the field of art in health.

## Conclusion

The utilisation of art therapy as a non-pharmacological intervention for individuals with health conditions yields numerous advantages and is experiencing a growing trend in popularity. As previously stated within this article, the use of art in the context of healthcare offers other therapy choices beyond pharmaceutical interventions. The utilisation of art in the context of healthcare has been found to have a beneficial impact on the treatment process. As a result, this approach is progressively being integrated into treatment protocols through the implementation of diverse art-based interventions, including painting, music, singing, and other related methods. This article provides a comprehensive literature review and bibliometric analysis of research trends in the field of art in health. The aim is to identify key areas of focus, including annual scientific production, average citations per year, prominent journals, frequently used keywords, influential authors, temporal variations in author productivity, national scientific production, and affiliations that contribute significantly to this field. A bibliometric study was conducted using a dataset including 2220 research documents obtained from Scopus and PubMed.

The primary finding of this study indicates a noteworthy rise in annual scientific output in Scopus, as revealed by bibliometric analysis, between the years 2016 and 2021. Similarly, a substantial increase in scientific production was observed in the PubMed database from 2018 to 2021. The results indicate that the journal "Arts in Psychotherapy" is the most well recognised publication in the Scopus database, whilst the journal "Frontiers in Psychology" holds a prominent position in the PubMed database. The author keyword and keywords plus most commonly utilised in the field of topic discipline, as observed in Scopus, are "art therapy." Conversely, in PubMed, the author keyword and keywords plus predominantly employed is "humans." According to the available data, REGEV D. emerges as the most widely recognised author inside the Scopus database, while TESTONI I holds a prominent position in the PubMed database. The United States of America is the leading contributor in terms of scientific article creation, as evidenced by data from Scopus and PubMed. The University of Haifa stands out as the most prominent institution associated with Scopus and PubMed.

In conclusion, the field of arts in healthcare aims to enhance patient experiences through meaningful artistic engagement, serving as a therapeutic alternative to pharmaceutical interventions. The bibliometric analysis from 2018 to 2023 demonstrates a global increase in scholarly production, highlighting the growing importance of arts in healthcare. Notable findings include rising annual scientific articles in Scopus and PubMed databases, with journals like "Arts in Psychotherapy" and "Frontiers in Psychology" being popular outlets. Authors like REGEV D and TESTONI I, along with institutions like the University of Haifa,



underscore the international significance of research in this area. These findings stress the need for further exploration and support in leveraging the therapeutic potential of art in healthcare, recognizing its valuable contribution to the healthcare journey.

**Acknowledgement:** Thanks to everyone for their help in publishing this article.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

- Ab Rashid, M. F., Abd Rahman, A., & Rashid, S. M. R. A. (2022). Research related to fireflies (coleoptera: lampyridae) around the world over the year 2000–2021: An overview and guidelines. *e-BANGI*, 19(3), 123-150.
- American Art Therapy Association. (2023, October 13). *About art therapy*. <https://arttherapy.org/about-art-therapy/>.
- Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959–975. <https://doi.org/10.1016/j.joi.2017.08.007>.
- Armstrong, J. (2021, September 17). *The Healing Power of Art*. MoMA Magazine. <https://www.moma.org/magazine/articles/629>.
- Art & Health. (2023, 8 October). *Aim and scope*. Tandfonline.com. <https://www.tandfonline.com/action/journalInformation?show=aimsScope&journalCode=rahe20#:~:text=ealth%20promotion%20and%20illness%20prevention,both%20physical%20and%20mental%20health>.
- El Geziry, A., Toble, Y., Al Kadhi, F., Pervaiz, M., & Al Nobani, M. (2018). Non-pharmacological pain management. *Pain management in special circumstances*, 1-14. <https://dx.doi.org/10.5772/intechopen.79689>.
- Fancourt, D., Perkins, R., Ascenso, S., Carvalho, L. A., Steptoe, A., & Williamon, A. (2016). Effects of group drumming interventions on anxiety, depression, social resilience and inflammatory immune response among mental health service users. *PloS one*, 11(3). <https://doi.org/10.1371/journal.pone.0151136>.
- Goodman, O., & Sims, E. (2009). *Arts in healthcare. americans for the arts*. State of the Field Report. [https://www.americansforthearts.org/sites/default/files/ArtsInHealthcare\\_0.pdf](https://www.americansforthearts.org/sites/default/files/ArtsInHealthcare_0.pdf).
- Green, D., & Ziviani, J. (2017). *The arts and children's occupational opportunities*. (2nd ed). Wiley & Sons Ltd.
- Harris, E. (2008). The meanings of craft to an occupational therapist. *Australian Occupational Therapy Journal*, 55(2), 133–142. <https://doi.org/10.1111/j.1440-1630.2007.00700.x>.
- Jobstreet. (2023, October 9). *Art therapist*. Jobstreet by seek. <https://www.jobstreet.com.my/career-advice/role/art-therapist>.
- Mohd Bakri, M. B., & Sabran, M. K. (2022). Art in health: Malaysian experience. *Wacana Seni Journal of Arts Discourse*, 21: 109–113. <https://doi.org/10.21315/ws2022.21.9>.
- National Organization for Arts in Health. (2017). *NOAH 2017 White Paper Online Edition*. The NOAH Network. <https://thenoah.net/wp-content/uploads/2019/01/NOAH-2017-White-Paper-Online-Edition.pdf>.
- Ockelford, A. (2012). Songs without words: Exploring how music can serve as a proxy language in social interaction with Autistic Children. *Music, health, and wellbeing* (pp. 289-323). Educational Contexts.
- PubMed (2023, August 15). *About -PubMed – National Institutes of Health (NIH)*. National Library of Medicine. <https://pubmed.ncbi.nlm.nih.gov/about/>.
- Şenel, E., & Demir, E. (2018). Bibliometric and scientometric analysis of the articles published in the journal of religion and health between 1975 and 2016. *J. Relig. Health*, 57 (4), 1473-1482. <https://doi.org/10.1007/s10943-017-0539-1>.
- Shukla, A., Choudhari, S. G., Gaidhane, A. M., Syed, Z. Q., & Gaidhane, A. (2022). Role of art therapy in the promotion of mental health: a critical review. *Cureus*, 14(8), 2-6. <https://doi.org/10.7759/cureus.28026>.

- Smile Train. (2023, October 9). *Art Impact for health in Brazil*. Smile Train 25. <https://www.smiletrain.org/2023/01/23/art-impact-health-brazil>.
- Thananusak, T. (2019). Science mapping of the knowledge base on sustainable entrepreneurship, 1996–2019. *Sustainability*, 11(13), 3565. <https://doi.org/10.3390/su11133565>.
- Townsend, E. A., & Polatajko, H. (2013). *Enabling occupation II: Advancing an occupational therapy vision for health, well-being, & justice through occupation*. (2nd ed). CAOT.
- University of Michigan Injury Prevention Center. (2023, October 9). *Non-Pharmacological Options for Pain Management – Provider Resources*. Michigan Safer Opioid Prescribing Toolkit. <https://injurycenter.umich.edu/opioid-overdose/michigan-safer-opioid-prescribing-toolkit/non-opioid-non-pharmacologic-options/non-pharmacologic-treatment-options/providers/>.
- World Health Organization. (2023, October 9). *Arts and Health*. <https://www.who.int/initiatives/arts-and-health>.
- Zheng, C., & Kouwenberg, R. (2019). A bibliometric review of global research on corporate governance and board attributes. *Sustainability*, 11(12), 3428. <https://doi.org/10.3390/su11123428>.