



Recent Trends In Research On Yoga And Mindfulness: A Scientific Mapping

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Abstract

Purpose: The present article aims to explore the recent trends in research on yoga and mindfulness. To attain this objective, the authors have investigated to recognise the most prominent authors and publications, the most used keywords, and the features of articles on yoga and mindfulness. It also discovers the collaboration patterns among the authors and the countries.

Methods: This research is descriptive based on extant literature where the data is drawn from the Scopus database. The search was performed on May 3, 2024, using the search string (TITLE-ABS-KEY (yoga AND (mindfulness OR attention OR consciousness OR observance OR cognizance)) AND PUBYEAR > 2013 AND PUBYEAR < 2025 AND (LIMIT-TO (DOCTYPE,"ar") OR LIMIT-TO (DOCTYPE,"re"))). Bibliometric analysis was performed in VOSviewer software.

Results: The results exhibit that many authors have published research on yoga and mindfulness in various journals belonging to different disciplines and the theme has the potential for further expansion. The analysis of country contribution exhibits that the US leads the research on this theme whereas India is yet to catch the speed. Co-occurrence analysis of the keywords highlighted emerging areas where future scholars may contribute to expanding the literature on yoga and mindfulness

This study will guide future researchers enabling them to identify potential research areas on the theme of yoga and mindfulness. The prospective researchers may also use the findings of this study to choose the authors for collaboration and the impactful journals to communicate their future work.

Keywords: Yoga, mindfulness, bibliometric analysis, Scientific mapping, VOSviewer, Sustainable Development and Growth

Introduction

The third mission of the United Nation's goal of Sustainable Development and Growth (SDG) is wellness and fitness. This goal has led to immense engagement of scholars in finding the methods to ensure sustainable health and wellness. Consequentially enormous publications have emerged on this theme in medical and social sciences. A major aspect of health and well-being is mental health (SDG-3). Good mental health can be attained by adopting healthy lifestyle management techniques. One such technique is yoga and mindfulness (Singh, 2008).

Yoga is a sophisticated technique for better health and improved well-being. It comprises physical postures known as *asanas*, breathing practices called *pranayama*, and meditation called *dhyana* (Govindaraj et al, 2016). Yoga is an age-old Indian tradition that has gained popularity among all sections of people across the world (Giridharan et. al, 2024; Smith et al, 2011; Woodyard, 2011). Yoga means the union of mind, body, and soul which is practised to attain body and mind fitness (Gaiswinkler and Unterrainer, 2016). It involves physical activity with a mental focus on self-awareness, breathing patterns, and the flow of energy that enables the practitioner to overcome nervousness, anxiety and discontent (Sundstrom et. al, 2023). The founding father of modern yoga, Patanjali described it as a procedure of quietening the alterations of mind (Cramer et al, 2017). The basic nature of yoga is monitoring mental modifications thus indicating the importance it ascribes to spiritual and intellectual well-being (Siegel et. al, 2009).

Yoga and mindfulness have their ancestries in ancient traditions of the eastern divide of the world which was practiced as a way to spiritualism. Over the years this ancient practice has covered a long journey from a pathway to spiritualism to a means of attaining good health and well-being. In its present form, it has made a space for itself in medical science too. The research indicates a surge of articles on yoga as a complementary technique to overcome the effects of COVID-19 (Kulkarni et al, 2022; Shara et a, 2022; Jasti et al, 2020). Yoga is recognised as a complementary and sometimes even an alternative method of

medication due to its therapeutic and defensive measures against physiological, neurotic, and psychosomatic disorders (Rani et al. 2021; Mooventhana and Nivethitha, 2020; Singh, 2006).

Mindfulness means being aware of the present situation which results from reduced anxiety, apprehension, and unhappiness (Walters, 2024). Mindfulness deepens consciousness and acceptance of bodily vibrations and sentiments. The integration of yoga and mindfulness has the potential to offer an exceptional synergetic result enhancing their discrete benefits. Yoga which involves body postures, breathing practices, and meditation can facilitate mindfulness. Thus, practising yoga and meditation together may lead to improved regulation of emotions, reduced experience of anxiety and sadness, and enhanced psychological and emotional health. The concepts emphasise the interrelatedness of physical, intellectual, and mystical well-being. Practising yoga improves physical well-being, reduces stress, and enhances cerebral health whereas mindfulness reduces signs of nervousness and sadness (Spinelli, et. al, 2020). In 2015 yoga was proposed as a daily health management tool and 21st June is celebrated as an international yoga day across the globe. Since then the interest of scholars on this theme has increased unprecedentedly. Consequentially, the interaction of yoga and mindfulness has drawn the consideration of scholars from distinct backgrounds for their probability of augmenting cognitive and intellectual health.

Though the extant literature shows a long history of research and the availability of numerous articles on yoga and mindfulness separately, research on the synergetic effect of both techniques is meagre from a global perspective (Taylor et al, 2020; Chou et. al, 2017). Moreover, the available literature is fragmented mainly focusing on the impact of either yoga or mindfulness on different aspects of well-being (Shah et al, 2022; Nagarathna et al, 2021; Zhang et. al, 2021; Schuman-Olivier et al, 2020; Mrazek, et. al, 2019; Shapero et. al, 2018). This indicates a need for an all-comprehensive study that identifies the areas that are most worked and the areas where there lies an opportunity for more work. Therefore, in this study, the authors intend to explore the literary work on yoga and mindfulness through scientific mapping. It will serve as a guide to scholars in identifying the scope for future research on this theme. This article focuses on the development of scholarly work in this area during the last ten years.

The study aims to explore the most productive authors and publications, the most used keywords, and the features of articles on yoga and mindfulness available in the Scopus database. The present piece of work also discovers the collaboration patterns among the authors and the nations. The motivation behind this research is the emerging interest of scholars considering yoga and mindfulness as a complementary measure

to resolve issues related to physical health and mental well-being (Slagter et al, 2022; Hunt et al, 2018; Lander et al, 2018; Khanna and Greeson, 2013). Moreover, the theme directly corresponds to the United Nation's third goal of sustainable development (SDG 3) which is good health and well-being.

Methods

The present study employs the method of bibliometric analysis to attain the objectives stated in the previous section. Bibliometric analysis is a rigorous technique of discovering and scrutinizing large volumes of scientific work to investigate the evolution of research areas, including themes, and authors based on the subject's conceptual, intellectual, and social structures (Donthu et al 2021; Verma and Gustafsson, 2020). This method of data analysis has gained massive popularity in recent years and the reason for this popularity is attributed to the advancement of software such as Biblioshiny, VOSviewer, Leximancer, and Gephi and the accessibility of the databases like Web of Science and Scopus (Khan et. al, 2021; Donthu et. al, 2021). Researchers use the bibliometric technique to discover evolving trends in a specific domain or journal performance, to identify collaboration patterns and constituents of research, and to discover the intellectual structure of an exact research activity in the available literature (Verma and Gustafsson, 2020). This technique is different from other methods of review such as systematic literature review (SLR) and scoping reviews (SR) (Peters et al, 2015; Grant and Booth 2009). The purpose of SLR and SR is to answer certain questions based on identified groups of research pieces and to recognize the landscape and range of scholarly evidence respectively. Bibliometric analysis on the other hand intends to provide a picture of local and global advancement in the literature (Levac et al, 2010; Rosas et al, 2011). Despite a history of more than seven decades and explored merits, bibliometric analysis remains moderately new in therapeutic science.

The present research is a descriptive study and intends to explore the recent trends in research on yoga and mindfulness as therapeutic measures. In this research, the authors have employed journal publications on yoga and mindfulness retrieved from the Scopus database. We selected the Scopus database for data mining as it has vast coverage of research dimensions, and due to its strict indexing requirements, it ensures quality and inclusiveness in bibliographic information (Sahni et. al, 2024). The search was performed on May 3, 2024, using the search string (TITLE-ABS-KEY (yoga AND (mindfulness OR attention OR consciousness OR observance OR cognizance)) AND PUBYEAR > 2013 AND PUBYEAR < 2025 AND (LIMIT-TO (DOCTYPE,"ar") OR LIMIT-TO (DOCTYPE, "re"))) It yielded 2085 articles. The Scopus output including citations, author keywords, author affiliation and other bibliographic information was examined

in VOSviewer version 1.6.20. VOSviewer is a software package designed in the Netherlands at Leiden University's Center for Science and Technology. This program produces bibliometric maps and creates visuals on those maps (Khudzari et al, 2018). Before analysing in VOSviewer, we processed the list of articles obtained from Scopus in MS Excel. This processing gave us the timeline and distribution of the articles that are elaborated in the following section.

RESULTS

Publication types

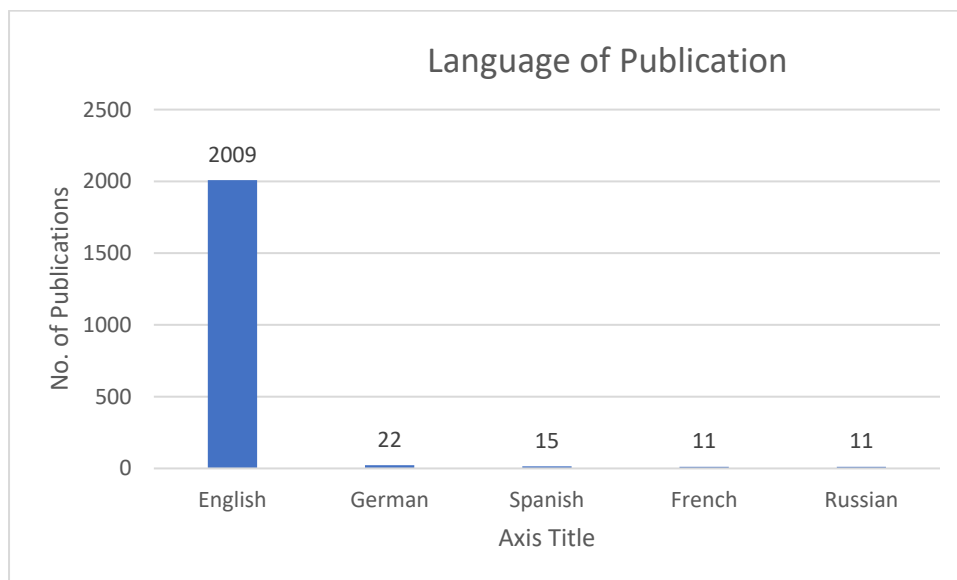
Fig. 1 exhibits the timeline for the publications in Scopus. The graph suggests that 2022 was the most productive year in the last decade with the maximum number of publications on this theme. However, 2024 is yet to be completed and the research community may expect an addition to the presently documented ninety-three publications.

Fig. 2 exhibits the language-wise distribution of the publications obtained from the Scopus database. The majority of the documents i.e., 2009 (96%) were written in English, followed by 22 in German (1%) and the rest of the manuscripts were in other languages.

Figure 1: Timeline of the documents



Figure 2: Publication Language



VOSviewer Analysis Results:

Co-authorship Analysis

We performed a co-authorship analysis to identify authors with impact, active institutes, and countries contributing to the theme and association among them.

Author impact and efficiency

Employing a co-authorship pointer, we documented the author's efficiency and impact through citation analysis and no. of documents published, respectively. Citation analysis highlights the intellectual dynamics of a research field (Donthu, et al, 2021). To ascertain the most impactful author, we performed citation analysis in VOSviewer. While doing so, we fixed the threshold value of a minimum of 5 published documents and a minimum of 10 citations per author. It was found that out of 8210 authors, 76 met the threshold. Table 1 highlights the top ten highly cited authors with their number of publications for the selected duration of the study. The result exhibits Cramer as the most productive author with 18 publications and Cherkin Daniel C. as the most influential author with 649 citations. It is interesting to explore that Cramer despite having published the maximum number of papers ranks third in citations whereas, Cherkin who has the highest citations, has not occupied any position in the top ten most productive authors. Based on the co-authorship analysis, figure 3 depicts the association among the principal authors who have worked on the theme of yoga and mindfulness. Colours denote working groups whereas the circle size represents the number of published papers per author. Cramer has the maximum international connection among the identified authors.

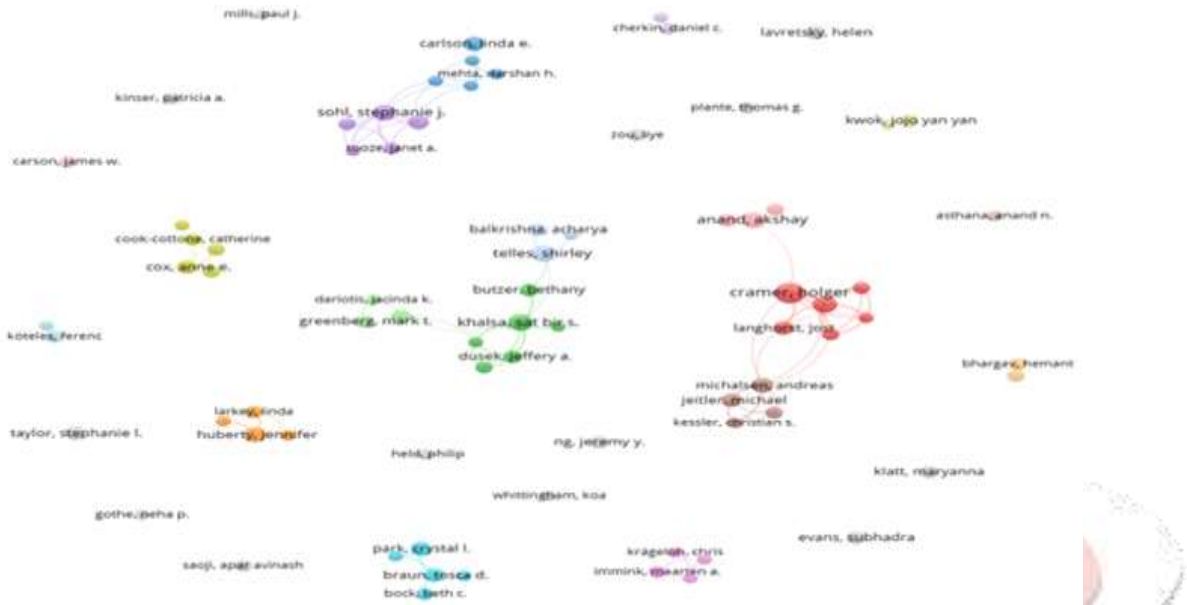
Table 1: Prominent authors by documents and citation

Sl. No.	Author	Documents	Rank	Author	Citations	Rank
1	Cramer, Holger	18	1	Cherkin, Daniel, C.	649	1
2	Dobos, Gustov	12	2	Sherman Karen, J.	602	2
3	Khalsas, Sat Bir S.	12	2	Cramer, Holger	514	3
4	Telles, Shirley	12	2	Pak, Crystal L.	420	4
5	Sol, Stephanie J.	11	3	Hofmann, Stefan,G.	390	5
6	Michalsen, Andreas	10	4	Dobos, Gustov	385	6
7	Huberty, Jennifer	10	4	Greenberg, Mark T.	354	7
8	Park, Crystal L.	9	5	Langhorst, Jost	318	8

9	Langhorst, Jost	8	6	Wells, Rebecca erwin	289	9
10	Greenberg, Mark T.	7	5	Klatt, Maryanna	285	10

Source: Analysis in Vosviewer

Figure 3 Collaboration among the authors.



Source: Vosviewer output

Country Collaboration

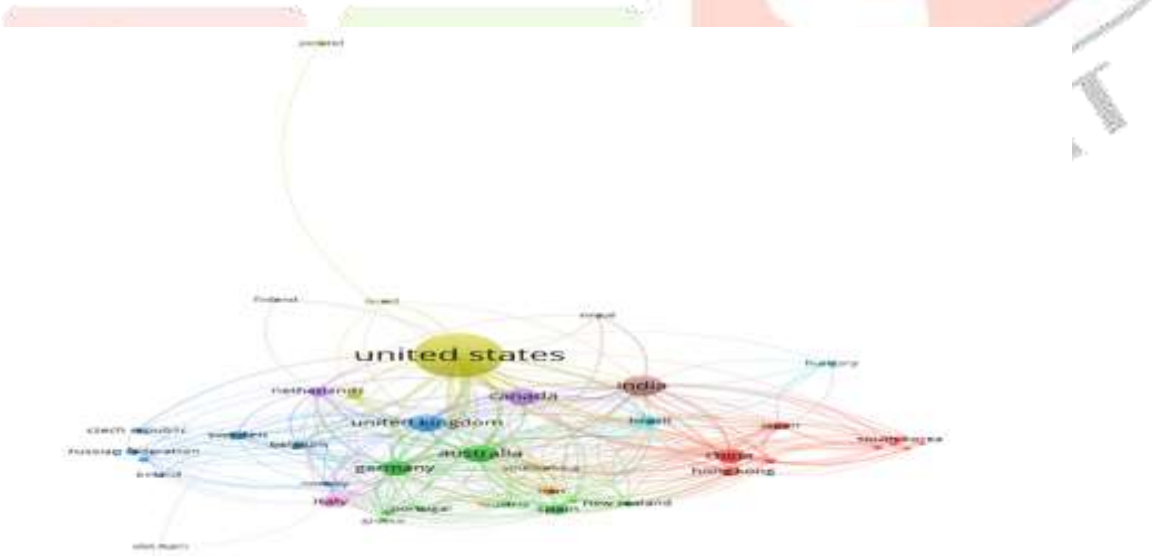
Country co-authorship analysis was performed to highlight the degree of communication between the nations and the nations with the highest documents. Table 2 illustrates ten countries that have produced the maximum number of papers with respective citations. The United States tops the list with 959 publications India ranks second with 214 publications followed by Australia placed third in the list with 151 publications. Interestingly India which ranks second for publications is positioned seventh for citations.

Table 2: Geographical Mapping of Publications

Country	Documents	Rank	Citations	Rank
United States	959	1	23477	1
India	214	2	1840	7
Australia	151	3	4607	3
United Kingdom	143	4	4937	2
Canada	136	5	4256	4
Germany	121	6	2474	6
Spain	56	7	1037	8
Netherland	47	8	2994	5
Sweden	44	9	979	9
Brazil	43	10	921	10

Source: Analysis in Vosviewer

Figure 4: Country Collaboration



Source: Vosviewer output

Institutional Impact and Efficiency

Table 3 demonstrates the top ten most productive institutions producing the maximum publications in the last ten years. The top three institutes are from the United States of America. Butler Hospital, USA tops the list with six documents and a total link strength of seven followed by Rhode Island Hospital, USA with five publications and a link strength of seven. Alpert Medical School also from the USA occupies the third

position on the list with four publications and a link strength of five. In the table, we find two institutions, PGIMER and Vivekananda Yoga Anusandhan from India ranking ninth and tenth respectively with a contribution of four publications each.



Table 3 Organization Co-authorship Analysis

Organization	Documents	Citations	Total Link strength
Butler hospital, providence, ri, USA	6	43	7
Rhode Island hospital, providence, ri, USA	5	75	7
Alpert Medical School of Brown University, USA	4	78	5
Centrum Catolica Graduate Business School	4	3	4
Pontificia Universidad Católica del Perú (PUCP), Lima, Peru	4	3	4

Australian Research Centre in Complementary and Integrative Medicine	5	138	0
Department of Internal and Integrative Medicine, Evang. Kliniken Essen-Mitte, Faculty of Medicine	4	9	1
Harvard Medical School, Boston	4	301	1
Neuroscience Research Lab, Department of Neurology, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India; CCRYN-Collaborative Centre for Mind Body Intervention through Yoga, India	4	41	0
Division of Yoga and Life Sciences, Swami Vivekananda Yoga Anusandhana Samsthana (S-VYASA), Bangalore, India	4	7	0

Source: Analysis in Vosviewer

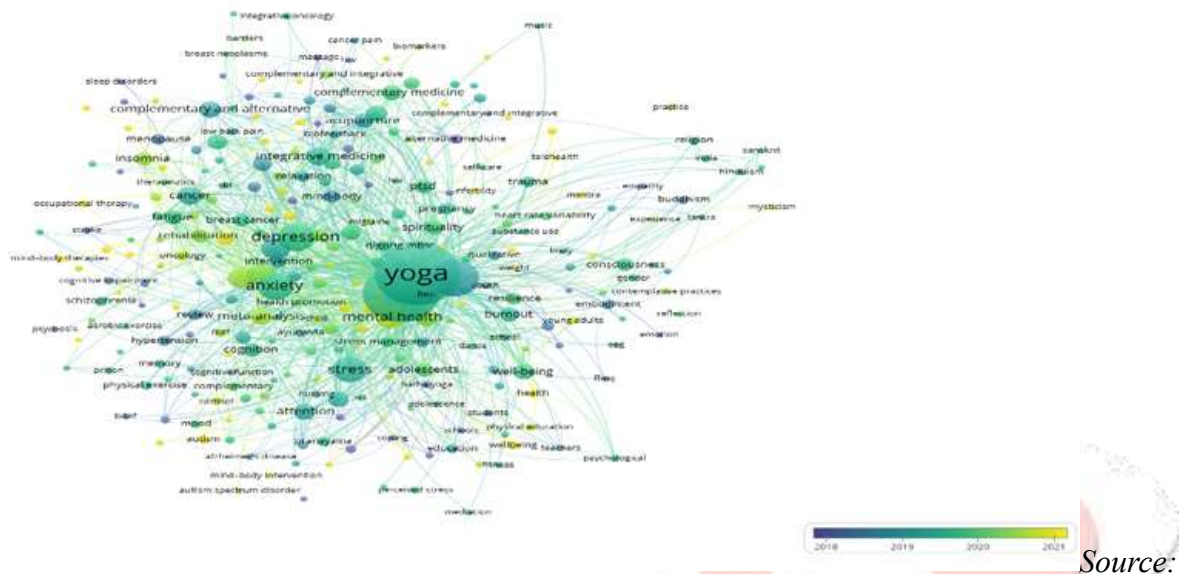
Co-occurrence analysis

In the co-occurrence analysis, we included the keywords used by the authors to investigate the distribution. Co-occurrence analysis depicts the rate at which a terminology appears along with other terminologies. Keyword employment reveals a pattern in extant literature thus guiding an accurate prediction of impending areas that require the researcher's attention. Table 4 exhibits yoga, mindfulness and meditation as the most used keywords. Figure 4 indicates the year-wise usage of the keywords. The size of the circles indicates the frequency of usage and colours indicate the year of publication. A lighter colour indicates a more recent year. Dark blue represents 2018 whereas yellow represents years 2021 onwards. We can find from the figure that some areas that have emerged in the last two to three years and the research has emerged fast include mental health, weight, and interception. The other keywords include rheumatoid arthritis, emotional intelligence, well-being, autonomic nervous system, autism, and physical function where the density of research work is less.

Table 4: Co-occurrence Analysis of Keyword

Keyword	Occurrences	Total Link Strength
Yoga	639	1827
Mindfulness	513	1541
Meditation	222	686
Depression	126	438
Anxiety	118	439
Stress	105	370
Exercise	77	256
Mental Health	85	249
Cancer	56	201
Quality of life	69	188

Source: Analysis in Vosviewer



Source	Documents	Rank	Citation	Rank	Total Link strength
Annals of Internal Medicine	2	9	2339	1	8
Mindfulness	32	4	1281	2	12
Journal of alternative and complementary medicine	41	1	890	3	27
Complementary therapies in medicine	41	1	770	4	22
Frontiers in psychology	39	2	737	5	19
Frontiers in psychiatry	32	5	602	6	11
Journal of Affective Disorders	11	7	395	7	11
Explore: the journal of science and healing	17	6	353	8	12
Journal of child and family studies	8	7	276	9	5
International journal of yoga therapy	36	3	167	10	9

Source: Analysis in Vosviewer

Discussion

The present study brings forth the scientific mapping conducted using VOSviewer software, of the research articles with DOI on the theme of yoga and mindfulness. In the present times, mindfulness has become a major concern in different aspects of life including the workplace, and day-to-day activities, hence the theme has attracted the attention of medical practitioners among the researchers of medical science who are

inquisitive about how to improve socio-psycho and physical well-being using methods that are complementary to medicines for quicker relief and sustainable wellness. The above results highlight that many authors have published research on yoga and mindfulness in various journals belonging to different disciplines. While performing co-authorship analysis to identify the most productive author, increasing the threshold value of minimum documents per author from five to ten gave an output of only eight authors. This means that the theme has the potential for further expansion. From the results drawn from country collaboration analysis, we infer that the US leads the research chart on this theme whereas India is yet to catch the speed. This result is congruent with the findings of Baminiwatta and Solangarachchi (2021). We also find that the US has published on diverse subjects including the impact of yoga and mindfulness on stress reduction, hormonal imbalance during the menopausal stage among women, pain management, depression, and anxiety disorders, self-care and burnout, memory capacity, and oncology. A closer look into the articles published by the most productive authors reveals that their work is biased in favour of research on the effect of yoga on anxiety disorders and pain management whereas other avenues such as burnout, memory enhancement, and intellect development call for further exploration. The results exhibit lots of dispersion in the author association network thus indicating the scope for further expansion of research on this theme. Co-occurrence analysis of the keywords highlighted emerging areas where future scholars may contribute to expanding the literature on yoga and mindfulness. These areas include anxiety disorders, mind-body therapies, autism, young adults and emotional intelligence.

Limitations and Conclusion

For this study, the authors have used the search string (TITLE-ABS-KEY(yoga AND (mindfulness OR attention OR consciousness OR observance OR cognizance)) AND PUBYEAR > 2013 AND PUBYEAR < 2025 AND (LIMIT-TO (DOCTYPE,"ar") OR LIMIT-TO (DOCTYPE,"re"))) thus limiting the findings of the research publications to the last ten years only. The research does not intend to include all possible terms on the selected theme as incorporating all the potential terminologies would complicate the study (Darko et. al, 2019). Future scholars may ponder on bigger data and broader terminologies for better results. We kept the scope of “doc type” limited to journal articles and reviews to ensure the inclusion of the most influential and reliable studies. We limited the selection of publications available in the English language only. This might have led to the exclusion of some thought-provoking studies. Our study is limited to the

articles listed in the Scopus database, future researchers are suggested to include multiple databases such as Web of Science, PubMed, Proquest, and Dimension to obtain more comprehensive outcomes.

This study was conducted to identify the research trends on the theme of yoga and mindfulness in the past decade. The results exhibit that the availability of research on the selected theme is quite large with contributions from the authors across the disciplines. The number of publications is expected to grow further due to the United Nation's focus on health and wellness as the third mission to attain Sustainable Development and Growth. This study will guide future researchers in identifying potential areas of research on the theme of yoga and mindfulness. The prospective researchers may also use the findings of this research to pick the authors for collaboration and the impactful journals to communicate their future work.

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