Application of Bibliometric Visualization Analysis in Periodical Evaluation: Taking "Chinese Journal of Drug Dependence" as an Example

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Abstract: The Chinese academic journal evaluations often focus on impact metrics, yet there is a lack of comprehensive evaluation methods for journal themes, sections, article types, author distributions, research trends, and cutting-edge hotspots. Bibliometric visualization analysis can assist comprehensively researchers in understanding the influence and research fields of target journals when selecting journals for submission, and it can also help editorial departments in manuscript selection, thereby enhancing the journal's impact. Adopting bibliometric statistical methods and integrating my expertise, this paper takes the "Chinese Journal of Drug Dependence" as an example. By consulting the "World Journal of Impact Index (WJCI) Report" and the "Chinese Academic Journal Impact Factor Annual Report (Natural Science and Engineering Technology)", the journal impact indicators are assessed. Concurrently, by employing VOSviewer software, a review and portrait of the 1080 articles published openly on the CNKI database platform from 2013 to 2023 is conducted. The focus of the visualization analysis is on the academic influence of the journal, institutions, authors, keywords, as well as research hotspots and frontier trends. The aim is to provide relevant information and references for researchers and readers in the field of drug dependence research when choosing journals for submission and for the development of generalist journals.

Keywords: Bibliometrics; Visual Analysis; Periodical; Article Analysis

1. Introduction

Scientific journals play a pivotal role in

academic research and exploration, bearing the significant responsibility of leading the disciplines. development of With the enhancement of research levels and the increasing frequency of academic exchanges, the establishment and continuous improvement of the journal evaluation system have become an urgent need. Journal evaluations help to measure the quality, academic level, and influence of academic journals, assisting researchers in understanding the academic status and influence of various journals, thereby selectively choosing their submission targets.

Moreover, journal evaluations can provide references for universities and research institutions, helping them understand the latest trends and research hotspots in academia, contributing to the improvement of teaching quality, and fostering the research capabilities and developmental potential of students. Additionally, journal evaluations can guide research directions, reveal key points and hotspots in academic research, reduce the occurrence rate of academic misconduct, and promote academic integrity and standard academic behavior.

On the international academic stage, highquality academic journals are an important manifestation of a country's academic status. The establishment of a scientific journal evaluation system can reflect the overall level of national academic journals, enhancing the influence of our country in the international academic community.

Currently, the evaluation of academic journals often adopts a journal impact index evaluation system, which includes a comprehensive index that fully reflects the quality and influence of academic journals. It is used to reflect the impact of scientific and technological journals

on knowledge innovation, which is of great reference significance for the overall assessment of the academic quality of scientific and technological journals, as well as for the macroscopic consideration of their publication orientation and strategies [1]. These indicators have played a crucial guiding role in the development of China's scientific and technological journals. However, they also have certain limitations, such as differing impacts of articles from different sections within a journal and the lagging guiding effect of "impact factors" and "citation frequency" on journals [2].

Bibliometrics and visualization analysis is a research method used to evaluate the quantity, quality, and impact of literature and display and analyze this data through visual means such as charts and maps. Applying bibliometrics visualization and analysis evaluation has methods to journal the following advantages: Bibliometrics can comprehensively evaluate journals from multiple perspectives, including the number of papers published, citation count, impact factor, self-citation rate, immediacy index, etc. These indicators can reflect different aspects of a journal, such as paper quality, influence, and publishing cycle. This data can provide a more comprehensive understanding for readers and researchers. By introducing quantitative analysis methods such as co-occurrence analysis, co-citation analysis, and keyword cooccurrence analysis, bibliometrics can more accurately describe and evaluate a journal's influence. This method can handle large amounts of data and predict the future trends of a journal, which can help authors and editors further understand the journal's potential for future development and make corresponding decisions. Moreover, compared to traditional qualitative evaluation methods, and visualization bibliometrics analysis methods are more objective and can avoid the influence of subjective factors.

Take the "Chinese Journal of Drug Dependence" as an example. This journal, formerly known as the "Chinese Bulletin of Drug Dependence," was first published in 1992 and is the first academic publication in China to report on the study of drug abuse and dependence. The journal is overseen by the Ministry of Education of the People's Republic of China, hosted by Peking University, and

undertaken by the Chinese Institute of Drug Dependence. This journal is suitable for clinical doctors; pharmaceutical science and technology personnel, teachers, students; medical and pharmaceutical management personnel, drug inspectors; relevant personnel from the public security, customs and other departments; medical workers and managers of detoxification institutions. The journal has been included in the databases of CA Chemical Abstracts (U.S.), JST Japan Science and Technology Agency (Japan), China Academic Journal Comprehensive Evaluation Database, CSCD China Science Citation Database Source Journal Database (Extended Version), Chinese Science and Technology Journal Database, China Academic Journal (CD-ROM), and China Journal Full-text Database. This paper selects the "Chinese Journal of Drug Dependence," and combines its professional knowledge to attempt to use bibliometrics and visualization analysis methods to study and analyze the academic influence, publication characteristics, and research trends of the journal from 2013 to 2023, and make a preliminary evaluation. It is hoped that this will provide relevant information and references for researchers and readers in the field of drug dependence research when selecting journals for submission and for the development of comprehensive journals.

2. Research Methods

2.1 Data Sources

The data sources include the Institute of Scientific and Technical Information of China, the China Academic Journal (CD-ROM) Electronic Magazine Co., Ltd., Tsinghua University Library, Wanfang Data Co., Ltd., the Chinese University Scientific Journal Research Association, and the Chinese Science and Technology Journal Editors Association. The jointly compiled 2021 version of the "World Journal of Science and Technology Impact Index (WJCI) Report" (hereinafter referred to as the "Report") [3], and the "China Academic Journal Impact Factor Annual Report (Natural Science and Engineering Technology)" (hereinafter referred to as the "Annual Report") [4], jointly released by the China Academic Journal (CD-ROM) Electronic Magazine Co., Ltd., the China Science and Technology Literature Metric

Evaluation Research Center, and the Tsinghua University Library. We have summarized the main indicators, and for the convenience of statistics, we have chosen the data for the category of "R9 Pharmacy" (referred to as "Drug Abuse" in the "Report"). We used the China National Knowledge Infrastructure (CNKI) database. selected "Publication Retrieval", set the "Source Name" to "Chinese Journal of Drug Dependence" for source retrieval, with the matching method set to "Exact", and set the time to "January 1, 2013 to September 30, 2023" for a full database search.

2.2 Research Method

3. Analysis of Results

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This study used MS Excel to compile the data and VOSviewer (1.6.18) visualization analysis software. VOSviewer, based on the Java environment, processes data to generate descriptive analysis statistics and cluster maps of relationships and co-citations among authors, keywords, institutions, and regions. It can display research hotspots and trends in the selected field over a certain period [5].

3.1 Journal Academic Impact Analysis

The "Report" only provides the World Impact Index (WJCI) for the three years from 2019 to 2021, and the 2023 "Annual Report" has not vet been released. Therefore, we took an integrated approach and organized the bibliometric indicators of the "Annual Report" from 2013 to 2022. These include the impact index, total composite citation, impact factor, composite ranking, ratio of funded papers, partition, Web instant download rate, efficiency index, and added WJCI (Table 1). The trend of changes in journal academic impact indicators is shown in Figure 1.



Figure 1. Changes in the Academic Influence Indicators of the Journal from 2013 to 2022

Year	CI	Total Citation	Impact Factor	Composite Class Ranking	Funded Paper Ratio	Web Instant Download Rate	Quartile	JMI	WJCI
2013	-	747	0.580	34/66	0.52	19	-	-	-
2014	-	845	0.580	32/65	0.48	22	-	-	-
2015	216.558	1110	0.659	23/69	0.53	18	-	3.384	-
2016	141.701	852	0.542	43/68	0.58	30	Q4	2.509	-
2017	145.672	1015	0.665	34/70	0.52	32	Q4	3.182	-
2018	160.098	893	0.659	41/69	0.55	33	Q4	3.037	-
2019	89.447	948	0.547	53/69	0.59	51	Q4	2.580	0.040
2020	195.869	928	0.808	54/69	0.70	74	Q4	4.187	0.153
2021	156.938	893	0.760	46/70	0.67	75	Q4	4.343	0.125
2022	130.808	988	1.012	36/68	0.73	117	04	5.953	-

 Table 1. Academic Influence Indicators from 2013 to 2022

Starting from 2015, the "Annual Report" added the "Clout Index (CI)" indicator, which sorts each subject journal by CI and divides them into four equal parts (Q1, Q2, Q3, Q4) according to the number of journals, more objectively reflecting the relative level of the journal's academic impact[6]. As the calculation method of the impact index was revised using the "Journal Mass Index (JMI)" after 2016, as shown in Figure 1, we focused on the changes in indicators from 2016 to 2022. We found that the "Chinese Journal of Drug

Dependence" has always been in the Q4 partition, with the impact index and total composite citation showing fluctuations, and in 2019, all indicators of journal academic impact, including impact factor (0.547) and efficiency index (2.580), hit their historical lows. The same year, the composite ranking was also relatively low, only ranked 53rd (out of a total of 69). However, the latest ranking in 2022 has risen to 36th (out of a total of 68), and the four indicators of the same year, impact factor (1.012), ratio of funded papers (0.73), Web

instant download rate (117), and efficiency index (5.953), all reached their historical highs and increased significantly compared to 2021. Overall, the ratio of funded papers generally shows an upward trend, and the Web instant download rate continues to rise, reflecting the high quality of manuscript sources and the continuous enhancement of online dissemination. The efficiency index has continued to rise since 2019, indicating that the average contribution impact has increased and the academic impact of citable literature is high. Considering these indicators, the authors preliminarily judge that the 2022 WJCI will break the historical high of 2020 (0.153), and the international influence and ranking of the journal will further improve.

3.2 Analysis of Journal Publication number

A search of the CNKI database (2013-2023) yielded a total of 1,128 Chinese-language documents and 1 English-language document (Char-Nie C.KETAMINE: MEDICAL AND NON-MEDICAL USES. 2016). After deduplication of the search results (4 documents), removal of documents with missing authors (41 documents), missing keywords (1 document), and missing institutions (4 documents), and after two rounds of verification to ensure accuracy, a total of 1,080 citable documents were obtained. Figure 2 shows the annual and cumulative publication numbers of the "Chinese Journal of Drug Dependence" between 2013 and 2023. The average annual publication number for the first ten years was 108 papers (1,080/10). As of September 2023, 85 papers have been published, predicted to exceed the total publication number for 2022 (93 papers). Annual analysis reveals that since 2016, the annual publication number has slightly declined, with the average annual publication number remaining around 90 papers.



3.3 Analysis of Highly Cited and Highly Downloaded Papers

This paper uses the search function provided by the CNKI database to select the top 13 papers in terms of citation count (≥ 25 times) and download count (\geq 1400 times). Among the 13 highly cited papers, the most were published in 2014 and 2015, with three each. Among these 13 highly cited papers, there were five review papers, and the most common subject was drug rehabilitation, with nine papers. Among the 13 highly downloaded papers, one was also among the highly cited papers (Zhou Juan, Recent Progress in the Study of Drug Abuse and Addiction in China, 2015), there were 12 review papers, and the covered subject areas were diverse, with three papers involving drug abuse and addiction, two involving mental illnesses, two involving traditional Chinese medicine interventions, and two involving non-substance addiction to the Internet and social media. This indicates that the journal's papers have strong interdisciplinary research and that high-quality review papers play a critical role in enhancing the influence of academic journals.

3.4 Analysis of Affiliated Institutions and Geographical Distribution

The publishing institutions of the retrieved results were sorted, and the top three institutions are the China Institute of Drug Dependence, Peking University, and the Institute of Mental Health of the Second Xiangya Hospital. The annual publication number of these ten high-frequency institutions is shown in Figure 3. As can be seen from Figure 3, as of 2022, the China Institute on Drug Dependence, the Institute of Mental Health of Peking University, and the Yunnan Institute for Drug Abuse Prevention and Control have maintained high productivity. The institution networks collinear visualization map is shown in Figure 4. There are 151 institutions with more than three published papers, and the geographic distribution of their published papers and cooperation relationships are shown in Figure 5. Besides a few provinces, a total of 29 provinces and municipalities have published more than five papers. The major publishing provinces and municipalities are Beijing (305), Guangdong (93), Hunan (90), Hubei (74), Yunnan (73), and Shanghai (63),

and there is close cooperation among them. According to the CNKI database, the sources of funding include 242 items from the National Natural Science Foundation, 18 items from the National Social Science Foundation, 51 items from the National Key R&D Program, and nine items from the Ministry of Education's Humanities and Social Sciences Project.



Figure 3. Trend of Annual Publication Number of High-Frequency Institution from 2013 to 2022



Figure 4. Institution Networks Collinear Visualization Map



Figure 5. Geographic Networks Visualization Map

3.5 Author Analysis

The author analysis revealed 2,924 signed authors in the literature. Among them, four authors with more than 30 signatures (inclusive) are Lu Lin (40 papers), Shi Jie (37 papers), Liu Zhimin (32 papers), and Hao Wei (30 papers). We also counted the number of papers by the first author, and the authors all have more than 3 papers. The top four first authors are Yang Ling (6 papers), Tang Hao (6 papers), Jiang Yongzhi (6 papers), and Xu Yanmin (6 papers). Notably, the top three authors all have national-level project funding, indicating a strong level of scientific research. Using the VOSviewer software, we identified the core authors in this field and the collaboration intensity and citation relationships among authors, and drew a visual map of the author co-occurrence network. The larger the font in the figure, the more frequently the author appears [7] (Figure 6). As can be seen in Figure 6, the cooperation relationships among authors, notably the network structures of Professor Lu Lin-Shi Jie, Professor Hao Wei-Zhou Xuhui, Professor Liu Zhimin-Bao Yanping, Professor Zhao Min-Du Jiang, Professor Li Suxia-Zhang Ruimin, the network led by Professor Li Yonghui, the network led by Professor Sun Hongqiang, the network led by Professor Wang Zengzhen, and the team of Professor Zhou Wenhua, etc., are particularly significant. The academic relationships among these teams are strong, the connections are tight, and the collaborative output is high.



Figure 6. Author networks collinear visualization map

3.6 Research Hotspots and Trend 3.6.1 Keyword analysis

Keywords summarize and refine the subject of an article, and those with high frequency or centrality over a certain period are usually considered as research hotspots in the field [8]. To avoid confusion and ensure the accuracy of statistical results, we consolidated the keywords. For instance, "drug addiction", "drug addiction/dependence", "mechanism of drug addiction", "drug addicts", "treatment of drug addiction" were all merged into "drug addiction"; "drug abusers", "prevention and control of drug abuse", "drug abuse",

"population of drug abuse" were all merged into "drug abuse"; "methadone", "methadone clinic". "methadone maintenance treatment". "methadone drug maintenance treatment", "methadone maintenance treatment clinic", "community methadone maintenance treatment" were all merged into "methadone maintenance treatment"; "ketamine", "К powder", "ketamine (KET)", "ketamine abuse", "ketamine dependence" were all merged into "ketamine", etc. The consolidated keywords were summarized according to the frequency of occurrence, resulting in a high-frequency keyword cloud map, as shown in Figure 7. There were 14 keywords with a frequency of over 40 times. Clustering and density visualization analysis of the keywords yielded 6 clusters, as shown in Figure 8 and Figure 9. The six clusters focus respectively on: methamphetamine, ketamine addiction research, drug detoxification and rehabilitation, emerging synthetic drug epidemiology, alcohol addiction neurobiology and clinical treatment, traditional drugs and methadone maintenance treatment, and teen internet addiction. To further explore the specific research situations of different authors and research institutions in each field, we conducted a dual-mode cluster analysis of "author-keyword" and "research institution-keyword", as shown in Figure 10 and Figure 11 (the numbers in the figure represent the number of papers published). For example, authors with high output, Hao Wei, Zhou Xuhui (Mental Health Institute of the Second Xiangya Hospital of Central South University), and Sun Hongqiang (The Sixth Hospital of Peking University) were clustered into one category, and their research mostly focused on the field of alcohol addiction; Liu Zhimin, Bao Yanping (School of Public Health, Peking University) were clustered into another category, with their research mostly focusing on the field of ketamine.



Figure 7. Keyword Cloud Map



Figure 8. Keyword Co-occurrence Clustering Visualization Map



Figure 9. Keyword Co-occurrence Density Visualization Map



Figure 10. Author-keyword Biclustering Map



Figure 11. Institution-keyword Biclustering Map

3.6.2 Hotspots and research trends

The COOC software was used to perform an evolutionary path analysis of keywords [9], and a knowledge map of the evolution of research hotspots in the journal was drawn, as shown in Figure 12. Starting from 2013, the focus of research has continuously been on

methamphetamine, alcohol addiction, methadone maintenance treatment, and drug abuse research. Starting from 2021, research hotspots have concentrated on e-cigarettes, exercise interventions, traditional pharmacy, synthetic cannabinoids, ketamine, nitrous oxide (laughing gas), tandem mass spectrometry, and rapid drug detection, etc.

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Figure 12. Keywords Cumulative Evolution Path Map

4. Conclusions and Prospects

advantages of bibliometric The and visualization analysis methods for journal providing evaluation lie in more comprehensive, objective, quantitative, and visualized evaluation results, helping readers and researchers to better understand the influence and development trends of journal hotspots. Taking the "Chinese Journal of Drug Dependence" as an example, this study strictly screened and cleaned the literature data published by the journal from 2013 to 2023 using bibliometric methods, carried out data statistics and visualization, and analyzed and explored the journal's academic influence, publishing institutions, productive authors, research hotspots and development trends. This comprehensive portrayal of the "Chinese Journal of Drug Dependence" journal offers a reference for researchers and readers in related fields. Due to space limitations, the bibliometric analysis of different disciplines and journals can be further deepened, especially with the participation of journal editorial staff, which will be more conducive to accurately understanding the journal, optimizing manuscript selection, and enhancing the journal's influence.

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