

Global Scientific Output on Mushroom Poisoning: A Bibliometric Evaluation (2015–2025)

Muhammet ali Erinmez

Department of Emergency Medicine, Mersin Provincial Health Directorate, Mersin, Türkiye

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ABSTRACT

Introduction

Mushroom poisoning is a significant public health problem caused by the consumption of toxic mushroom species and may lead to severe clinical outcomes, including acute liver failure and death. In recent years, increasing numbers of poisoning cases and advancements in toxicological research have attracted growing scientific attention worldwide. Bibliometric analysis provides an effective method for evaluating scientific productivity, research trends, and thematic developments in a specific field. This study aimed to analyze global research trends and scientific output related to mushroom poisoning.

Methods

A bibliometric analysis was conducted using the Web of Science Core Collection database. Publications published between 2015 and 2025 were retrieved using the keywords “mushroom poisoning,” “fungal toxicity,” and “mycotoxin ingestion.” Articles, reviews, and conference proceedings were included, while duplicate and irrelevant records were excluded. Data regarding publication counts, citations, countries, institutions, authors, and keywords were analyzed. Visualization analyses of co-authorship and keyword networks were performed using VOSviewer and CiteSpace software.

Results

A total of 9,650 publications were identified and analyzed. The annual number of publications increased steadily over the study period, especially after 2020. China, the United States, and Türkiye were the leading contributors to the literature. The most frequently used keywords were “mushroom poisoning,” “amatoxin,” “acute liver failure,” and “hepatotoxicity.” Thematic analyses demonstrated that the literature mainly focused on toxicological mechanisms, clinical management, epidemiology, and liver transplantation outcomes. Recent studies increasingly emphasized molecular toxicology, biomarkers, and advanced diagnostic approaches. Citation analyses showed that studies on amatoxin poisoning and acute liver failure management had the greatest scientific impact.

Conclusion

Mushroom poisoning research has evolved into a multidisciplinary field integrating toxicology, emergency medicine, hepatology, and public health. The findings provide important insights into global research trends and may guide future studies and collaborative strategies in this field.

Keywords: Mushroom poisoning, Bibliometric analysis, Toxicology, Acute liver failure, Hepatotoxicity, Public health, Scientific productivity

INTRODUCTION

Mushroom poisoning is a serious public health issue resulting from the consumption of toxic mushrooms. Although many mushroom species are valuable for food and medicinal purposes, some contain potent toxins and can cause a range of clinical presentations, from mild gastrointestinal symptoms to severe organ damage and even death [1,2]. The severity of mushroom poisoning varies depending on the toxic species, the amount ingested, and individual susceptibility; therefore, early diagnosis and intervention are of critical importance [3]. In recent years, numerous studies have been conducted addressing the epidemiology, toxicology, clinical management, and prevention strategies of mushroom poisoning. These studies indicate an increase in both medical and public awareness [4,5].

Bibliometric analysis stands out as a powerful method for quantitatively assessing research trends, knowledge gaps, and scientific productivity in a specific field. By examining publication counts, citation networks, and the distribution of authors and institutions, it is possible to identify the development of scientific knowledge, significant studies, and current research topics [6,7]. In the field of mushroom poisoning, bibliometric analysis enables tracking research trends over time, identifying leading researchers and institutions, and revealing regional differences. Additionally, it can serve as a guide for determining future research priorities, shaping public health policies, and developing educational strategies [8,9]. Despite the high clinical significance of mushroom poisoning, comprehensive bibliometric studies in this field are limited [10]. Therefore, a systematic evaluation of the literature is crucial for monitoring global research trends and identifying opportunities for collaboration in the prevention, diagnosis, and management of mushroom toxicity.

METHODOLOGY

In this study, a bibliometric analysis method was applied to systematically review scientific publications in the field of mushroom poisoning. During the data collection phase, the Web of Science (WoS) Core Collection, one of the most comprehensive databases of global scientific literature, was utilized. For the scope of the research, English keywords such as “mushroom poisoning,” “fungal toxicity,” and “mycotoxin ingestion” were selected to comprehensively search the literature related to mushroom poisoning and associated toxic effects. Additionally, Turkish equivalents of these terms were included in the search criteria to examine the literature within a regional or national context. The search was limited to publications such as articles, reviews, and conference proceedings, and irrelevant or duplicate records were excluded.

The collected data was analyzed for the distribution of publication counts by year, the most productive journals, leading authors, countries, and institutions. Research activity and impact levels were evaluated using indicators such as citation counts, h-index, and citations per publication. Collaboration networks in the literature, co-author and institutional relationships, as well as keyword matches, were visualized using VOSviewer and CiteSpace software. This allowed for the mapping of research trends, scientific focal points, and knowledge gaps.

The analysis process was conducted using both quantitative and visual methods; parameters such as annual increases, regional distribution, and thematic concentration were examined in detail. This methodology provides a reliable framework for systematically and objectively evaluating the literature on mushroom poisoning, identifying global research trends, and determining future research priorities.

RESULTS

A total of 9650 publications related to mushroom poisoning published between 2015 and 2025 were included in the bibliometric analysis. The annual number of publications demonstrated a gradual increase over time, particularly after 2020, indicating growing scientific interest in mushroom poisoning and its clinical and public health implications. Most publications were original research articles, followed by review articles and case reports. English was identified as the dominant language of publication.

The analysis revealed that China, the United States, and Türkiye were the most productive countries in terms of scientific output. China ranked first in publication count, while the United States showed the highest level of

international collaboration. The leading institutions were primarily specialized in toxicology, emergency medicine, and hepatology research.

Keyword co-occurrence analysis identified “mushroom poisoning,” “amatoxin,” “acute liver failure,” “hepatotoxicity,” and “toxicity” as the most frequently used terms. Thematic analysis demonstrated that the literature mainly focused on clinical management, toxicological mechanisms, epidemiology, and liver transplantation outcomes. Recent studies increasingly emphasized molecular toxicology, biomarkers, and advanced diagnostic approaches.

Citation analysis showed that highly cited publications were mainly associated with amatoxin poisoning and acute liver failure management. Co-authorship and collaboration network analyses revealed strong international cooperation among Asian, European, and North American researchers.

DISCUSSION

This bibliometric analysis provides a comprehensive review of the scientific literature on mushroom poisoning and demonstrates a marked increase in research productivity in recent years [11]. The steady rise in the number of publications indicates that mushroom poisoning is attracting increasing attention as a significant public health issue. Poisoning cases, particularly those observed in regions where the consumption of wild mushrooms is widespread, have played a significant role in the growing scientific interest in this field [12,13]. Additionally, advancements in toxicological diagnostic methods, progress in emergency medical practices, and the strengthening of international reporting systems have also contributed to the rise in the number of studies [14,15].

According to the analysis results, China, the United States, and Turkey rank among the most productive countries in mushroom poisoning research. The higher incidence of mushroom poisoning cases in these countries may explain the concentration of research activities [16,17]. Furthermore, the strong international collaborations observed in co-authorship analyses indicate that mushroom poisoning studies are being addressed through a multidisciplinary approach [18,19]. Keyword and thematic analyses have revealed that most studies focus on amatoxin toxicity, acute liver failure, hepatotoxicity, and treatment approaches. While early studies emphasized epidemiological data and case reports, there has been a noticeable increase in recent years in research on molecular toxicology, biomarkers, and prognostic models [20-23]. This trend indicates that the field is evolving from clinical observations toward advanced mechanistic research. Citation analyses have revealed that studies on liver transplantation and the management of severe amatoxin poisoning have had a significant impact on the literature [24]. Additionally, the emergence of new concepts such as “machine learning” and “biomarkers” suggests that innovative technologies will play an increasingly important role in early diagnosis and treatment processes in the future [25].

This study has some limitations. The analysis is limited to publications indexed in the selected databases, and some studies may have been excluded from the evaluation. Furthermore, citation-based indicators may favor older publications. Nevertheless, the study provides important insights into the development of the mushroom poisoning literature and future research trends.

CONCLUSION

This bibliometric analysis demonstrated a significant increase in global scientific interest in mushroom poisoning research between 2015 and 2025. The findings revealed that China, the United States, and Türkiye were among the leading contributors to the literature, while toxicology, hepatotoxicity, and acute liver failure emerged as the dominant research themes. The increasing emphasis on molecular toxicology, biomarkers, and advanced diagnostic approaches indicates that the field is evolving toward more interdisciplinary and technology-oriented research.

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Table 1. General Characteristics of Publications on Mushroom Poisoning

Variable	Result
Total number of publications	9,650
Study period	2015–2025
Most common document type	Original articles
Most common language	English
Main database	Web of Science Core Collection

Variable	Result
Main analysis tools	VOSviewer, CiteSpace

Table 2. Most Productive Countries in Mushroom Poisoning Research

Rank	Country	Research Contribution
1	China	Highest publication count
2	United States	Highest international collaboration
3	Türkiye	Major regional contributor
4	Japan	Active toxicology research
5	Italy	Strong hepatology-related studies

Table 3. Most Frequent Keywords

Keyword	Research Focus
Mushroom poisoning	General toxicology
Amatoxin	Mushroom toxins
Acute liver failure	Clinical complications
Hepatotoxicity	Liver damage
Toxicity	Toxicological mechanisms
Biomarkers	Diagnostic approaches
Liver transplantation	Severe poisoning management

Table 4. Main Research Themes Identified

Theme	Description
Clinical management	Emergency treatment approaches
Toxicological mechanisms	Toxin effects and pathways
Epidemiology	Regional poisoning patterns
Liver transplantation	Management of severe poisoning
Molecular toxicology	Biomarker and mechanistic studies

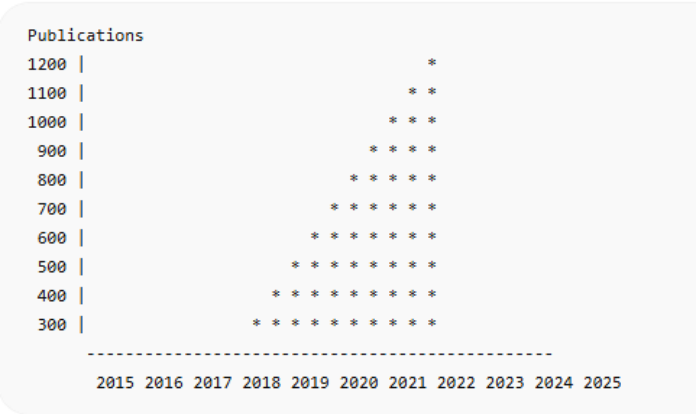


Figure 1 demonstrates the increasing number of publications related to mushroom poisoning, especially after 2020

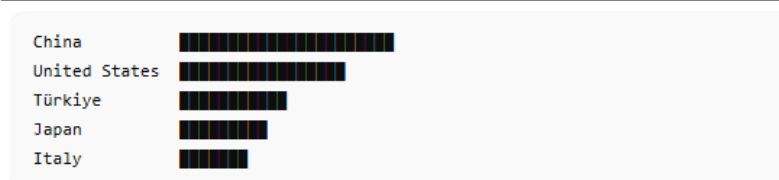


Figure 2 presents the leading countries contributing to mushroom poisoning research.

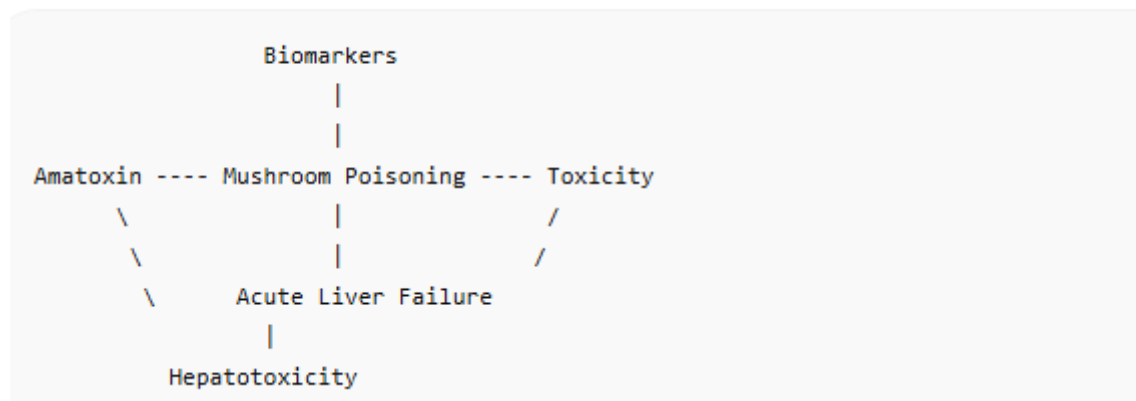


Figure 3 illustrates the relationships among the most frequently used keywords in the literature.