



Mapping and analyzing the scientific literature on drug abuse

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ABSTRACT

This scientometric study comprehensively analyzes drug abuse research within the top 10 countries indexed in the Web of Science from 2010 to August 2023. It highlights the significant contributions of authors like Kendler KS and institutions such as the University of California System, emphasizing their pivotal role in advancing our understanding of drug abuse. The United States, China, and Iran emerge as leading contributors, with funding predominantly provided by institutions like the United States Department of Health and Human Services, NIH USA, and NIDA. The study identifies four distinct research clusters focusing on alcohol, cocaine, opioids, and cannabis, offering nuanced insights into specific areas of emphasis within drug abuse research. These findings underscore the need for collaborative, multi-faceted approaches involving researchers, institutions, and countries to address the complex challenges posed by drug abuse effectively. Building upon these insights, future research and policy initiatives can work towards more effective prevention, intervention, and support strategies, ultimately contributing to improvements in public health and well-being.

Keywords: drug abuse, substance abuse, scientometric analysis, web of science.

1. INTRODUCTION

NONMEDICAL drug consumption dates back to the discovery of mood-altering substances such as opium, leading to their widespread acceptance in various societies (Siegel, 2005). The consumption of some drugs has never been pointed out as a concern until the late 20s when the terms “drug abuse” and “substance abuse” were pinpointed to describe using contraband drugs in the US (Zinberg *et al.*, 1978).

Drug abuse refers to “the excessive, mal-adaptive, or addictive use of drugs for non-medical purposes despite social, psychological, and physical problems that may arise from such use” (Britanica, 2023). Abusing substances, although commonly seen as utterly similar to drug abuse, is a little different and includes consuming “agents such as anabolic steroids, which some athletes use to accelerate muscular development and increase strength” (2023).

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In other terms, the use of certain chemicals, for example, alcohol, tobacco, cocaine, opium, heroin, ecstasy, and LSD, to produce pleasurable effects on the brain is referred to as drug abuse or substance abuse, which can be primarily used as a pain reliever, curiosity, peer pressure, religious practices or rituals, recreational, or even obtaining creative inspiration (Mandal, 2013; Possi, 2018). Over and over, substance abusers develop chemical dependence, slowly constructing a wall of denial and genuinely believing drug use is a result of misfortune, leading to repeated negative consequences (Tommasello, 2004).

The usage and dependency indeed do come with a course of drawbacks and risk factors. A study showed that risk factors for substance abuse during pregnancy include subpar prenatal care, a history of premature labor, and bring difficulties that seriously impact the health of both the mother and the fetus (Kuczkowski, 2007). As for physical damages, for example, drug abuse can manifest as skin changes, granulomas, ulcerations, and recurrent infections, with oral disease and tooth decay often linked to methamphetamine abuse (Liu *et al.*, 2010). Another issue related to drug abuse can be seen as genetic risk factors and altered gene expression, as well as psychiatric and neurological symptoms, which are the primary manifestations of drug toxicity alongside cardiovascular complications (Büttner, 2011). Furthermore, it is not summarized only on an individual's physical scale; it also results in anti-social behaviors (Ray, 2002).

The distinction between utilizing drugs and abusing them was quite noticeable when observing extreme behaviors, but discerning between the two became challenging within the intermediate zone, which encompassed the majority of instances. Many factors can propel these behaviors, including society, the environment, family, friends, or peers. Personal characteristics like specific behaviors, self-confidence, value system, and grade average may also facilitate or trigger drug abuse (Sheppard, 1984).

Drug abuse is directly responsible for many sufferings, like fatalities, diseases, and impairments. Also, they are linked to the most catastrophic and dangerous issues, such as cancer, cardiovascular illness, accidents, and violence (Haack & Adger, 2002). Therefore, scholars

implied discrepant approaches, including literature analysis or bibliographic approaches, to comprehend and structure the preceding research outcomes. One of the most commonly used approaches to bibliometric studies, especially in social science, is science mapping, which involves analyzing and visualizing the intellectual contributions within a specific area of scientific knowledge using tools, metrics, and theories to uncover patterns and trends in the literature (Chen, 2017). Utilizing science mapping tools can yield novel insights into the evolution of social work as a scientific field, including its knowledge formation, strengths, and potential future focus areas, highlighting the ongoing importance of employing these tools for analyzing the social work domain. For example, in one study (Martínez *et al.*, 2015) using science mapping analysis to show the social work field's conceptual structure and scientific evolution, the results showed research themes have gained more interest in social work.

Drugs themselves and many related areas have been shed up an array of times in different approaches, for instance, offering a framework that maps up drug production, distribution, and consumption (Hallam & Bewley-Taylor, 2010). Given the importance of drug abuse, it has also appeared numerous times in scholars' work to address the issue (Hallam & Bewley-Taylor, 2010). However, to date, there has not been a study done on science mapping drug abuse in the top 10 countries, including the US, Canada, England, Spain, Italy, Germany, Iran, India, China, and Brazil, between 2010 and August 2023. In this study, we analyzed the correlation between academic productions about drug and substance abuse and drug abuse in the mentioned countries, implying a science mapping technique to blur whether focusing on a societal issue can genuinely address the issue.

2. METHODS

The study employed a descriptive methodology and a scientometric approach to analyze data on drug abuse. The data was sourced from the Web Of Science, with the Statistical Society comprising all documents produced in this scientific field by the top 10 countries between 2010 and August 2023. Notably, the total number of scientific degrees indexed in the Web of

Science was 9117, with no statistical sampling employed for this study. To gather the necessary data, the search term “drug abuse” was entered into the Web of Science topic option under the advanced search section of the Web Of Science. The search results were then restricted to the top 10 countries from 2010 to 2023 (August). It is essential to highlight that the search operation was conducted on August 25, 2023, and the search strategy employed in this study was: “Results for “drug abuse” (Topic) and 2010 or 2011 or 2012 or 2013 or 2014 or 2015 or 2016 or 2017 or 2018 or 2019 or 2020 or 2021 or 2022 or 2023 (Publication Years) and USA or PEOPLES R CHINA or IRAN or CANADA or ENGLAND or SPAIN or ITALY or GERMANY or INDIA or BRAZIL (Countries/Regions)”

To save the data, the storage section of Web of Science was used. The data was saved in plain text format in packages of 1000 numbers and later consolidated into a single file in plain text format. By utilizing the WOS analysis section, we were able to extract descriptive results in the form of tables and graphs, which made it much easier to analyze our findings. We used Microsoft Excel V.2019 and Vosviewer V.1.6 software to conduct statistical analysis and create scientific maps. With the help of Vosviewer V.1.6, we could generate scientific maps that depicted the inter-relationships between countries, co-occurrences, and clusters in this scientific field. It is important to note that ethical considerations were not applicable in this study, as the samples examined were articles.

3. RESULTS

Based on the analysis of the data presented in Table 1, it is apparent that Kendler KS played a significant role in the field of drug abuse research between 2010 and 2023. Sundquist K and Sundquist J also made noteworthy contributions, ranking second and third, respectively. Furthermore, it is worth noting that authors from ten countries with high scientific production in this domain were well represented. After analyzing the data presented in Table 1, it is clear that Kendler KS played a significant role in drug abuse research from 2010 to 2023. Sundquist K and Sundquist J also made notable contributions, ranking second and third. Additionally, it is interesting that authors from

10 countries with high scientific production in this field were well represented (Table 1).

Authors	Record Count	% of 9,117
Kendler KS	71	0.779
Sundquist K	71	0.779
Sundquist J	69	0.757
Ohlsson H	51	0.559
Nunes EV	34	0.373
Schwartz RP	34	0.373
Dart RC	31	0.340
Wu LT	31	0.340
Schifano F	30	0.329
Carroll ME	29	0.318

Table 1. Top authors in the scientific field of drug abuse in the years 2010-2023 (top 10 countries)

Table 2 reveals that the University of California System, the National Institute of Health NIH USA, and Harvard University were the foremost institutions in terms of scientific output within the field of drug abuse from 2012 to 2023. The University of California System was at the forefront, producing 501 documents, equating to 5.495% of the scientific output during that period. These findings offer valuable insight into the institutions’ substantial contributions to drug abuse research (Table 2).

Affiliations	Record Count	% of 9,117
University of California System	501	5.495
National Institutes of Health NIH USA	365	4.004
Harvard University	312	3.422
US Department of Veterans Affairs	278	3.049
Veterans Health Administration VHA	274	3.005

Table 2. Top universities in the scientific field of drug abuse in the years 2010-2023 (top 10 countries).

We were examining Scientific Figure 1 and noticed that it effectively displays the correlation between the universities with the highest ranking for scientific output in drug abuse. It covers the period from 2010 to 2023. (Figure 1).

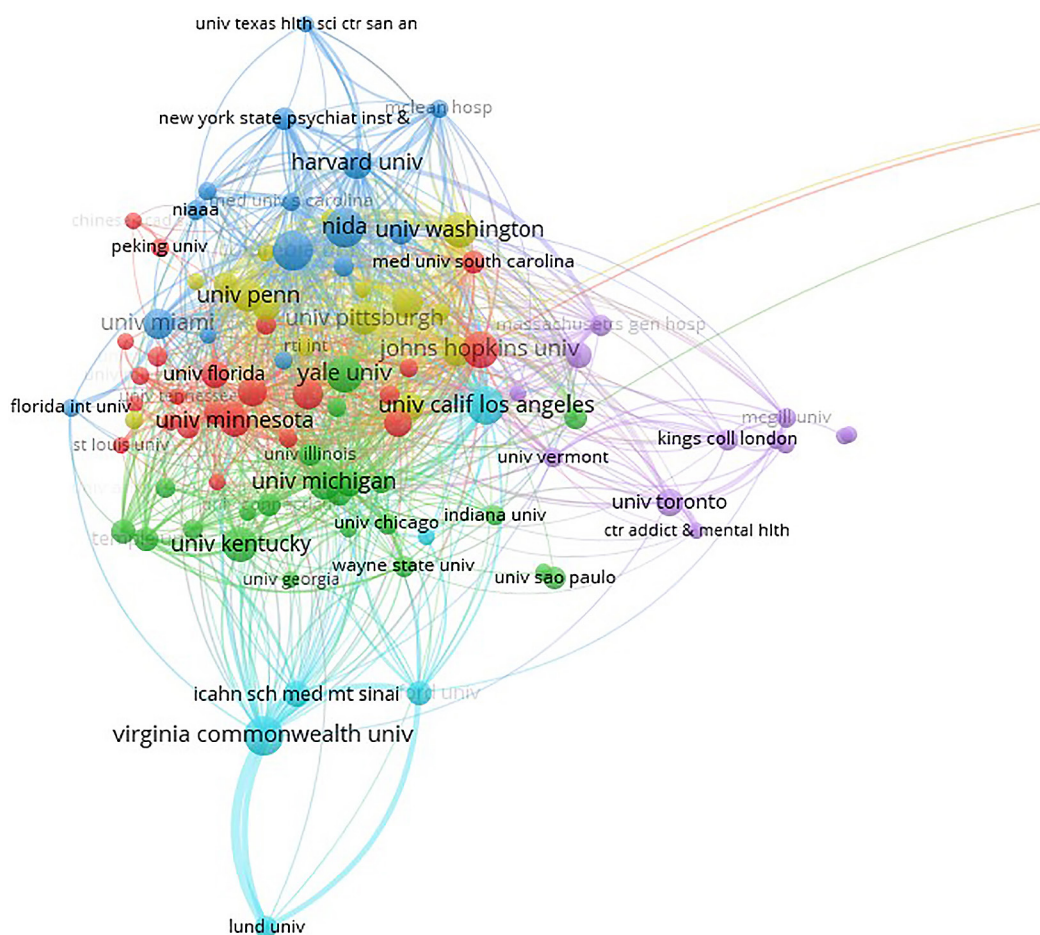


Figure 1. Relations of top Universities in the scientific field of drug abuse in the years 2010-2023 (top 10 countries)

Figure 2 presents a comprehensive analysis of the countries that have made the most significant scientific contributions to drug abuse between 2010 and 2023. The results indicate that the United States, China, and Iran are the top three countries in scientific production in this field. Additionally, Canada, England, Spain, and Italy have emerged as the fourth through seventh countries, respectively, among the top ten contributors to drug abuse research during this specified time frame. These findings are crucial in providing a global perspective on the distribution of drug abuse research, which can prove immensely valuable in shaping future research efforts (Figure 2). Also, upon examining Science Figure 3, we observed that it effectively illustrates the correlation between the highest-ranking countries regarding scientific output in drug abuse, spanning from 2010 to 2023. (Figure 3).

Upon analyzing the subject, we learned that articles containing 7475 records are the most frequent form of scientific production. Following closely, we have reviewed articles with 1046 records and editorial materials with 246 records. Book Chapters with 212, Meeting Abstracts with 203, and Proceeding Papers with 174 records rank next in frequency. Table 4 comprehensively lists other document types (Figure 4).

According to the data in Table 5, the United States Department of Health and Human Services is the primary funder in the scientific realm of drug abuse. They have allocated 2737 funds, making up roughly 30.021% of the total funds provided. The NIH USA and NIDA branches of the National Institutes of Health closely followed in second and third place with 2623 and 1536 funds, respectively. These three institutions are the main sources of funding for this field from 2010 to 2023 (Table 3).

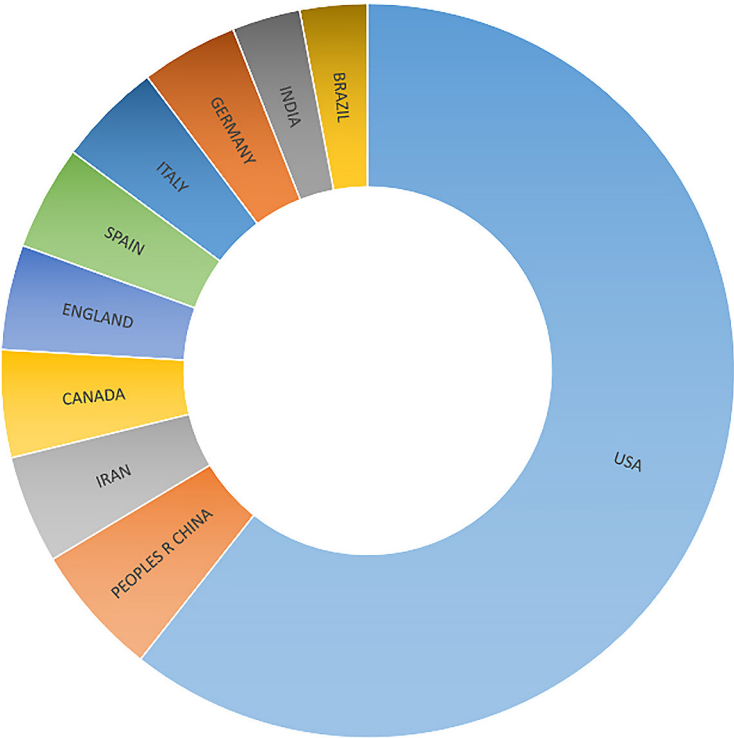


Figure 2. Top countries in the scientific field of drug abuse in the years 2010-2023 (top 10 countries).

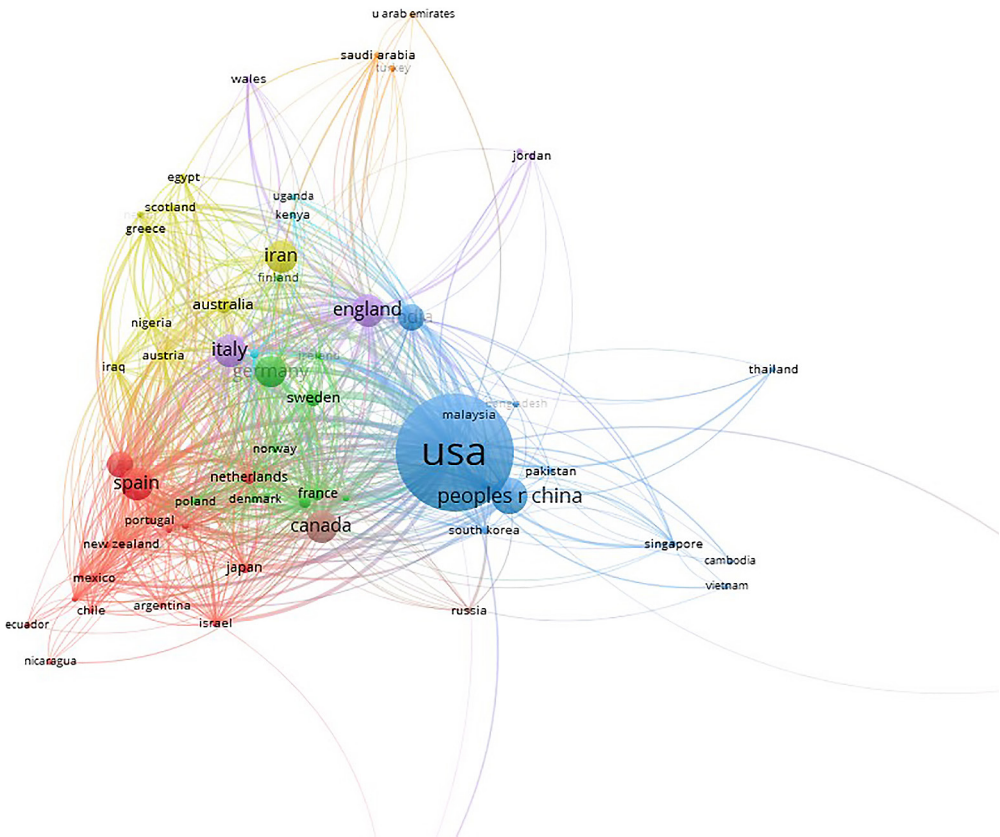


Figure 3. Relations of top countries in the scientific field of drug abuse in the years 2010-2023 (top 10 countries).

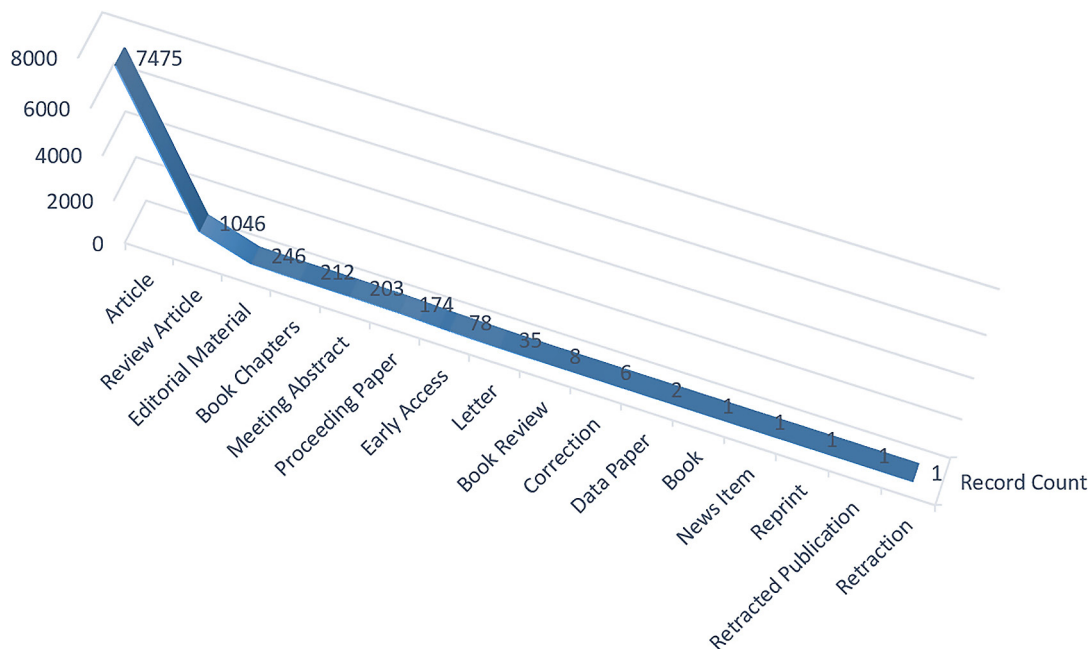


Figure 4. Types of documents in the scientific field of drug abuse in the years 2010-2023 (top 10 countries).

Funding Agencies	Record Count	% of 9,117
United States Department Of Health and Human Services	2737	30.021
National Institutes Of Health Nih Usa	2623	28.770
Nih National Institute On Drug Abuse Nida	1536	16.848
Nih National Institute On Alcohol Abuse Alcoholism Nia	320	3.510
Nih National Institute Of Mental Health Nimh	244	2.676
National Natural Science Foundation Of China Nsfc	228	2.501
Canadian Institutes Of Health Research Center	109	1.196
Spanish Government	102	1.119
UK Research Innovation Ukri	76	0.834
Conselho Nacional De Desenvolvimento Cientifico E Tecnologico Cnpq	73	0.801

Table 3. Institutions providing funds in the scientific field of drug abuse in the years 2010-2023 (top 10 countries).

In the field in question, 9,117 scientific records have been published by reputable publishers, including Elsevier Publications, Springer Nature Publications, and Taylor & Francis. Of these publishers, it has been noted that Elsevier Publications boasts the highest number of scientific publications, with a total of 2,130 records. Secondly, Springer Nature Publications has published 1,333 records, and Taylor & Francis has published 818 records. This notable observation underscores the significant contributions that Elsevier Publications have made to the scientific community in this specific field.

Notably, the journal DRUG AND ALCOHOL DEPENDENCE has the highest scientific records in this field, with a total of 254. Following closely behind are PSYCHOPHARMACOLOGY with 188 records and SUBSTANCE USE MISUSE with 170 records. These findings underscore the significance of these journals as valuable resources for researchers and practitioners alike, shaping the discourse around the abuse of drugs.

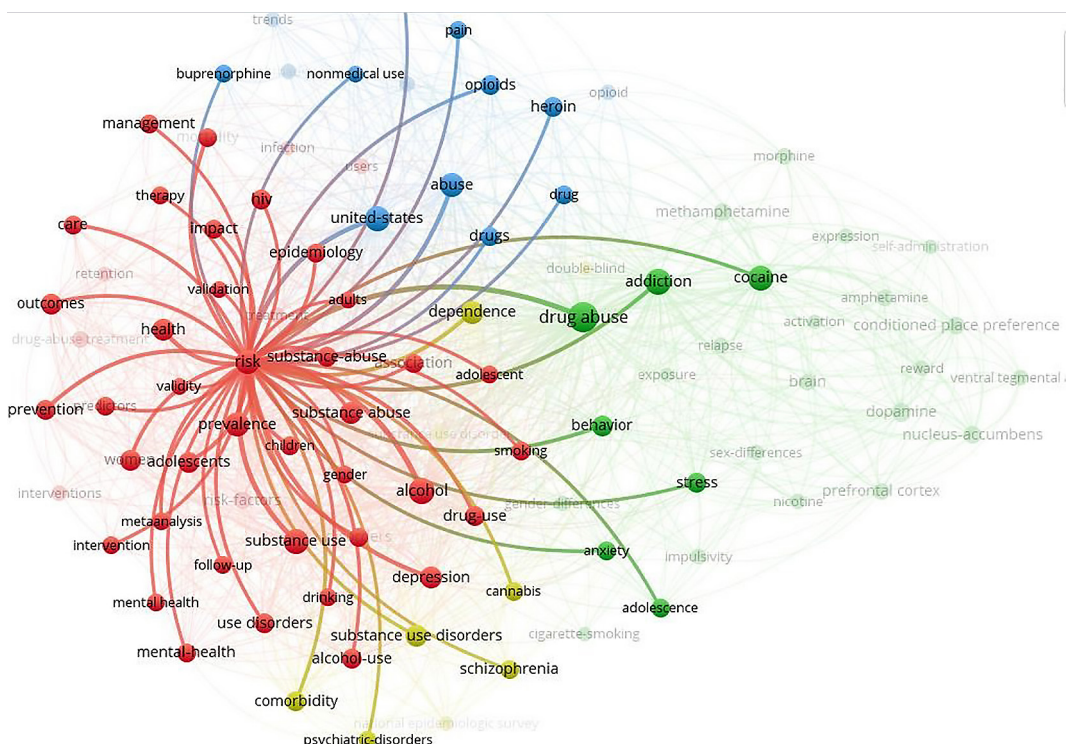
It's interesting to note that Psychiatry has been the most important research area of interest to researchers, with a total of 9117 scientific records. Substance Abuse follows closely

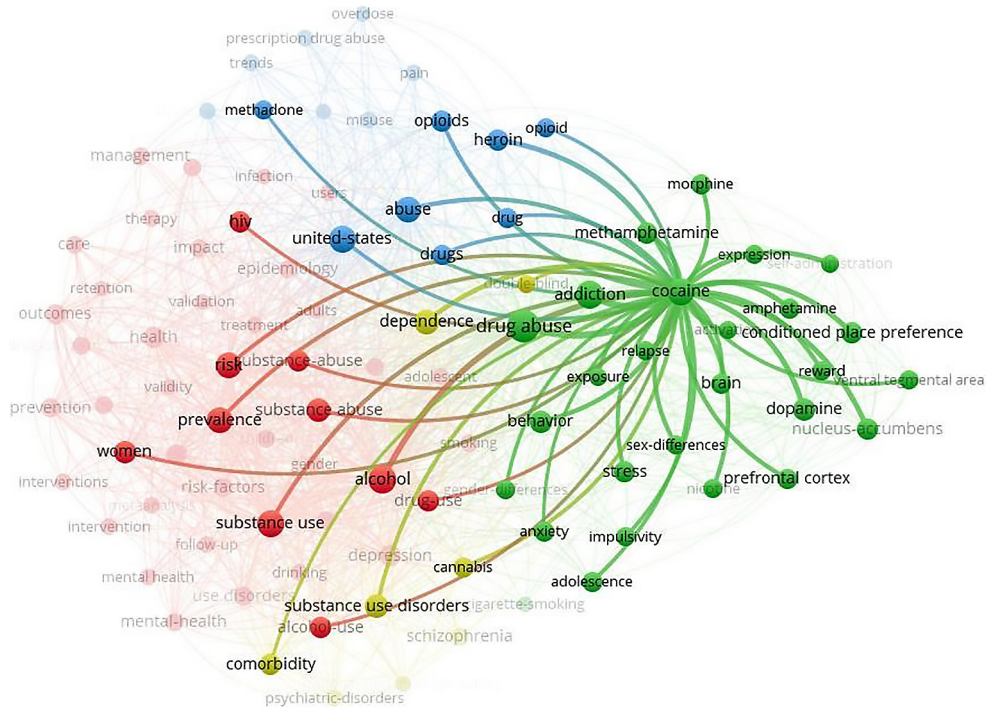
the scientific field of drug abuse, and it's fascinating to see that they have received so much attention from 2010 to 2023 (Table 4).

Research Areas	Record Count	% of 9,117
Psychiatry	1757	19.272
Substance Abuse	1698	18.625
Neurosciences Neurology	1552	17.023
Psychology	1424	15.619
Pharmacology Pharmacy	1276	13.996
Public Environmental Occupational Health	804	8.819
General Internal Medicine	613	6.724
Behavioral Sciences	325	3.565
Health Care Sciences Services	291	3.192
Biochemistry Molecular Biology	285	3.126

depression, etc. In this cluster, we can see the importance of the relationship between alcohol and adults (alcohol consumption), and issues such as HIV, infection, and smoking are other co-occurrences. In general, it can be said that the main topic of the first cluster is related to alcohol and the issues and concerns related to it. (Figure 5).

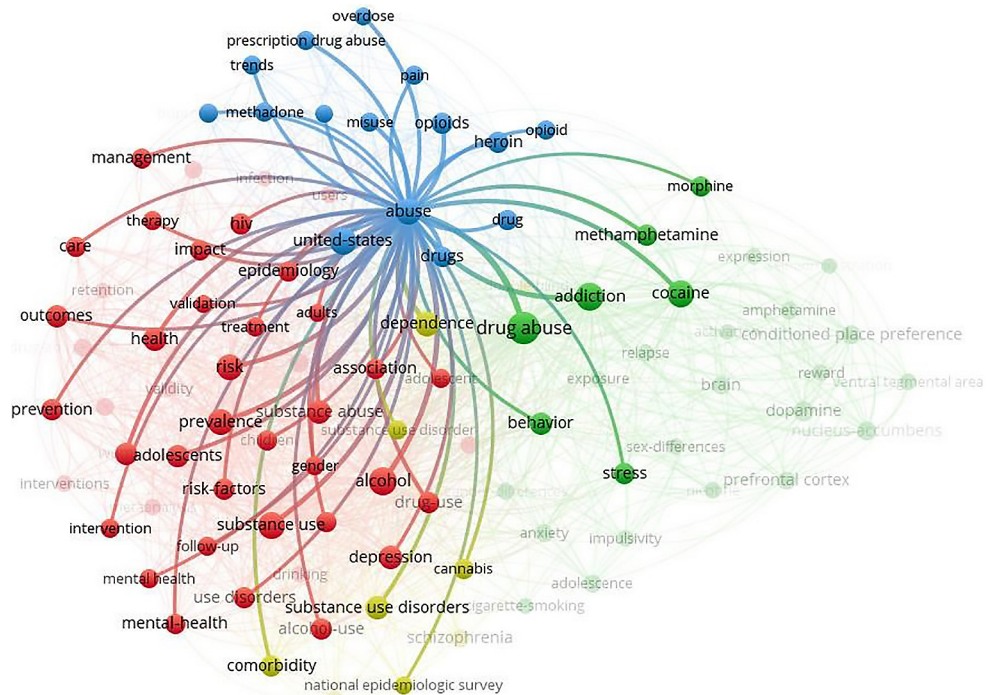
the issues and concerns related to it. (Figure 5).





The second cluster is associated with drug abuse and cocaine. In this cluster, the relationship between cocaine, methamphetamine, morphine, and issues such as stress and anxiety

and sex differences has been discussed. Activation, addiction, adolescence, and amphetamine are some of the most important co-occurrences in this cluster. (Figure 6).



like pain and nonmedical use, as well as overdose. We noticed that abuse, buprenorphine, drug(s), heroin, and methadone are some of the most significant co-occurrences in this cluster. (Figure 7).

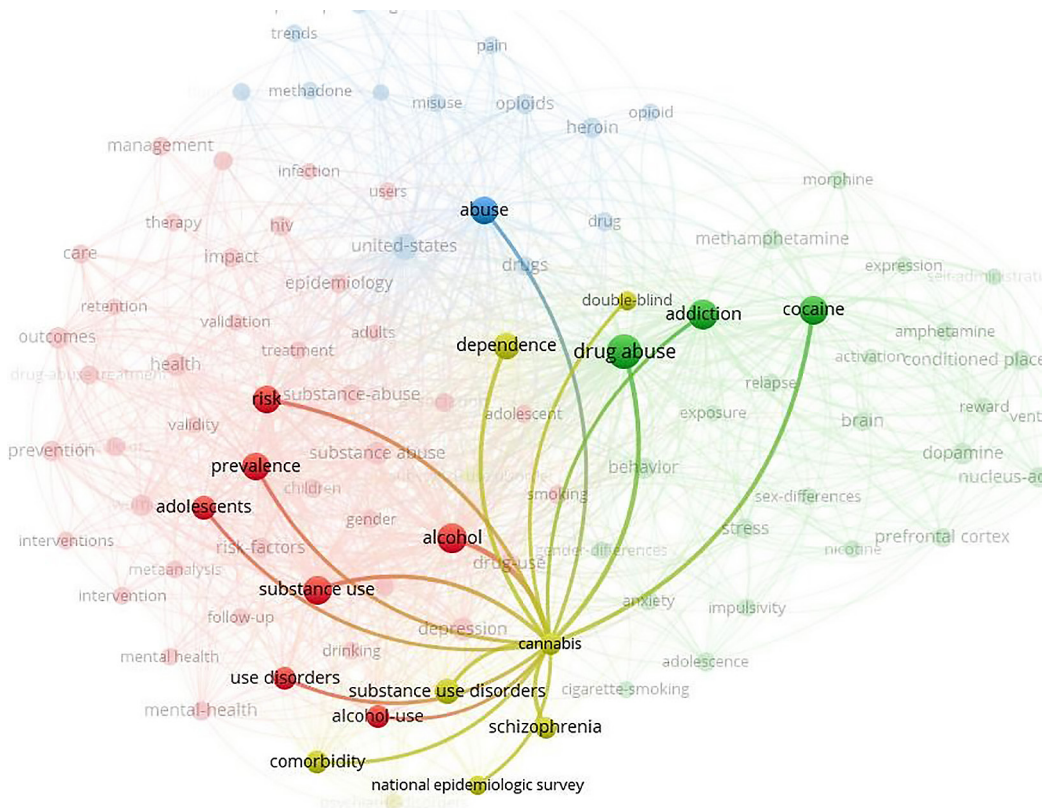


Figure 8. Fourth clusters in the scientific field of drug abuse in the years 2010-2023 (top 10 countries).

the fourth through seventh countries. Interestingly, the United States Department of Health and Human Services provided the most funds in the scientific field of drug abuse. The NIH USA and NIDA, both branches of the National Institutes of Health, closely followed in second and third place.

According to our research, the journal “Drug And Alcohol Dependence” holds the highest number of scientific records in the field, with a total of 254. Psychiatry has been the most important research area of interest to researchers. The first cluster is around alcohol use and alcohol, and it depicts the relationship between the risks of alcohol use, health, mental health, depression, etc. The study conducted by Bahram Armoon *et al.* (2022) entitled “HIV related stigma associated with social support, alcohol use disorders, depression, anxiety, and suicidal ideation among people living with HIV: a

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systematic review and meta-analysis” came to a conclusion that further supports their findings. It was discovered that alcohol consumption is linked to depression, anxiety, and poor mental health. These results highlight the importance of addressing alcohol use disorders. According to the research conducted by Ariadna Capasso *et al.* (2021), individuals with symptoms of depression and anxiety are at a greater risk of harm from excessive alcohol consumption. This finding is in line with the current study, which also highlights the link between alcohol consumption and depression and anxiety (2021).

The second cluster is around drug abuse and the drug cocaine. Activation, addiction, adolescence, and amphetamine are some of the most important co-occurrences in this cluster. As per Reinfeld’s (2022) study, there seems to be a strong correlation between the misuse of cocaine, amphetamines, and addiction in adults. This finding aligns with the co-occurrences observed in the second cluster of the present study.

The third cluster revolves around abuse and opioids. Abuse, buprenorphine, drug(s), heroin, and methadone are some of the most significant co-occurrences in this cluster. The fourth cluster has a strong focus on the subject of cannabis. Alternatively, Cluster 4 delves into the correlation between cannabis, psychiatric disorders, and schizophrenia. We recently came across a study conducted by Sarris *et al.* (2020) that explored the relationship between cannabis use and psychiatric disorders and schizophrenia. The study found that there is a significant association between cannabis use and schizophrenia (2020). These findings confirm the co-occurrences in the present study.

5. CONCLUSION

This study has provided a comprehensive analysis of drug abuse and substance abuse research, offering valuable insights into the key contributors, institutions, countries, and funding sources in this critical field of study.

Based on the current study, drug abuse appears to be primarily focused on four main substances: alcohol, opioids, cocaine, and cannabis. These four drugs are the primary drivers of drug abuse, emphasizing the need to prioritize prevention and treatment strategies to combat substance abuse caused by these drugs.

The findings have illuminated various facets of drug abuse, shedding light on the complexities and challenges associated with this pervasive societal issue.

The prominent role of Kendler KS and the University of California System underscores their significant contributions to advancing our understanding of drug abuse. Their work has not only contributed to academic discourse but also has implications for policy development and intervention strategies aimed at mitigating the adverse effects of drug abuse.

The allocation of funds by institutions such as the United States Department of Health and Human Services, NIH USA, and NIDA is a testament to the commitment of these organizations to addressing drug abuse on a broad scale. This financial support is instrumental in facilitating high-quality research and the implementation of evidence-based interventions.

The global perspective provided by this study highlights the collaborative nature of drug abuse research. The leading contributions from countries such as the United States, China, and Iran emphasize the widespread impact of drug abuse and the collective effort required to address this multifaceted issue. This international collaboration is crucial for developing comprehensive strategies that can be applied across diverse cultural contexts.

The identification of distinct research clusters around alcohol, cocaine, opioids, and cannabis provides a nuanced understanding of specific areas of focus within drug abuse research. These clusters offer valuable guidance for researchers and policymakers, directing attention toward critical topics that warrant further investigation and intervention.

In conclusion, this study serves as a foundation for future research endeavors and policy initiatives to tackle drug and substance abuse. A multi-faceted approach involving collaboration between researchers, institutions, and countries is essential in addressing the complex challenges posed by drug abuse. By building upon the insights provided by this study, we can work towards more effective strategies for prevention, intervention, and support for individuals affected by drug abuse. Ultimately, this collective effort holds the potential to make a substantial impact on improving public health and well-being. ●

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