

Altmetric Profile of Top 100 “Yoga” Research Publications: A Decadal Comparative Analysis Using Scopus

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Abstract

Altmetrics have emerged as one of the complementary indicators of research impact by tracking attention across social media, news outlets, blogs and policy documents. This offers insights more than traditional citation counts. This study analyzes the top 100 Yoga research publications from 2015 to 2025 indexed in Scopus, ranked by Altmetric Attention Score (AAS), to characterize their altmetric profiles and bibliometric features. Data on AAS and source-specific mentions (news, blogs, social media, policy, Mendeley readers) was obtained from Altmetric.com. The citation and bibliographic data was retrieved from Scopus. Descriptive statistics were used to examine year-wise trends, contributions from countries, journal distribution, open access (OA) types and attention sources. To check the relationship between AAS and citations, Pearson's correlation was applied. The results show that 2017 and 2018 were peak years for Yoga publications. The United States contributed 62% of the top 100 articles, followed by the United Kingdom and other Western countries. India contributed only 3%. The largest share of publications ($n = 28$) was Gold Open Access, which shows a strong tendency toward open spreading of Yoga research. Major attention sources were X/Twitter mentions and news media. Comparatively lower engagement was from blogs, Facebook, Wikipedia and policy documents. A moderate positive correlation between AAS and Scopus citations ($r = 0.494$; $r^2 = 0.244$) indicates that altmetrics and citations capture related but distinct dimensions of research impact. Overall, the study highlights a Western centric and open-access oriented altmetric footprint for high-impact Yoga research and highlights the need for stronger digital dissemination of Yoga scholarship from its country of origin.

KEYWORDS: *Altmetric Attention Score; Altmetrics; Bibliometrics; Research Impact; Scopus; Yoga*

Introduction

The ancient Indian mind-body discipline of Yoga with philosophical foundations, is evolving into a globally accepted practice. It has proven physical, psychological and social health benefits. The United Nations declared the International Day of Yoga (IDY) in 2014 and was first observed on

21st June 2015. This significantly boosted global awareness and participation (Manjunath, 2023). Following this, research related to Yoga has also grown substantially. This increase is reflected in major databases such as Scopus, where Yoga is now more visible across literature

on clinical, psychological, public health and integrative medicine.

Earlier, research impact assessment relied on citation-based metrics, which offer a delayed, narrow view of research influence. In contrast, altmetrics capture online engagement through social media posts, news coverage, blogs, policy citations, and reference managers. While citation-based metrics reflect the academic influence of scholarly research, altmetric attention provides a broader view of how research is disseminated across online platforms (Khatale & Raut, 2026). This offers a more instant and broader picture of how research circulates in digital spaces (Priem et al., 2010; Bornmann & Haunschild, 2018a).

This research bridges that gap through an analysis of the 100 highest Altmetric Attention Score Yoga publications from 2015-2025 in Scopus. The patterns of influence on academia, viewership in digital environments and geographic distribution among modern Yoga studies is determined by merging altmetric and bibliometric data.

BACKGROUND OF YOGA

Classical Yoga is systematically collated in Patanjali's Yoga Sutras. The Yoga Sutras are estimated to be from between the 2nd century BCE and 5th century CE. The sutras outline the eight limbs (Ashtanga) comprising of yama and niyama (ethical conducts), asana (postures), pranayama (breath regulation), pratyahara (sensory withdrawal), dharana (concentration), dhyana (meditation) and samadhi (absorption), leading to citta-vritti-nirodha (liberation through the cessation of mental fluctuations) (Manjunath, 2023). Yoga is a disciplined method for aligning body, breath and mind. Using contemporary research, these principles are extended into clinical, psychological and preventive health domains.

SIGNIFICANCE OF THE STUDY

Citation-based metrics alone do not fully capture how research appeals to the public,

media, or policymakers. These metrics are restricted by long time lags and disciplinary differences. Altmetrics complement citations by quantifying early and various forms of attention. This includes social media mentions, news stories, policy uses and readership data from platforms such as Mendeley (Priem et al., 2010; Bornmann & Haunschild, 2018).

Yoga is a common factor in clinical medicine, mental health, lifestyle and cultural heritage. Thus, mapping altmetric engagement is particularly important to understand how scientific evidence is being communicated and adopted beyond academic fields. Using the top 100 Yoga articles with the highest AAS, this study provides a focused view of the most visible and discussed Yoga research. This offers insights into where it is produced, how it circulates online and how altmetric indicators relate to traditional citations (Sugimoto et al., 2017).

REVIEW OF LITERATURE

Over the past two decades, bibliometric studies have shown a significant increase in yoga-related research. This reflects the acceptance of yoga as an 'evidence-based complementary therapy' in modern medicine (Büssing et al., 2012; Kumawat & Metri, 2025). Recent assessments indicate that increased international collaboration has led to research diversification across countries and disciplines, establishing yoga research as a global, multidisciplinary field (Cramer et al., 2014; Manjunath, 2023).

The Altmetric Attention Score (AAS) has been found to be a good way of identifying visible research in health sciences based on the level of scholarly attention the document has generated, though it has been shown to be only moderately linked to citation counts within the various disciplines (Sugimoto et al. in 2017). While highly cited works tend to receive substantial amounts of web-based attention, many moderately-cited papers still demonstrate considerable visibility on the internet. Thus, the relationship between

altmetric attention and Scopus citation counts merits further exploration (Bornmann, 2014; Costas et al. 2015). Such a need is particularly relevant to research on yoga since there is a high volume of scholarly interest in and popularity of the subject. In a recent study by Ng et al. (2025), they found that altmetric attention complements citation impact for Traditional Complementary and Integrative Medicine (including yoga) and is typically found to be higher for open-access articles, while Singh et al. (2024) have reported a large degree of social media visibility associated with chemistry research, demonstrating the relevance and importance of altmetrics in measuring social impact.

Currently, the availability of yoga research has greatly increased due to new ways that researchers are communicating their findings to other people. The popularity of open-access publications allows for much wider accessibility and distribution of information via the Internet, resulting in significantly higher altmetrics (Piwowar et al., 2018). Nishikawa & Murakami (2025) found that gold open-access publication leads to increased citations in disciplines beyond yoga; this especially occurs within clinical medicine and has allowed for improved transfer of knowledge between disciplines. Shelke & Barphe (2025) investigated how published research related to computer science is being cited through altmetrics; they were able to conclude that researchers communicate through social media or other professional networks to share their research with people outside of academia (Haustein et al., 2015). Chaware & Khatale (2022) discovered that those who teach yoga use many different types of digital resources, including audiovisual e-resources such as YouTube and WhatsApp, as well as mobile online platforms to educate students about yoga.

Although bibliometric studies on yoga have increased, most focus on publication counts, citations, and thematic trends, while altmetric analyses are rare. Very few studies

have systematically examined global online attention over time, across regions, and across platforms. Therefore, integrating bibliometric and altmetric indicators is necessary for a comprehensive assessment of research impact (Bornmann and Haunschild, 2018).

OBJECTIVES

1. To identify the top 100 Yoga research publications based on Altmetric Attention Score.
2. To analyze the year-wise and country-wise distribution of the top 100 publications.
3. To examine the altmetric mentions distributed across multiple attention sources tracked by Altmetric.com.
4. To explore the correlation between Altmetric Attention Score and traditional citation metrics from Scopus.

SCOPE

The scope of the study is limited to Yoga publications that are meeting the following criteria:

1. Keywords limited to "Yoga" or "Yog" in titles or keywordsh
2. Articles which are indexed in the Scopus database between 1st January 2015 and 18th October 2025 and have a valid DOI.
3. Altmetric data which is available from Altmetric.com for the identified records.

The analysis emphasizes altmetric scores, attention sources, bibliometric indicators and the comparative interpretation of these metrics for the most influential Yoga articles in this scope.

METHODOLOGY

Study Design

Quantitative bibliometric and altmetric study design was used to identify top 100 Yoga research articles by AAS and characterize.

Data Source and Search Strategy

The Scopus database was selected as it has extensive coverage of peer-reviewed

literature and covers multiple disciplines. Advanced search was conducted using the following query:

TITLE("Yoga" OR "Yog") OR KEY("Yoga" OR "Yog") AND DOI(10) AND PUBYEAR > 2014 AND PUBYEAR < 2026*

This search resulted in 9,992 records. The full dataset (2015–2025) was exported on 18th October 2025, including fields such as title, year, authors, affiliations, source title, citations, DOI, open access status, etc.

Altmetric Data Collection

Altmetric Attention Score and source-specific mention counts (news, blogs, policy documents, Twitter/X, Facebook, Wikipedia, video, podcasts, Mendeley readers and Dimensions citations) were obtained from Altmetric.com (Altmetric Explorer) using DOIs through Scientometric Researcher Access to Data program. 6,294 articles having at least one AAS were ranked as per their AAS.

Selection of Top 100 Articles

Scopus and Altmetric datasets were compared via DOI and deduplicated. All resulting Yoga publications were ranked by AAS and the top 100 articles with the highest scores were selected for detailed analysis. The recommended practices in altmetric evaluations were duly followed. (Sugimoto et al., 2017).

Data Analysis and Interpretation

Descriptive statistics were used to summarise publications year-wise distribution, country-wise contributions based on affiliation fields, journal distribution and ranking, open access types (Gold, Green, Hybrid, Bronze, Closed) and altmetric attention sources and their mention counts. Pearson's correlation coefficient was calculated to examine the relationship between the AAS and citation counts from Scopus. The techniques (bar charts, trend plots) for visualization were used to illustrate publication trends, geographical contributions and attention source distributions.

RESULTS

Dataset Characteristics

The Scopus database contained 9,992 yoga-related research articles (from 2015 till 2025). The core fields, such as title, year, DOI and citations, had no missing values. The Altmetric database included 6,294 research articles, which had complete coverage for AAS, DOI, title, OA status, publication date and mention counts.

The final subset comprised the top 100 Yoga articles by AAS, covering publication years 2015–2025. The mean Scopus citation count of 195.1 (median 59.5), indicates a skewed distribution which is dominated by a few highly cited papers.

Table 1: Journal Distribution of Top 100 Yoga articles ranked by AAS

Ranking	Journal title	Number of top 100 publications
1	Annals of Internal Medicine	8
2	Journal of the American Medical Association	4
3	The Lancet	3
3	JAMA Network Open	3
4	Journal of the American Geriatrics Society	2
4	Mayo Clinic Proceedings	2
4	JAMA Psychiatry	2

4	International Journal of Environmental Research and Public Health	2
4	Journal of Alternative & Complementary Medicine	2
4	PLOS ONE	2
4	Journal of Clinical Oncology	2
4	Journal of Alzheimer's Disease	2
4	Cancer (0008543X)	2
4	Journal of General Internal Medicine	2
4	British Medical Journal	2
5	JACC	1
5	New England Journal of Medicine	1
5	PLoS Genetics	1
5	Preventive Medicine	1
5	Proceedings of the National Academy of Sciences of the USA	1
5	Psychological Medicine	1
5	Psychoneuroendocrinology	1
5	Evidence-based Complementary & Alternative Medicine	1
5	International Journal of Preventive Medicine	1
5	Nature Reviews Rheumatology	1
5	Journal of Evidence-Based Complementary & Alternative Medicine	1
5	Circulation	1
5	Journal of Bodywork & Movement Therapies	1
5	Menopause (New York, N.Y.)	1
5	Neurology	1
5	Psychiatric clinics of North America	1
5	Topics in Geriatric Rehabilitation	1
5	Women's Health	1
5	American Journal of Lifestyle Medicine	1
5	Annals of Medicine	1
5	Canadian Journal of Cardiology	1
5	European Journal of Preventive Cardiology	1
5	Journal of Clinical Psychiatry	1
5	Oxidative Medicine & Cellular Longevity	1

5	Psychology Research and Behavior Management	1
5	Sleep Medicine Reviews	1
5	EPMA Journal	1
5	Translational Psychiatry	1
5	CA: A Cancer Journal for Clinicians	1
5	Frontiers in Human Neuroscience	1
5	Frontiers in Psychiatry	1
5	BMJ Case Reports	1
5	Frontiers in immunology	1
5	Cochrane database of systematic reviews	1
5	NCHS data brief	1
5	Arthritis & Rheumatology	1
5	JAMA Dermatology	1
5	JAMA Internal Medicine	1
5	Open Forum Infectious Diseases	1
5	BioMed Research International	1
5	Biomedical Journal	1
5	Clinical Diabetes	1
5	Medicine (Wolters Kluwer)	1
5	Journal of Integrative and Complementary Medicine	1
5	International Journal of Behavioral Nutrition and Physical Activity	1
5	Frontiers in Pain Research	1
5	Canadian Medical Association Journal	1
5	Acta Psychiatrica Scandinavica	1
5	Age & Ageing	1
5	American Journal of Gastroenterology	1
5	Behaviour Research & Therapy	1
5	British Journal of Sports Medicine	1
5	Clinical Psychology Review	1
5	Depression & Anxiety (1091-4269)	1
5	Experimental Physiology	1
5	International Journal of Radiation Oncology, Biology, Physics	1
5	Journal of Affective Disorders	1

5	Journal of Orthopaedic Research	1
5	Journal of Psychiatric Research	1
5	Journal of the American Academy of Child & Adolescent Psychiatry	1

As shown in Table 1, “*Annals of Internal Medicine*” contributed the highest number of top 100 articles ($n = 8$), followed by “*Journal of the American Medical Association*” ($n = 4$). “*The Lancet*” and “*JAMA Network Open*” each contributed three articles. Eleven journals published two articles each in the top 100. There are

60 journals published with only a single article. The concentration of publications found in a small number of high impact journals reflects the selective nature of altmetric visibility and the tendency for high-profile medical journals to attract media and public attention.

8.3 Year-wise Distribution of Top 100 Publications

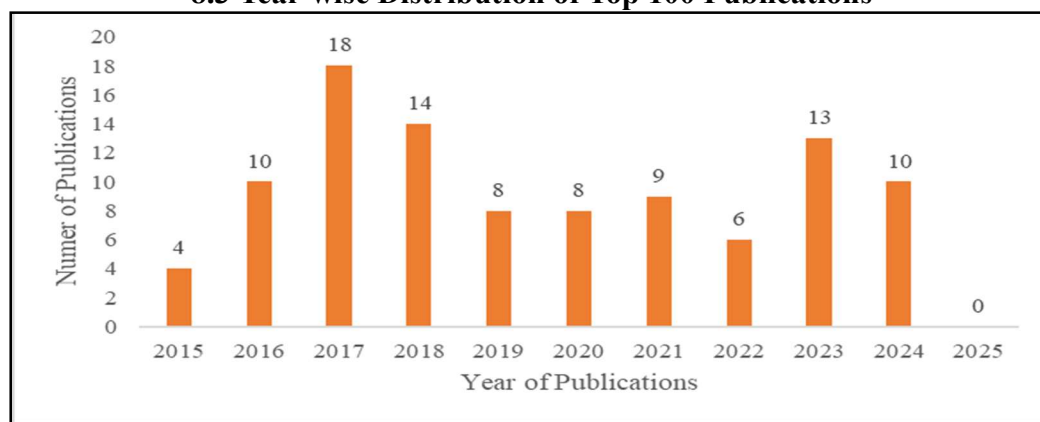


Figure 1: Year-wise distribution of the top 100 Yoga publications by AAS

Figure 1 shows that the highest number of top publications occurred in 2017 ($n = 18$), 2018 ($n = 14$) and 2023 ($n = 13$). A moderate amount of publication activity was seen in 2016 ($n = 10$), 2021 ($n = 9$), 2019 ($n = 8$) and 2020 ($n = 8$). The lowest was in 2015 ($n = 4$) and 2022 ($n = 6$). There were no publications from 2025 that appeared in the top 100, mostly because altmetric did not have enough time to accumulate. The peak in 2017–2018 suggests an active period for highly visible Yoga research. This is probably due to increased global interest in mind-body medicine and preventive health. Another major factor in this may be the growing capabilities of digital broadcasting. The drop in 2022 and also absence of very recent publications may indicate a temporary variation in public and academic attention patterns. It may also be the delay

required for recent articles to accumulate sufficient online mentions.

8.4 Country-wise Distribution of Top 100 Publications

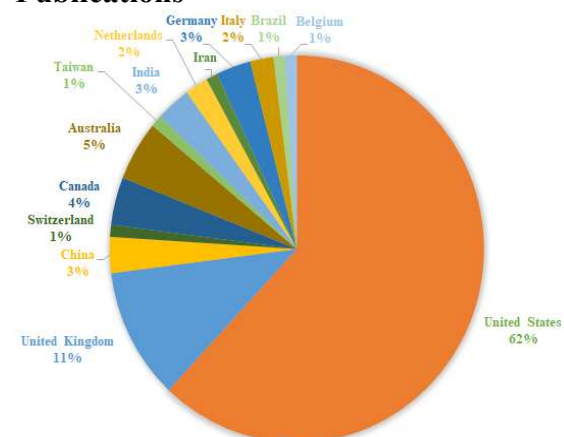


Figure 2: Country-wise distribution of the top 100 Yoga publications by Altmetric Attention Score

As shown in Figure 2, the United States covers 62% of the highly discussed papers,

that is the dominant part in globally visible Yoga research. The United Kingdom contributes 11%, Australia (5%), Canada (4%), China (3%), India (3%) and Germany (3%). Countries such as the Netherlands, Switzerland, Taiwan, Iran, Italy, Brazil and Belgium each contribute between 1% to 2%. India's relatively limited share in the altmetric top 100 suggests that much of the

globally visible Yoga research and its online discourse are concentrated in Western academic systems. This Western centric pattern probably reflects stronger institutional visibility, robust open access and science communication practices. Also, Yoga could be integrated into mainstream clinical and wellness contexts in developed nations.

8.5 Open Access Status of Top 100 Publications

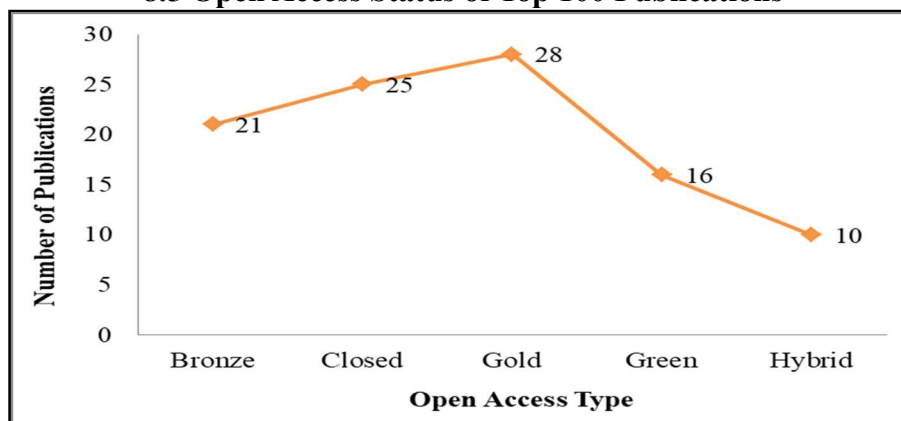


Figure 3: Open access types among the top 100 Yoga publications

Figure 3 indicates that Gold Open Access is the most prevalent model among top 100 publications (n = 28), accounting for 28% of the highly visible Yoga articles. The Closed Access (n = 25; 25%), Bronze Open Access (n = 21; 21%), Green Open Access (n = 16; 16%) and Hybrid Open Access (n = 10; 10%).

The Gold Open Access has a maximum of 28 of the top 100 papers using this model. In fact, 54% (Gold + Green + Hybrid = 54 articles; 54% of top 100) of papers are open

access in some form, versus only 25% (Closed = 25; 25%) that remain behind paywalls. This suggests that when papers are free to read, they get shared more. They are covered by news outlets more and discussed more on social media. That could be the reason why they rank higher on Altmetric. Therefore, the data supports that the open access publishing practices enhance digital visibility and public engagement with Yoga research.

8.6 Altmetric Mention Counts by Attention Source

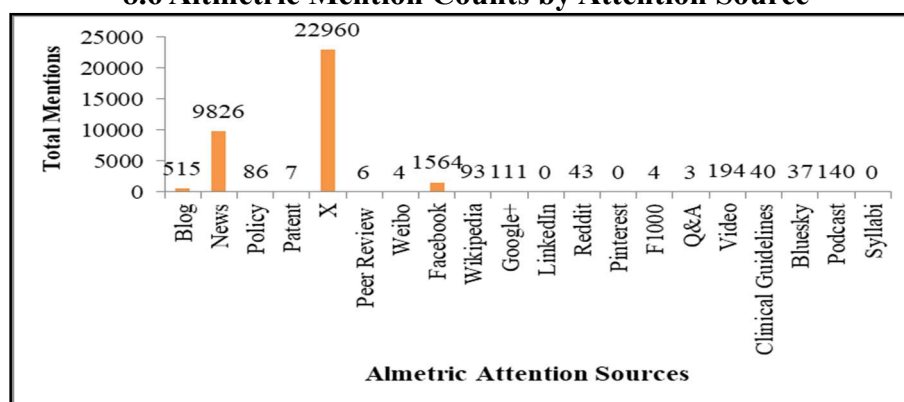


Figure 4: Altmetric mentions of the top 100 Yoga publications by source

Figure 4 shows significant heterogeneity in attention channels. The news outlets and X/Twitter mentions dominate the altmetric mentions. The News mentions reach a maximum of 9,826 across all top 100 articles. The mean of 194.6 per article, indicating that mainstream media plays a significant role in increasing spread of Yoga research. The X/Twitter mentions show a maximum of 22,960 and a mean of 454.7 per article. This shows a strong social media engagement. Facebook mentions average 31 per article (max 1,564) and blogs average 10.2 (max 515). Policy document mentions are sparse (mean 1.7; max 86) and Wikipedia (mean 1.8; max 93) and video platform citations (mean 3.8; max 194). The

mentions from platforms such as LinkedIn, Pinterest and Syllabi are almost negligible or absent. These patterns indicate that the top 100 Yoga articles gather significant visibility due to professional news broadcasting and social microblogging. It gets comparatively limited engagement through formal policy channels, encyclopedic reference, or academic syllabi. The majority of news and social media indicates that Yoga research with high altmetric attention appeals more to general audiences and journalistic interest. It appeals less to the policymakers or for the formal institutional curriculum integration.

8.7 Correlation Between Altmetric Attention Score and Scopus Citations

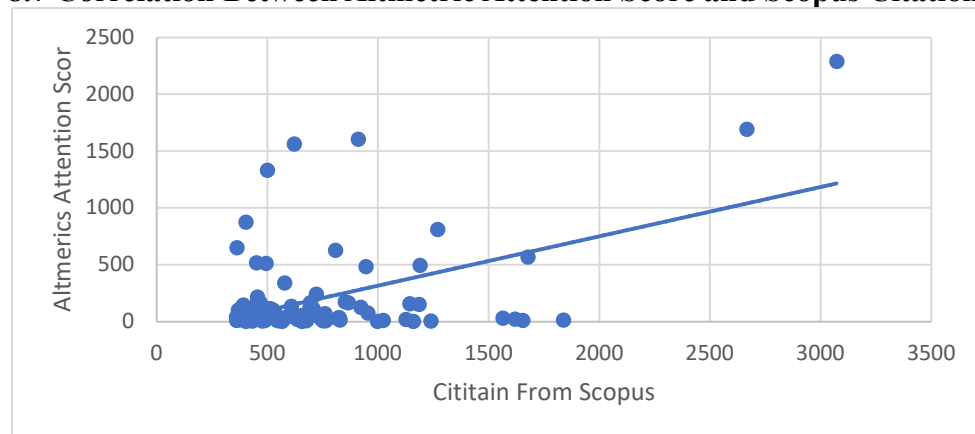


Figure 5. Relationship between Altmetric Attention Score and Scopus citations for the top 100 Yoga publications.

The solid line represents the linear regression fit. Pearson's correlation coefficient calculated for Altmetric Attention Score and Scopus citations for the top 100 articles was $r = 0.494$ ($p < 0.001$). This indicates a moderate positive linear relationship. Figure 5 shows that as AAS increased, citation counts tended to grow, though the relationship was not perfect. There was considerable scatter around the fitted line.

The coefficient of determination was $r^2 = 0.244$. It means approximately 24.4% of the variations in citations could be explained by AAS. The remaining 75.6% was due to other factors. The moderate correlation is inline with what is expected in bibliometric

and altmetric literature. This confirms that altmetrics and citations captures are overlapping yet distinct dimensions of research impact. The social media and news attention (captured by AAS) reflect broader public and journalistic interest. The citations reflect scholarly usage and scientific effect. Papers with higher altmetric attention tend to be discussed more widely and cited more frequently. AAS alone is a limited predictor of citation impact. The correlation affirms the view that citations and altmetrics should be used as complementary indicators rather than exclusive indicators while evaluating influence of any research.

DISCUSSION

An analysis of the annual distribution of highly visible yoga research shows that the period 2017-2018 has been particularly active in terms of online attention (Gupta et al., 2018). A number of coordinated factors may be responsible for this intensive trend in search yields during this period. Prominent among these are the global expansion of 'mind-body therapy' in clinical practices, the growing acceptance of yoga in corporate workplaces and public health programs, and the rise in media interest following the establishment of 'International Yoga Day' (Ranade and Nikam, 2024). Additionally, digital dissemination of research and sophisticated use of social media by researchers and academic institutions have also played a significant role in accelerating this visibility. (Sahoo et al., 2023). In contrast, the apparent decline in highly visible publications in 2022 is difficult to interpret definitively. It may indicate a real reduction in research output or public interest, but it is equally plausible that recent papers have not had sufficient time to accumulate attention and altmetric indicators, because altmetrics often require time to reflect visibility (Haustein, 2016).

The overwhelmingly Western dominance of yoga research is confirmed via an institutional analysis; it shows that 62% of citations on yoga research in major publication outlets like the *Journal of Alternative and Complementary Medicine* come from U.S. institutions, while 11% come from the UK and no other countries reach more than 5% (Gupta et al., 2018). It is essential to note, however, that this data does not necessarily represent total global production of yoga research because there are many other countries, particularly India and other Asian countries, that have made highly significant contributions to yoga research (Ramamurthy et al., 2021). The key difference between the U.S. and Asian countries for yoga research is that the U.S.-based researchers' research is readily available within the digital world and therefore is easier for the general public to

access. Because digital visibility is a proxy for global attention of research findings, researchers in the U.S. use established academic infrastructure and strong institutionalized science communication in order to promote their findings to the public through press releases, advertising on social media, and other similar methods. U.S. based research is also distributed through "open access" publishing that allows the public to access their findings in an expeditious manner and receive press coverage. (Piwovar et al., 2018). The deep integration of yoga into Western medical and public health systems has also contributed to increased journalistic and public interest. The concentration of articles in prestigious Western medical journals further strengthens this influence, given the extensive digital reach and established media networks of these platforms. Conversely, India's underrepresentation (3%), despite being the birthplace of yoga, points to challenges such as indexing of research papers, limited availability of open access, and barriers to active scientific communication. Expanding publication in internationally indexed open-access journals and employing structured digital outreach could enhance the global altmetric visibility of Indian Yoga research. While citations show the academic influence of scholarly research, altmetric attention highlights a wider view of how research is disseminated over online digital platforms.

Research visibility and the 'open access' system are closely interconnected. Statistics show that 54% of leading yoga publications utilise open access, resulting in these articles receiving greater altmetric attention through news and social media (Piwovar et al., 2018). Free availability facilitates the rapid dissemination of research to non-academic communities, which is crucial for practical applications in applied fields like yoga. However, the impact of yoga research currently appears to be more concentrated at the public and media levels than in policy documents (Haustein, 2016). Ultimately, the moderate

correlation between altmetric scores and citation counts indicates that these two factors highlight two different but complementary aspects of research impact (Costas et al., 2015).

CONCLUSION

The altmetric profile of the top 100 Yoga research publications (2015 to 2025) reveals a Western-centric, open-access leaning and digitally visible subset of the Yoga literature, dominated by contributions from the United States and published in high-impact clinical and general medical journals. Time-based analysis shows clustering around 2017 to 2018, likely reflecting convergence of global Yoga adoption, advances in digital penetration and increased public health interest. Gold Open Access dominance and strong spread through news media and social media indicate that open availability and public relevance are drivers of altmetric visibility. The statistically significant moderate correlation between AAS and citations ($r = 0.494$, $p < 0.001$) confirms that altmetrics and traditional metrics capture complementary dimensions of research impact. The AAS reflecting public and media attention and Citations reflecting scholarly uptake.

The study highlights the need for increasing global equity in Yoga research visibility, particularly strengthening the digital and international presence of scholarship from originating country India. The strategies include promoting open-access publishing, building international research collaborations, strengthening institutional communication capacity, and integrating Yoga research into policy and curricula. In future, altmetric and bibliometric analyses should track whether these interventions increase the global and digital footprint of Yoga research and whether increased altmetric and citation attention translates into evidence based Yoga practice and policy.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest related to the conduct or publication of this study.

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