Bibliometric Analysis of Academic Journal Articles Reporting Results of Psychedelic Clinical Studies

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**ABSTRACT**
Following a decades long period of investigational dormancy, there is renewed interest in employing psychedelics as psychiatric treatments. The academic journals, institutions, and countries that have helped sustain clinical psychedelic research and the evolution of the literature on clinical studies of psychedelics have only recently begun to be investigated. To expand upon this work, we conducted a bibliometric analysis of clinical studies of 5-methoxy-N, N-dimethyltryptamine (5-MeO-DMT), ayahuasca, dimethyltryptamine (DMT), lysergic acid diethylamide (LSD), psilocybin, mescaline, 3,4-methylenedioxymethylamphetamine (MDMA), and psilocybin published from 1965–2021. Our search revealed 394 relevant articles. After a lull from the 1970s-1990s, publications in this area have resurfaced. Studies most frequently focused on MDMA (49%), LSD (19%), psilocybin (18%), and ayahuasca (7%). A subanalysis of studies from 1965 to 2009 ("Older cohort") compared to 2010–2021 ("Recent cohort") revealed that the Recent cohort had a higher proportion of studies investigating psychedelics’ therapeutic applications and a lower proportion of studies investigating the effects of psychedelics on people using them in non-research settings. Compared to the Older cohort, psilocybin studies increased proportionally in the Recent cohort, while DMT and mescaline studies decreased. Network analyses of inter-country collaborations suggested that psychedelic researchers in the United Kingdom have the most diverse international collaborations.

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**Introduction**
After a decades long period of clinical and investigational dormancy, there is renewed interest in employing psychedelics as treatments for mental illness and addiction (Kelly et al. 2019; Murnane 2018; Sessa 2018). At the forefront of interventions into the therapeutic applications of psychedelics is 3,4-methylenedioxymethylamphetamine (MDMA), which is currently in phase 3 trials for treatment of posttraumatic stress disorder, while psilocybin is amid phase 2 trials for major depressive disorder, cancer-related depression and anxiety, depression associated with Mild Cognitive Impairment (MCI) or early Alzheimer’s Disease, eating disorders, substance use disorders, and other psychiatric conditions, with a phase 3 trial for treatment-resistant depression soon to begin. Given the treatment potential demonstrated by therapeutic approaches involving these compounds, the United States (US) Food and Drug Administration has bestowed Breakthrough Therapy designation on psilocybin-assisted psychotherapy (Compass Business Wire 2019; Pathways 2018) and MDMA-assisted psychotherapy (Burge 2017). While regulatory, financial, and cultural issues remain important barriers to further advances in psychedelic medicine, researchers, nonprofit organizations, philanthropists, and biotechnology companies continue to make significant strides in bringing these compounds back from the brink of scientific dismissal and into the clinic once more.

Despite growing academic and societal interest in psychedelics, the evolution of the academic literature on clinical studies of psychedelics has only begun to studied in recent years (Hadar et al. 2022; Lawrence et al. 2021), meaning we have limited knowledge of the people, articles, and institutions that have helped sustain and continue to propel clinical psychedelic research forward. In order to further our understanding of the psychedelic clinical research literature, we performed a bibliometric analysis of academic journal articles published from 1965–2021 reporting findings from clinical studies of the prominent psychedelics 5-methoxy-N, N-dimethyltryptamine (5-MeO-DMT),

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ayahuasca, dimethyltryptamine (DMT), ibogaine, lysergic acid diethylamide (LSD), mescaline, MDMA (ecstasy), and psilocybin. This study serves to extend previous bibliometric work in this area by including important non-classic psychedelics (MDMA and ibogaine) in our search strategy and focusing exclusively on clinical studies, in contrast to the approach by Lawrence and colleagues, while also expanding the analysis of the literature from 1965 to 2021, in contrast to Hadar and colleagues’ investigation of articles reporting on psychedelic clinical studies published from 1990–2020. Through our approach, we hope to provide a more temporally comprehensive analysis of the psychedelic clinical research literature that is inclusive of studies conducted on both classic and non-classic psychedelics.

Methods

Search strategy

On February 14th, 2022, we searched PubMed using the “All Fields” search capability for journal articles published from 1936–2021 containing the following search terms: (“psilocybin”) OR (“magic mushrooms”) OR (“LSD”) OR (“lysergic acid diethylamide”) OR (“mescaline”) OR (“peyote”) OR (“MDMA”) OR (“3,4-methylenedioxymethamphetamine”) OR (“ecstasy”) OR (“DMT”) OR (“dimethyltryptamine”) OR (“5-methoxy-N,N-dimethyltryptamine”) OR (“5-MeO-DMT”) OR (“ibogaine”) OR (“ayahuasca”) OR (“hoasca”). We limited results to clinical studies involving humans using PubMed’s built-in filtering functionality. We then entered the PubMed IDs (PMIDs) of resulting articles into the Clarivate Web of Science (WoS) Core Collection for all available years (1965–2021) and extracted detailed metadata on the articles.

After exporting results from WoS, authors JW and BB evaluated the articles to determine whether they were written in English and whether they reported findings of clinical studies investigating the effects of the psychedelics in humans. Discrepancies about whether to exclude an article were resolved through discussion between the authors. Notably, the authors found that a number of search terms overlapped with other commonly used acronyms in medical research (for example, the search term “DMT” resulted in articles on “disease modifying therapy” in the treatment of multiple sclerosis and “LSD” produced results for papers mentioning the statistical terms “least square difference” and “least significant difference”), leading to numerous articles being excluded from the final dataset.

Bibliometric analysis

Bibliometric analysis allows for quantification of publication trends and provides the tools necessary for dissecting and categorizing the academic papers fueling those trends. We used bibliometrix (Aria and Cuccurullo 2017), an open-source R-tool designed to perform comprehensive science mapping analyses, and its associated web-based app biblioshiny to analyze articles detailing clinical studies of psychedelics and extract information about the journals they were published in, their year of publication, their citation count, and their authors (including authors’ academic institutions and the countries of those institutions).

We also conducted a network analysis to study the pattern of coauthor collaboration across countries (Aria and Cuccurullo 2017). A coauthor collaboration network based on affiliation country was generated by indexing the co-occurrence of countries in the author list of an article. To quantitatively describe a country’s propensity to engage in collaborations, we calculated a nodal metric of betweenness centrality that measures how often a node appears on the shortest path between nodes (Brandes 2001). Centrality values were then min-max normalized to the range [0, 1] for simplicity. We used Gephi 0.9.2 (https://github.com/gephi/gephi) and a force-directed layout algorithm for network visualization (Bastian, Heymann, and Jacomy 2009; Jacomy et al. 2014).

Content analysis and associated statistical analyses

Articles were manually reviewed to determine which psychedelics were studied and whether the study involved administering psychedelics to research subjects to assess therapeutic potential or studying the residual effects of psychedelics among people using them in non-research settings. Pearson’s chi-squared test was used to determine whether proportions of articles with varying characteristics based upon the content analysis changed between the Older Cohort (1965–2009) and the Recent Cohort (2010–2021) of articles. In creating these cohorts, we followed Lawrence and colleagues’ decision to dichotomize the literature at the year 2010 (Lawrence et al. 2021). Statistical significance for Pearson’s chi-squared test interpretation was set at p < .05.

Results

Our initial PubMed search identified 807 articles. Four hundred and thirteen were excluded (reasons for exclusion detailed in Figure 1), resulting in a final dataset of 394 articles published across 122 journals and authored by 1130 individuals. The mean number of articles...
reporting findings of clinical studies published per year was 7.04, with a peak during the initial wave of psychedelic research of nine articles in 1968. For further descriptive statistics, including those on article citations, authors, and author collaborations, see Table S1 in the supplement. While only three articles in total were published from 1977–1993, there has been an upward trend since the mid-1990s, which reached an annual peak of 25 articles during 2018. Figure 2A-B illustrates the proportion of clinical study articles published on psychedelics from 1965–2021 and trends in publications on specific psychedelics over this period. 45.4% (179) of articles were published from 1965–2009, while 54.6% (215) were published from 2010–2021.

**Journals**

The journals publishing the most psychedelic clinical trial articles from 1965–2021 were: Psychopharmacology (66), Journal of Psychopharmacology (42), Neuropsychopharmacology (29), and Biological Psychiatry (13). Looking at publications during the “Recent Cohort,” the journals publishing most on psychedelics were Psychopharmacology (38; 57.6% of publications on psychedelics by this journal), Journal of Psychopharmacology (30; 71.4% of publications on psychedelics by this journal), Neuropsychopharmacology (15; 51.7% of publications on psychedelics by this journal). The journals with the most citations of articles reporting findings from psychedelic clinical studies were Psychopharmacology (4,258), Journal of Psychopharmacology (3,848), Neuropsychopharmacology (2,484), and Biological Psychiatry (964). Further details on journals publishing psychedelic clinical study articles can be found in Figure S2 and S3 of the supplement.

**Academic institutions and countries of corresponding authors**

The academic institutions most frequently affiliated with corresponding authors were University of Basel (103), University of Zurich (78), Universitat Autònoma de Barcelona (37), Maastricht University (31), Johns Hopkins University (25), and Imperial College London (25). Corresponding authors were most commonly based in Switzerland (87), United States (USA) (83), United Kingdom (UK) (41), Spain (39), and the Netherlands (38). Countries (by all authors) with the greatest number of paper citations were the USA (8,093), Switzerland (6,664), UK (3,354), Spain (2,567), Netherlands (1,296), Germany (1,156), and Australia (281). Among countries producing at least five clinical studies, the highest number of average article citations came from the USA (97.5), UK (81.8), Switzerland (76.6), Spain (65.8), Germany (46.2), and Netherlands (34.1). For further details on corresponding author countries associated with psychedelic clinical study articles see Figure S4 and S5 in the supplement.

The country collaboration network consisted of 28 nodes. Three nodes (Czech Republic, Lithuania, and Israel) did not have connections and were removed, resulting in a 19-node connected network (Figure 3A). The node representing the UK has the largest number of connections to other nodes and occupies a central position in the network (Figure 3(a-b)). Other nodes, such as USA, Switzerland, and Germany have a stronger connection between them (Figure 3(a)), but a lower overall centrality in the network (Figure 3(a-b)).
Articles most frequently reported findings from clinical studies of MDMA (195, 49.5%), followed by LSD (75, 19.0%), psilocybin (72, 18.3%), ayahuasca (28, 7.1%), DMT (14, 3.6%), mescaline (6, 1.5%), and ibogaine (5, 1.3%). We found that 68.1% (49) of psilocybin studies, 57.1% (16) of ayahuasca studies, 50.8% (99) of MDMA studies, 49.3% (37) of LSD studies, 40.0% (2) of ibogaine studies, 6.7% (1) of DMT studies, and 0% (0) of mescaline clinical studies were published in the Recent Cohort of articles.

Compared to the Older cohort, the Recent cohort of articles contained a higher proportion of studies investigating psilocybin (24.1% versus 12.0%, p = .002) and lower proportions of studies on DMT (0.5% versus 6.8%, p = .001) and mescaline (0% versus 3.1%, p = .011). MDMA remained the most commonly investigated psychedelic in clinical studies, accounting for almost half (48.77%) of articles in the Recent Cohort, only a slight, non-statistically significant decrease from 50.26% in the Older Cohort. The Recent Cohort was also noted to contain a larger proportion of studies on the therapeutic use of psychedelics (19.2% versus 9.4%, p = .006) and

**Content analysis**

![Figure 2](image_url)  (A) Proportion of psychedelic clinical study articles published on therapeutic use annually from 1965–2018. (B) Number of psychedelic clinical study articles published per year per compound.
a larger proportion of studies of the effects of psychedelics in people using them in non-medical settings (23.6% versus 8.4%, \( p < .0001 \)). Further comparisons of the Older and Recent Cohorts can be found in Table 1.

The 10 most cited articles from both the Recent and Older Cohorts of psychedelic studies are listed in Table 2. These articles provide insight into the significant shifts in research on psychedelics that have occurred over the last decade. Among the 10 most cited papers from the Older Cohort, MDMA is the subject of five papers, which were published from 1994–2000. During this period, recreational use of MDMA in the nightclub scene grew significantly and a number of deaths involving MDMA, often due to interactions with medications such as ritonavir, gained extensive media attention that peaked from 2000–2002 (Ahrens 2013). There was also media coverage and research into whether MDMA caused neurotoxicity and other serious side effects, which is also reflected in the top 10 cited papers of the Older Cohort. Two of these papers (McCann et al. 1994, 1998) were investigations into MDMA’s potential for serotonergic neurotoxicity, while the remainder reported investigations of MDMA’s physical and psychological effects (F. X. Mas et al. 1999; Vollenweider et al. 1998b), including its pharmacokinetic properties (De la Torre et al. 2000). Despite being the subject of extensive studies in the 1950s and 1960s, only one article in the Older Cohort’s top 10 cited articles investigated LSD. That article, which had a primary focus on tetrahydrocannabinol (THC), included a small experiment demonstrating that there was no cross tolerance between THC and LSD (Isbell et al. 1967). Another indicator of the scientific community’s focus on psychedelic-related risks in the Older Cohort is the fact that only two articles from its top 10 most cited were related to therapeutic applications of psychedelics, with one being a study of psilocybin in obsessive-compulsive disorder (Moreno et al. 2006) and the other being “Psilocybin can occasion mystical-type experiences having substantial and sustained personal meaning and spiritual significance” (R. R. Griffiths
| Authors | Title | Journal | Year | Citations |
|---------|-------|---------|------|-----------|
| Griffiths, RR; Richards, WA; McCann, U; Jesse, R | Psilocybin can occasion mystical-type experiences having substantial and sustained personal meaning and spiritual significance | Psychopharmacology | 2006 | 550 |
| Mccann, UD; Szabo, Z; Scheffel, U; Dannals, RF; Ricaurte, GA | Positron emission tomographic evidence of toxic effect of MDMA (Ecstasy) on brain serotonin neurons in human beings | Lancet | 1998 | 490 |
| Vollmeider, FX; Vollmeider-Scherpenhuyzen, MF; Babler, A; Vogel, H; Hell, D | Psilocybin induces schizophrenia-like psychosis in humans via a serotonin-2 agonist action | Neurureport | 1998 | 478 |
| Isbell, H; Gorodetzki, D; Jasinski, D; Claussen, U; Vonsnap; Korte, F | Effects of (-)-delta9-trans-tetrahydrocannabinol in man | Psychopharmacologia | 1967 | 420 |
| Vollmeider, FX; Gamma, Ag; Liechtli, M; Huber, T | Psychological and cardiovascular effects and short-term sequelae of MDMA (Ecstasy) in MDMA-naive healthy volunteers | Neuropsychotherapy | 1998 | 292 |
| Mccann, Ud; Ridenour, A; Shaham, Y; Ricaurte, Ga | Serotonin neurotoxicity after (+) 3,4-methylenedioxymethamphetamine (MDMA ecstasy) – a controlled-study in humans | Neuropsychopharmacology | 1994 | 261 |
| De La Torre, R; Farre, M; Ortiz, J; Mas, M; Brenneisen, R; Roset, PN; Segura, J; Cami, J | Non-linear pharmacokinetics of MDMA ("ecstasy") in humans | British Journal Of Clinical Pharmacology | 2000 | 255 |
| Moreno, Fa; Wiegand, Cb; Taitano, Ec; Delgado, Pl | Safety, tolerability, and efficacy of psilocybin in 9 patients with obsessive-compulsive disorder | Journal Of Clinical Psychiatry | 2006 | 246 |
| Strassman, Rj; Qualls, Cr; Uhlenhuth, Eh; Kellner, R | Dose-response study of n,n-dimethyltryptamine in humans: subjective effects and preliminary-results of a new rating-scale | Archives Of General Psychiatry | 1994 | 243 |
| Mas, M; Farre, M; De La Torre, R; Roset, PN; Ortiz, J; Segura, J; Cami, J | Cardiovascular and neuroendocrine effects and pharmacokinetics of 3,4-methylenedioxymethamphetamine in humans | Journal Of Pharmacology And Experimental Therapeutics | 1999 | 241 |
| Griffiths, RR; Johnson, MW; Carducci, Ma; Umbricht, A; Richards, Wa; Richards, Bd; Cosimano, Mp; Klinedinst, Ma | Psilocybin produces substantial and sustained decreases in depression and anxiety in patients with life-threatening cancer: A randomized double-blind trial | Journal Of Psychopharmacology | 2016 | 485 |
| Grob, Cs; Danforth, Al; Chopra, GS; Hagerty, M; Mckay, CR; Halberstadt, AL; Greer, GR | Pilot Study of Psilocybin Treatment for Anxiety in Patients With Advanced-Stage Cancer | Archives Of General Psychiatry | 2011 | 456 |
| Carhart-Harris, Rj; Erritzoe, D; Rucker, J; Day, Cmj; Forbes, B; Feilding, A; Taylor, D; Pilling, S; Curran, Vh; Nutt, Dj | Psilocybin with psychological support for treatment-resistant depression: an open-label feasibility study | Lancet Psychiatry | 2016 | 429 |
| Ross, S; Bossis, A; Guss, J; Agin-Liebes, G; Malone, T; Cohen, B; Mennenga, Se; Belser, A; Kalliontzki, K; Babb, J; Su, Z; Corby, P; Schmidt, BI | Rapid and sustained symptom reduction following psilocybin treatment for anxiety and depression in patients with life-threatening cancer: a randomized controlled trial | Journal Of Psychopharmacology | 2016 | 423 |
| Carhart-Harris, Rj; Erritzoe, D; Williams, T; Stone, Jm; Reed, Lj; Colasanti, A; Tyacke, Rj; Leech, R; Malizia, Al; Murphy, K; Hobden, P; Evans, J; Feilding, A; Wise, Rg; Nutt, Dj | Neural correlates of the psychedelic state as determined by fMRI studies with psilocybin | Proceedings Of The National Academy Of Sciences Of The United States Of America | 2012 | 418 |
| Bogenschutz, Mp; Forcehimes, Aa; Pommy, Ja; Wilcox, Ce; Barbosa, Pcr; Strassman, Rj | Psilocybin-assisted treatment for alcohol dependence: A proof-of-concept study | Journal Of Psychopharmacology | 2015 | 348 |
| Griffiths, RR; Johnson, MW; Richards, WA; Richards, BD; McCann, U; Jesse, R | Psilocybin occasioned mystical-type experiences: immediate and persisting dose-related effects | Psychopharmacology | 2011 | 312 |
| Mitmoefer, Mc; Wagner, Mt; Mitmoefer, At; Jerome, L; Doblin, R | The safety and efficacy of +/- 3,4-methylenedioxymethamphetamine-assisted psychotherapy in subjects with chronic, treatment-resistant posttraumatic stress disorder: the first randomized controlled pilot study | Journal Of Psychopharmacology | 2011 | 311 |
| Johnson, Mw; Garcia-Romeu, A; Cosimano, Mp; Griffiths, Rr | Pilot study of the 5-HT2AR agonist psilocybin in the treatment of tobacco addiction | Journal Of Psychopharmacology | 2014 | 297 |
| Gasser, P; Holstein, D; Michel, Y; Doblin, R; Yazarr-Klosinski, B; Passie, T; Brenneisen, R | Safety and Efficacy of Lysergic Acid Diethylamide-Assisted Psychotherapy for Anxiety Associated With Life-threatening Diseases | Journal Of Nervous And Mental Disease | 2014 | 263 |
et al. 2006), which is said by many to have initiated the “psychedelic renaissance.” The two final most cited papers from the Older Cohort were a dose–response study of dimethyltryptamine (Strassman et al. 1994) and a study demonstrating that psilocybin’s subjective effects in humans are due to 5-HT2 (serotonin) receptor activation rather than stimulation of the dopaminergic system (F. X. Vollenweider et al. 1998b).

The top most cited papers of the Recent Cohort demonstrate two shifts occurring in high impact psychedelic clinical research. The first of these is a transition from research focused on potential risks of psychedelics (MDMA in particular) toward studies focusing on their therapeutic potential, with nine of the papers focused on therapeutic applications of LSD, MDMA, and psilocybin (Grob et al. 2011; R. R. Griffiths et al. 2016; R. L. Carhart-Harris et al. 2016; Ross et al. 2016; Mithoefer et al. 2011; Bogenschutz et al. 2015; R. R. Griffiths et al. 2011; Johnson et al. 2014; Gasser et al. 2014). The second shift is the ascendance of psilocybin in psychedelic clinical studies, with that compound being the focus of eight of the 10 most cited articles. These articles on psilocybin are wide ranging, including a functional imaging study of its psychological effects (R. L. Carhart-Harris et al. 2012), as well as studies of its effects on psychologically healthy individuals in a supportive setting (R. R. Griffiths et al. 2011), patients with depression (R. L. Carhart-Harris et al. 2016), patients experiencing psychological distress due to cancer (Grob et al. 2011; R. R. Griffiths et al. 2016; Ross et al. 2016), patients with alcohol use disorder (Bogenschutz et al. 2015), and patients with tobacco use disorder (Johnson et al. 2014). Rounding out the Recent Cohort top cited articles are a study of LSD-assisted psychotherapy’s effects on anxiety associated with life-threatening disease (Gasser et al. 2014) and MDMA-assisted psychotherapy’s effects on treatment-resistant posttraumatic stress disorder (Mithoefer et al. 2011).

Discussion

This appears to be only the third peer-reviewed bibliometric investigation of articles reporting results of psychedelic studies. While the first such analysis (Lawrence et al. 2021), focused on the most cited articles reporting results of clinical and pre-clinical studies of classic psychedelics, this study broadens our understanding of psychedelic research in humans by its evaluation of all clinical studies of classic psychedelics and the prominent non-classic psychedelics ibogaine and MDMA published from 1965–2021. Though the second psychedelic study bibliometric analysis focused on clinical studies like ours, its range was restricted to the years 1990 to 2020 (Hadar et al. 2022). Consistent with these studies, our findings indicate that publications on clinical studies of psychedelics have resurfaced over the last two decades and continue on an upward trajectory. They also reveal that most psychedelic clinical studies thus far have focused on MDMA, LSD, psilocybin, and ayahuasca. Considerably fewer articles have been published on clinical studies of 5-MeO-DMT, ayahuasca, DMT, and ibogaine. Our content analysis demonstrated that the proportion of articles on mescaline and DMT clinical studies has dropped in the Recent Cohort of articles, while there has now been one published clinical study of 5-MeO-DMT in the Recent Cohort compared to none in the Older Cohort (Uthaug et al. 2020). With five active clinical studies of DMT (U.S. National Library of Medicine 2022g, 2022e, 2022d, 2022a, 2022c) and two of mescaline (U.S. National Library of Medicine 2022f, 2022b) registered on clinicaltrials.gov, it appears that the dearth of DMT and mescaline studies in the Recent Cohort may not hold. Given the interest in developing psilocybin as a treatment for depression and other disorders, the proportion of psilocybin studies in the Recent Cohort was more than double that of the Older Cohort. The predominance of MDMA studies throughout the entire cohort likely reflects a focus on this compound by funding agencies due to its higher misuse potential secondary to its ability to induce higher levels of drug liking and a subjective “high” than classic psychedelics (Holze et al. 2020).

We found that the Recent Cohort of articles contained more than twice the proportion of articles on studies of the therapeutic potential of psychedelics as the Older Cohort, though these types of studies are still in the minority. As research-focused governmental organizations around the world begin funding medicinal psychedelic research for the first time in decades (Barnett, Parker, and Weleff 2021; Johns Hopkins Medicine Newsroom 2021), it is likely that this proportion will grow. Somewhat concerningly, the proportion of clinical studies investigating the beneficial and adverse effects of psychedelics in people using them in non-medical settings fell considerably in the Recent Cohort. Despite the growth in clinical trials of psychedelics, such studies, particularly those including people who use psychedelics in naturalistic settings, remain important, particularly given recent increases in naturalistic psychedelic use reported in multiple countries (United Kingdom Government 2021; Van Laar and Van Miltenburg 2020; Yockey, Vidourek, and King 2020). Such studies can help provide a clearer understanding of the risk profile of psychedelic use outside the laboratory setting and may be helpful for policymakers,
considering the ongoing reappraisal of psychedelics’ societal and medicinal value, as well as their legal status, that appears to be underway in many countries, including the US, Canada, and the UK (British Broadcasting Corporation 2022; Campbell 2022; Ponieman 2021).

As of 2021, articles reporting on psychedelic clinical studies were primarily published in journals with a biological psychiatry or psychopharmacology focus. However, with recent results of clinical trials of psilocybin-assisted therapy for depression (R. Carhart-Harris et al. 2021) and MDMA-assisted therapy for PTSD (Mitchell et al. 2021) published in high profile general medical journals such as the New England Journal of Medicine and Nature Medicine, future bibliometric analyses may find an expansion of the types of journals publishing these types of articles.

Notably, our findings demonstrate that investigators at a small number of academic research institutions in the USA, the UK, Switzerland, Spain, Netherlands, Germany, and Australia have conducted the majority of psychedelic clinical research thus far. Two established psychedelic research centers, Imperial College in the UK (O’Hare 2019) and Johns Hopkins University (Lewis 2020) in the US, have opened formal research centers dedicated to the study of psychedelics in recent years. Additional centers have also recently opened in the US and Canada, suggesting growing academic interest in working with psychedelics and a likely expansion of institutions contributing to this area of research.

The network analyses we applied to inter-country collaborations suggests that psychedelic researchers in the UK have more diverse collaborations by working with collaborators in a large number of countries. Further, the UK occupies a unique position in the global psychedelic clinical studies network by connecting nodes of researchers who would otherwise be disconnected (Denmark, Sweden, and South Africa). These analyses also revealed several collaborations between certain countries, such as Switzerland-USA-Germany, Belgium-Netherlands, and Italy–Spain. Intriguingly, the countries that account for the highest research output were not necessarily the most collaborative internationally (Figure 3B).

With philanthropists (Psychedelic Science Funders Collaborative 2017), the biotechnology industry (Taylor and Gormley 2021), and governments increasingly interested in developing psychedelic treatments, the medicinal psychedelic research community appears poised to see the entry of new investigators and institutions. Hopefully, this will catalyze the scientific community’s efforts to better understand these compounds and potentially harness them as novel treatments.

The primary limitation of this study is the fact that only articles published in journals indexed in PubMed and WoS were captured in our search. Relevant older journal articles may not have been indexed, likely skewing our data toward more recent publications. Additionally, our study’s scope was limited to articles addressing clinical studies of psychedelics. Thus, articles describing basic science investigations into psychedelics were excluded.

**Conclusions**

We believe this study to be the first bibliometric analysis of clinical studies in humans involving classic psychedelics, as well as the prominent non-classic psychedelics MDMA and ibogaine, from 1965–2021. We found that MDMA, LSD, and psilocybin were the most commonly studied psychedelics during the study period, with the recent cohort of articles published starting in 2010 having a higher proportion of studies investigating psychedelics’ therapeutic applications and a lower proportion of studies investigating the effects of psychedelics on people using them in non-research settings compared to the older cohort of articles. Importantly, studies on psilocybin appear to be increasing proportionally since 2010, while studies on DMT and mescaline have decreased proportionally and studies on MDMA are proportionally unchanged. With increasing academic interest in psychedelics and growing funding opportunities, it seems likely that there will be changes in the journals, authors, academic institutions, and countries involved in clinical studies of psychedelics in coming years.

**Disclosure statement**

Dr. Barnett reports receiving stock options from CB Therapeutics for compensation of consulting services. He also receives monetary compensation for editorial work for DynaMed Plus (EBSCO Industries, Inc). Dr. Akiki serves on the scientific advisory board of and has stock options with Mindbloom, Inc., and receives payment for editorial work for Data in Brief (published by Elsevier). Dr. Weleff reports no potential conflicts of interest.

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Data availability statement

Data used in this analysis has been uploaded and made publicly available on figshare (Weleff, Akiki, and Barnett 2021). Other information can be obtained by contacting Dr. Weleff.

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