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Global scientific research landscape on binge drinking: a comprehensive bibliometric and visualization analysis of trends, collaborations, and future directions

Sa'ed H. Zyoud[1,2,3*]

Abstract

Background Binge drinking constitutes a significant public health concern. Defined as the consumption of five or more alcoholic beverages on a single occasion, binge drinking leads to acute cognitive and motor impairments and is associated with a multitude of detrimental health consequences. Therefore, the aim of this study was to analyse globally published peer-reviewed literature on binge drinking.

Methods A thorough search of the Scopus database was conducted to gather all the relevant research. Keywords related to binge drinking were used to locate a wide range of studies. Specific criteria were subsequently applied to narrow the results, ensuring the inclusion of only the most relevant articles. This process yielded a collection of 2,763 research papers. Finally, a software program called VOSviewer was utilized to analyse and visualize the connections between these studies.

Results A bibliometric analysis was performed to investigate trends in binge drinking research literature published between 1980 and 2024. The findings revealed a significant increase in publications (R^2=0.916; $p < 0.001$), with a peak in 2018 (191 articles). The majority (89.65%, $n = 2,477$) were research articles, followed by review articles (4.74%, $n = 131$). Authors from 139 countries contributed to binge-drinking research, with the USA ($n = 1,550$; 56.1%) and the UK ($n = 216$; 7.82%) leading in the volume of publications. The *National Institute on Alcohol Abuse and Alcoholism* ($n = 65$; 2.35%) and the *University of North Carolina at Chapel Hill* ($n = 63$; 2.28%) emerged as the main institutional contributors. The *National Institute on Alcohol Abuse and Alcoholism* in the United States was the main funding source, supporting 599 articles (21.68%), followed by the *National Institutes of Health* in the United States, with 544 articles (19.69%). In particular, the post-2016 period witnessed a shift in research themes toward mechanistic investigations alongside studies on societal interventions, reflecting a growing focus on mitigating the broader social impact of binge drinking.

Conclusions This study is the first comprehensive analysis of trends in binge drinking research. Over the past decade, binge drinking has increased dramatically, led by the United States, the UK, and Spain. Initially, focused on social and

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cultural factors, research shifted after 2016 to mechanistic and animal models, shaping future research directions and strategies.

Keywords Binge drinking, Bibliometric, Visualization, Scopus, VOSviewer

Introduction

Alcohol consumption is a significant risk factor that contributes substantially to the global burden of disease. Research has shown a strong correlation between increased alcohol intake and all-cause mortality, as well as for specific cancers. In particular, minimal health benefits are observed at zero consumption. These findings highlight the potential need to revisit and strengthen global alcohol control policies, with an emphasis on population-level initiatives aimed at reducing consumption [1].

Binge drinking, also referred to as heavy episodic drinking, is defined by the rapid consumption of large amounts of alcohol in a short period of time [2–4]. It is a critical public health concern, particularly among young adults [2–4]. This hazardous pattern is associated with both immediate consequences, such as injuries, and long-term adverse effects, including the development of alcohol use disorders [3]. The prevalence of binge drinking remains high, and a significant portion of the population exceeds established consumption thresholds on a regular basis [5–7]. The negative consequences of binge drinking extend far beyond the individual, contributing to accidents, violence, and even adverse fetal development [5].

The term "binge drinking" is frequently used in lay discourse and mass media campaigns, although a definitive definition is lacking [8]. However, a common research threshold for binge drinking is five or more drinks consumed within two hours for men and four or more drinks consumed for women [9–11]. Enhancing awareness of the severity of binge drinking is essential for early detection and the implementation of appropriate interventions [2].

In recent decades, research on binge drinking has encompassed a diverse array of topics. A thorough review of the published literature is essential for assessing density and identifying existing gaps. Although we identified several bibliometric studies that address specific substance use disorders [12–20], none have explicitly focused on binge drinking, which makes this article a pioneering contribution in this area. This study aimed to investigate the global performance and progress of binge drinking research using a visualization tool to map patterns and trends. By conducting a bibliographic analysis of previous publications, this study seeks to establish a foundation for a comprehensive understanding of existing research on binge drinking and to highlight potential future research directions.

Methods

Study design

An observational, descriptive, retrospective study using bibliometric methods and science mapping was used to identify and characterize the literature on binge drinking.

Database

This study chose to employ Scopus as the principal database to evaluate the global body of research on binge drinking. This decision was motivated by Scopus's extensive coverage and sophisticated search capabilities. Although Google Scholar indexes a wider range of disciplines, it lacks citation metrics, which are essential for bibliometric analysis. In contrast, Scopus offers a vast repository of more than 24,000 peer-reviewed publications spanning diverse scientific fields, coupled with robust metric tools. This advantage was deemed more significant than the broader coverage provided by Google Scholar [21–23]. Notably, the use of a single database is common practice in bibliometric studies because of the challenges associated with applying bibliometric indicators and mapping the literature across multiple platforms [24]. In particular, Scopus encompasses almost all the content found in PubMed and exceeds Web of Science in terms of the number of indexed journals, underscoring its status as a comprehensive repository that effectively consolidates the content from these prominent databases [25].

Search strategy

The terms pertaining to binge drinking were identified through PubMed Medical Subject Headings (MeSH) and pertinent literature on binge drinking [26–29]. These terms were subsequently utilized in the Scopus engine. Each selected "keyword" served as an entry in the search for "Article Title". The keywords used in this study, specifically 'Binge Drinking' or 'Binge Alcohol*', were selected for their direct relevance to binge drinking itself rather than other concepts. Owing to frequent updates in the database, literature retrieval was conducted on a specific date, 24 January 2025. Consequently, the studies included publications from the entire preceding year until December 31, 2024. The resulting search was as follows: (TITLE(Binge Drink*) OR TITLE(Binge Alcohol*) OR TITLE(binge beer*) OR TITLE(Heavy Episodic Drinking) OR TITLE (Heavy Episod* Drink*)) AND PUBYEAR > 1979 AND PUBYEAR < 2025 AND (LIMIT-TO (SRCTYPE,"j") AND (EXCLUDE (DOCTYPE,"er"))).

A total of 2,884 studies were retrieved (Fig. 1: Flowchart). The following inclusion and exclusion criteria were applied: (1) no language or availability restrictions; (2) papers published in 2025 were excluded; (3) only journal articles were selected on the basis of document type; and (4) books, book chapters, retracted articles, and errata were excluded from the analysis. Finally, 2,763 articles were included in the bibliometric analysis.

Validation of the search strategy

To mitigate the inclusion of irrelevant publications (false positives), the search strategy was refined, followed by an assessment of the topical relevance of the most frequently cited articles (top 200). Two bibliometric experts independently examined the titles and abstracts of these highly cited works to identify potential false positives.

Upon confirmation from both experts that no false positives were identified, the search strategy was deemed comprehensive. To mitigate the possibility of false negatives (omission of relevant studies), a correlation analysis was performed between the retrieved data and the known research outputs of the 20 most prolific researchers in the field. The strong positive correlation coefficient ($r = 0.963$) and the statistically significant p value ($p < 0.01$) resulting from the correlation test indicated the effectiveness of the search strategy in capturing relevant research. This validation approach adheres to established practices in bibliometric studies, as detailed in the literature [21, 30–33]. This study adopted a title search methodology that incorporates keywords to ensure that the documents recovered directly addressed binge drinking. This approach was designed to enhance the reliability
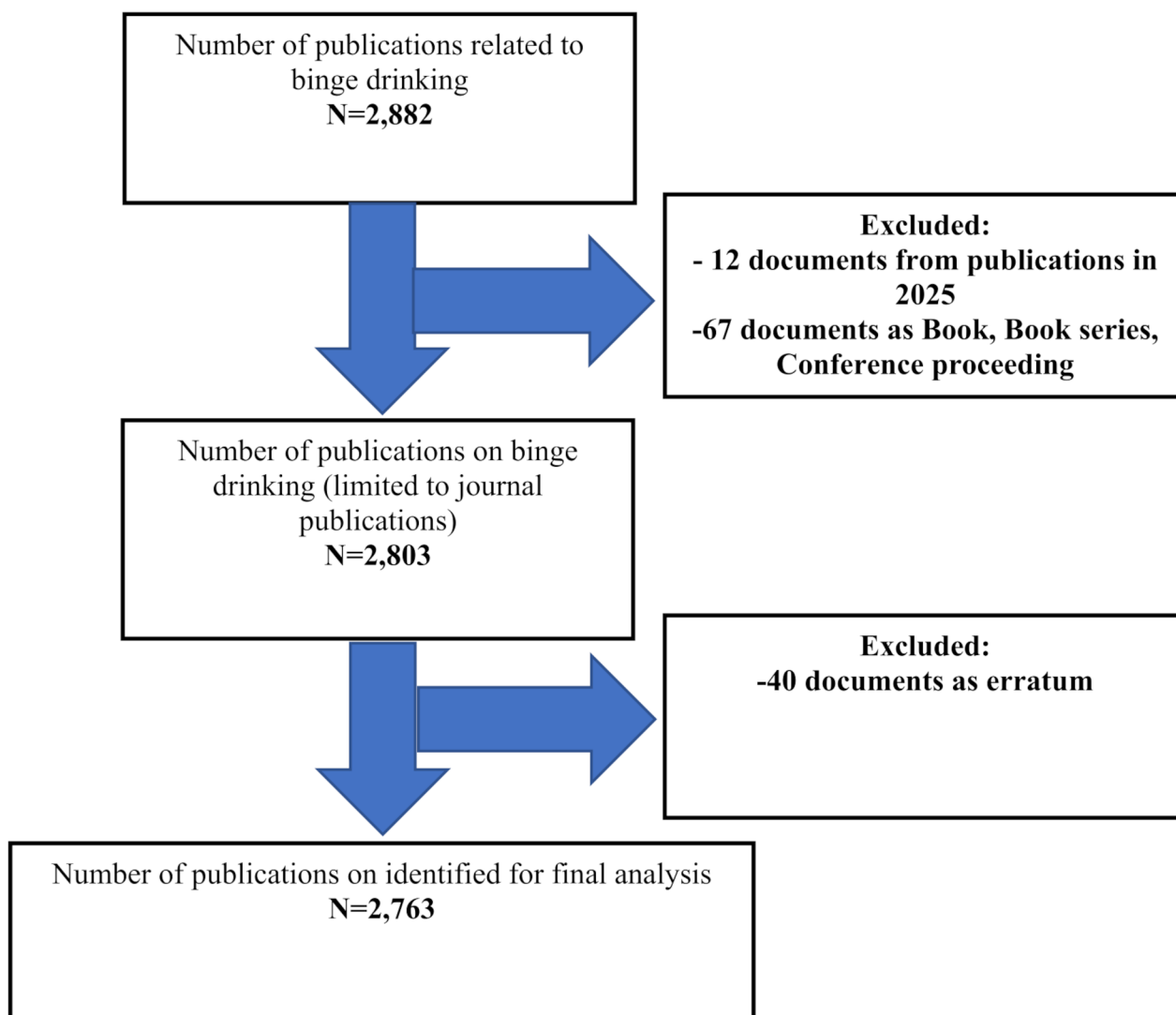

Fig. 1 Flowchart for including and excluding literature studies

of the search and minimize the inclusion of irrelevant articles. In contrast, previous studies employing a title/abstract/keyword search strategy [21, 23, 32, 34] yielded a significant number of false positives, lacking a specific focus on binge drinking.

Data export

A bibliometric analysis was also performed to reveal global research patterns in binge drinking in the following aspects, which has been used in previous studies [33, 35–37]. Following data retrieval, the information was transferred to Microsoft Excel for subsequent analysis and tabulation. The exported data encompassed various categories, including types of retrieved documents, annual publication growth rates, prolific countries and institutions, collaboration pattern, prominent funding agencies, the most highly cited publications, total citations, average citations, the h index, and the journals associated with the retrieved documents. To eliminate the bias caused by the time since publication, a citation index was calculated for each article. This index is determined by dividing the total number of citations by the number of years since the article's original publication, resulting in the average number of citations per year. Furthermore, the retrieved data were exported to VOSviewer v.1.6.20 (https://www.vosviewer.com/), a free online program with mapping functionalities [38, 39]. This software was used to generate network visualization maps, which served to illustrate patterns of international research collaboration and emerging research areas (research hotspots) [40].

Results

Temporal distribution of published articles

Our analysis of the Scopus database revealed that 2,763 articles on binge drinking were published over the past 44 years. The majority (89.65%, $n = 2477$) were research articles, followed by review articles (4.74%, $n = 131$) and other document types, including notes, letters, and editorials (5.61%, $n = 155$). The volume of research publications on binge drinking has significantly increased ($r = 0.916$; $p < 0.001$) over the years, as shown in Fig. 2. This upwards trend reached its peak in 2018, which recorded the highest number of articles published ($n = 191$) within the analysed period (1980–2024). A strong, statistically significant positive correlation was observed between the number of binge drinking research articles and their citation counts over the years ($r = 0.966$; $p < 0.001$).

Geographical distribution of countries and institutions and the Cooperation network

The retrieved documents involved contributions from authors across 139 different countries. The top ten most active countries are listed in Table 1, together accounting for approximately 84.7% of the total 2,342 documents. The USA led the group with 1,550 publications, 1,292 (56.1%) of which were solely from the USA, and 258 were
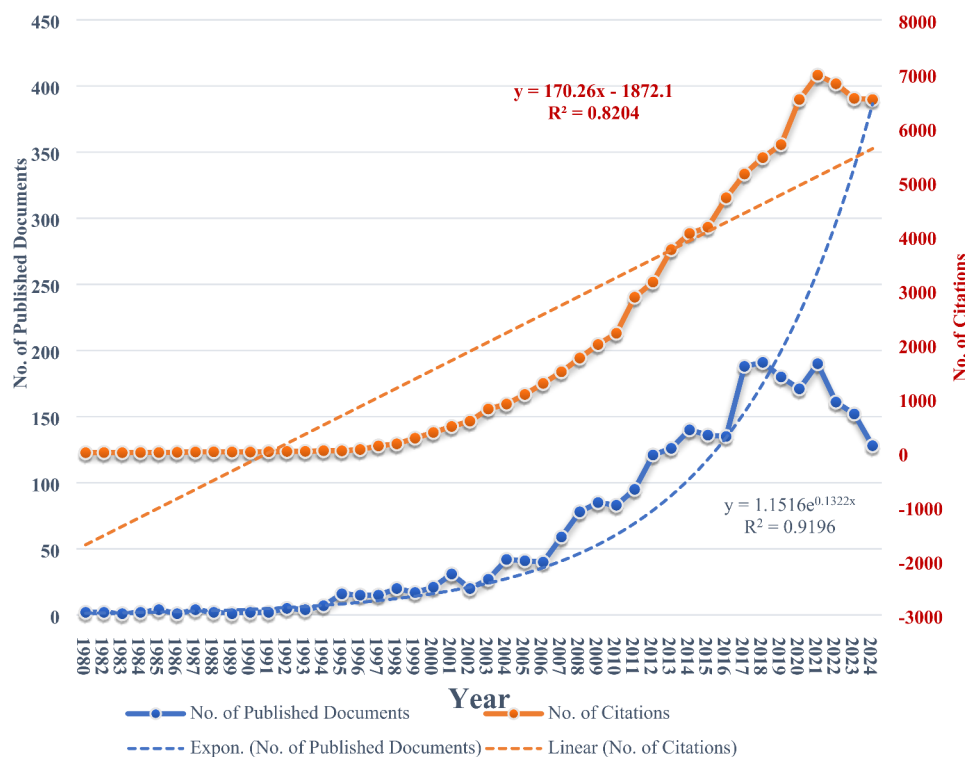

Fig. 2 Annual growth of publications related to binge drinking from 1980–2024

Table 1 The top 10 countries contributing to research related to binge drinking

Ranking	Country	No. of documents	%	Average citations per document	h-index	No. of collaborative countries	No. of publications from collaboration
1st	United States	1550	56.10	37.86	105	60	258
2nd	United Kingdom	216	7.82	39.64	51	35	100
3rd	Spain	184	6.66	22.98	35	25	62
4th	Canada	132	4.78	27.23	31	25	71
5th	Australia	129	4.67	25.17	32	24	61
6th	France	81	2.93	20.47	24	21	32
7th	Brazil	78	2.82	14.32	20	10	30
8th	Germany	77	2.79	26.05	24	21	31
9	Italy	72	2.61	22.75	25	18	25
10th	South Korea	64	2.32	22.98	18	4	20
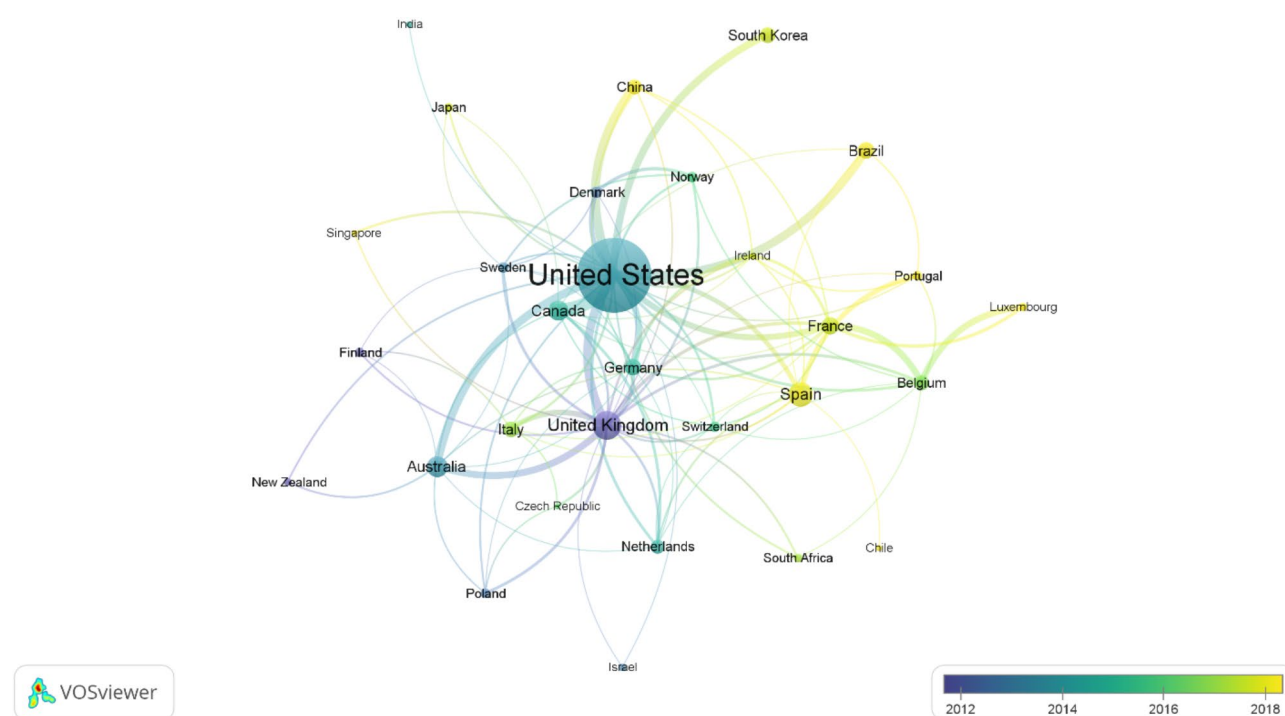
Fig. 3 Global research collaboration network (*n* = 30 countries), with line thickness indicating collaboration strength and node size reflecting research output (threshold: 10 documents per country)

international collaborations. The UK ranked second with 216 (7.82%) publications, followed by Spain with 184 (6.66%), Canada with 132 (4.78%), and Australia with 129 (4.67%). The h-index for all publications on binge drinking was 119. The USA had the highest h index at 105, with Spain at 51 and Spain again at 35. The highest average citation rate was seen in UK publications, with 39.64 citations per document, followed by the USA with 37.86 citations and Canada with 23.27 citations.

Figure 3 displays a network visualization map showing the collaborative connections between countries that have contributed at least 10 documents. The size of the circles represents the number of publications in the country, and the thickness of the lines signifies the size of

the collaboration. The centrality analysis of the collaboration network indicates that the USA, followed by the UK and Spain, was the top contributor. The map highlights 30 countries grouped into eight distinct clusters, each represented by a unique color. The thickness of the connecting lines between countries reflects the strength of their collaboration. For example, the collaboration strength between the USA and Canada is represented by a thick line with a strength of 40, whereas the line between the USA and China has a weaker strength of 24. Countries sharing the same color belong to the same cluster. For example, Denmark, India, Japan, Norway, Singapore, Sweden, and the USA, all marked in red, form one cluster with the highest level of collaboration. Similarly, the

Table 2 The top 10 institutions contributing to research related to binge drinking

Ranking	Institute	Country	No. of documents	%
1st	National Institute on Alcohol Abuse and Alcoholism NIAAA	USA	65	2.35
2nd	The University of North Carolina at Chapel Hill	USA	63	2.28
3rd	University of Michigan, Ann Arbor	USA	55	1.99
4th	University of California, San Diego	USA	53	1.92
5th	UNC School of Medicine	USA	49	1.77
5th	Universidade de Santiago de Compostela	Spain	49	1.77
7th	Centers for Disease Control and Prevention	USA	45	1.63
8th	Columbia University	USA	43	1.56
9th	Université Catholique de Louvain	Belgium	42	1.52
9th	Indiana University-Purdue University Indianapolis	USA	42	1.52

Table 3 The top 10 funding agencies involved in research related to binge drinking from 1980–2024

Ranking	Institute	Country	No. of documents	%
1st	National Institute on Alcohol Abuse and Alcoholism	USA	599	21.68
2nd	National Institutes of Health	USA	544	19.69
3rd	U.S. Department of Health and Human Services	USA	384	13.90
4th	National Institute on Drug Abuse	USA	174	6.30
5th	National Institute of Mental Health	USA	56	2.03
6th	U.S. Department of Veterans Affairs	USA	43	1.56
7th	National Institute of Child Health and Human Development	USA	40	1.45
8th	European Commission	European Commission	37	1.34
9th	Medical Research Council	UK	35	1.27
10th	National Cancer Institute	USA	33	1.19

Czech Republic, Finland, Italy, Poland, and South Korea are grouped in purple because of their primary collaborations with the UK.

A total of 6,153 institutions participated in this field of research, with the top 10 institutions producing 15.56% (430 articles) of the total published work in binge drinking. Notable contributors include the *National Institute on Alcohol Abuse and Alcoholism*, which led with 65 articles (2.35%), followed by the *University of North Carolina at Chapel Hill* with 63 articles (2.28%) (see Table 2). Notably, the USA has a significant presence, with eight institutions in the top ranks, whereas Belgium and Spain each have one institution among the top contributors. The high representation of U.S. institutions in binge drinking research, with eight of the top 10 institutions, is likely because most publications come from the USA.

Analysis of funding agencies

Out of the total 1,508 publications, which represent 54.58% of the articles retrieved, financial support was provided. Table 3 presents the top 10 funding agencies for research on binge drinking. These agencies collectively funded 957 articles, representing 34.64% of the total. The *National Institute on Alcohol Abuse and Alcoholism* in the United States was the main funding source, supporting 599 articles (21.68%), followed by the *National Institutes of Health* in the United States with 544 articles (19.69%) and the *U.S. Department of Health and Human*

Services in the United States with 384 articles (13.90%). In particular, eight of the funding agencies were based in the United States, whereas the UK and the European Union each had one agency represented on this list.

Top ten most active journals

On the basis of the data presented in Table 4, the top 10 journals collectively accounted for approximately 26.56% (n = 734) of the total publications on binge drinking research. The leader of the list was *Alcoholism: Clinical and Experimental Research*, which contributed 180 publications (6.51%), with an average of 47.44 citations per document. It was followed by *Addictive Behaviors*, with 94 publications (3.40%) and an average of 37.43 citations per document. *Drug and Alcohol Dependence* published 93 papers (3.90%), with an average of 31.57 citations per document, *whereas Alcohol* contributed 69 publications (2.90%), with an average of 28.9 citations per document.

Analysis of citations

Citation analysis of the collected articles showed an average of 31.53 citations per article, with a cumulative total of 87,110 citations. Of these, 255 articles had no citations, while 175 articles each received over 100 citations. The citation count varied between 0 and 1523. Table 5 presents the top ten publications on binge drinking, which together accumulated 8,070 citations, with individual citation counts ranging from 539 to 1523 [10, 41–49].

Table 4 The top 10 journals contributing to published articles related to binge drinking from 1980–2024

Ranking	Journal/source title	No. of documents	%	IF[*]	location	Total citations	Average citations per document
1st	Alcoholism Clinical and Experimental Research	180	6.51	3.0	USA	8539	47.44
2nd	Addictive Behaviors	94	3.40	3.7	UK	3518	37.43
3rd	Drug and Alcohol Dependence	93	3.37	3.9	Ireland	2936	31.57
4th	Alcohol	69	2.50	2.9	USA	1994	28.90
4th	Alcohol and Alcoholism	69	2.50	2.1	UK	1939	28.10
6th	Psychology of Addictive Behaviors	44	1.59	3.2	USA	2420	55.00
7th	Substance Use and Misuse	42	1.52	1.8	UK	898	21.38
8th	Plos One	41	1.48	2.9	USA	1235	30.12
9th	Addiction	38	1.38	5.2	UK	1422	37.42
10th	Addiction Biology	32	1.16	3.1	USA	789	24.66
10th	Journal of Studies on Alcohol and Drugs	32	1.16	2.4	USA	860	26.88

[*] Journal Citation Reports from Clarivate, 2024

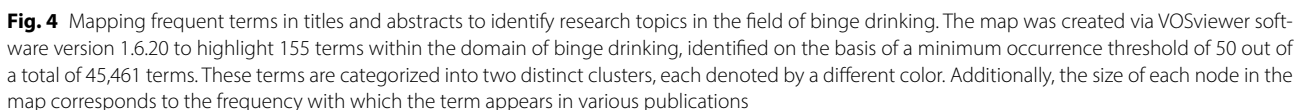**Table 5** List of the top 10 most cited papers related to binge drinking from 1980–2024

Ref	Title	Journal	Cited by	Study design	Citation index [1]
Wechsler et al. [44] 1994	"Health and Behavioral Consequences of Binge Drinking in College: A National Survey of Students at 140 Campuses"	*JAMA*	1523	Cross-sectional	49.1
Wechsler et al. [49] 2002	"Trends in college binge drinking during a period of increased prevention efforts: Findings from 4 harvard school of public health college alcohol study surveys: 1993–2001"	*Journal of the American College Health Association*	1229	Cross-sectional	53.4
Wechsler et al. [48] 2000	"College binge drinking in the 1990s: A continuing problem results of the harvard school of public health 1999 college alcohol study"	*Journal of the American College Health Association*	865	Cross-sectional	34.6
Naimi et al. [43] 2003	"Binge drinking among US adults"	*JAMA*	827	Cross-sectional	37.6
Miller et al. [42] 2007	"Binge drinking and associated health risk behaviors among high school students"	*Pediatrics*	715	Cross-sectional	39.7
Wechsler et al. [45] 1995	"Correlates of college student binge drinking"	*American Journal of Public Health*	621	Cross-sectional	20.7
Chassin et al. [41] 2002	"Binge drinking trajectories from adolescence to emerging adulthood in a high-risk sample: Predictors and substance abuse outcomes"	*Journal of Consulting and Clinical Psychology*	612	longitudinal cohort study	26.6
Wechsler et al. [46] 1995	"A gender-specific measure of binge drinking among college students"	*American Journal of Public Health*	590	Cross-sectional	19.7
Wechsler et al. [47] 1998	"Changes in binge drinking and related problems among American college students between 1993 and 1997 results of the harvard school of public health college alcohol study"	*Journal of the American College Health Association*	549	Cross-sectional	20.3
Courtney and Polich [10] 2009	"Binge Drinking in Young Adults: Data, Definitions, and Determinants"	*Psychological Bulletin*	539	Review-mechanism	33.7

The top 10 articles had an average citation rate per year ranging from 19.7 to 53.4. Table 5 shows the top 10 publications on the basis of their average number of citations per year. The three most cited articles, in terms of average citations per year, were "Wechsler et al. [49] 2002", with an average of 53.4 citations per year; "Wechsler et al. [44] 1994", with 49.1 citations per year; and "Miller et al. [42] 2007", with 39.7 citations per year. The most cited article in the period from 1980 to 2006 was by Wechsler et al. (1994) [44], with 1,523 citations. In contrast, between 2007 and 2024, the most cited article was by Miller et al. (2007) [42], with 715 citations.

Research themes

In this study, a comprehensive analysis was performed via VOSviewer 1.6.20 software to examine 2,763 publications on binge drinking from 1980 to 2024. The software facilitated the creation of term co-occurrence network maps, which visually delineated significant themes within the research landscape (depicted in Fig. 4). These maps illustrated connections among terms found

Fig. 4 Mapping frequent terms in titles and abstracts to identify research topics in the field of binge drinking. The map was created via VOSviewer software version 1.6.20 to highlight 155 terms within the domain of binge drinking, identified on the basis of a minimum occurrence threshold of 50 out of a total of 45,461 terms. These terms are categorized into two distinct clusters, each denoted by a different color. Additionally, the size of each node in the map corresponds to the frequency with which the term appears in various publications

in the title and abstracts. Using a minimum-term occurrence threshold of 50, a total of 155 terms were identified from a pool of 45,461 within this field. These terms were categorized into two distinct clusters, each denoted by a different color scheme. The node sizes in the maps correspond to the frequency of term occurrence in all publications. Figure 4 presents the primary groups identified from the analysis. The first cluster, labelled **"Social and Cultural Factors and Interventions for Binge Drinking"** (red), includes 84 keywords with a minimum occurrence threshold of 50. This group explores social and cultural dimensions, with prominent terms such as *sample* ($n = 517$), *survey* ($n = 437$), *intervention* ($n = 436$), *student* ($n = 508$), *woman* ($n = 479$), *age* ($n = 596$), *population* ($n = 394$), *man* ($n = 370$), *gender* ($n = 244$), *prevalence* ($n = 346$), *education* ($n = 128$), *interview* ($n = 127$), and *intention* ($n = 95$). Research in this area emphasizes the importance of interventions such as public health campaigns and community support programs, which play a key role in reshaping behaviors and addressing the social consequences of binge drinking.

The second cluster, labelled **"Mechanistic and Animal Model Research for Binge Drinking"** (green), comprises 71 keywords with a minimum occurrence threshold of 50. This group emphasizes biological mechanisms and animal models, featuring key terms such as *effect*

($n = 1073$), *mouse* ($n = 277$), *treatment* ($n = 270$), *mechanism* ($n = 268$), *expression* ($n = 217$), *impairment* ($n = 137$), *alteration* ($n = 132$), *inhibition* ($n = 106$), *gene* ($n = 96$), and *animal model* ($n = 71$), all of which are related to binge drinking.

Future research direction analysis

In Fig. 5, VOSviewer employs a color-coding system to differentiate each term on the basis of its average frequency in all analysed publications. This color scheme reflects the chronological distribution of term appearances, where blue denotes earlier occurrences and yellow signifies more recent occurrences. Prior to 2016, the predominant research focus in this field was "Social and Cultural Factors and Interventions for Binge Drinking." However, after 2016, there was a noticeable emergence of terms related to "Mechanistic and Animal Model Research for Binge Drinking," highlighting the current direction of research interest.

Discussion

This study used a bibliometric approach to examine themes and focal points of the literature on binge drinking. A total of 2763 documents were found after publications indexed in the Scopus database between 1980 and 2024 were identified. The results showed a steady
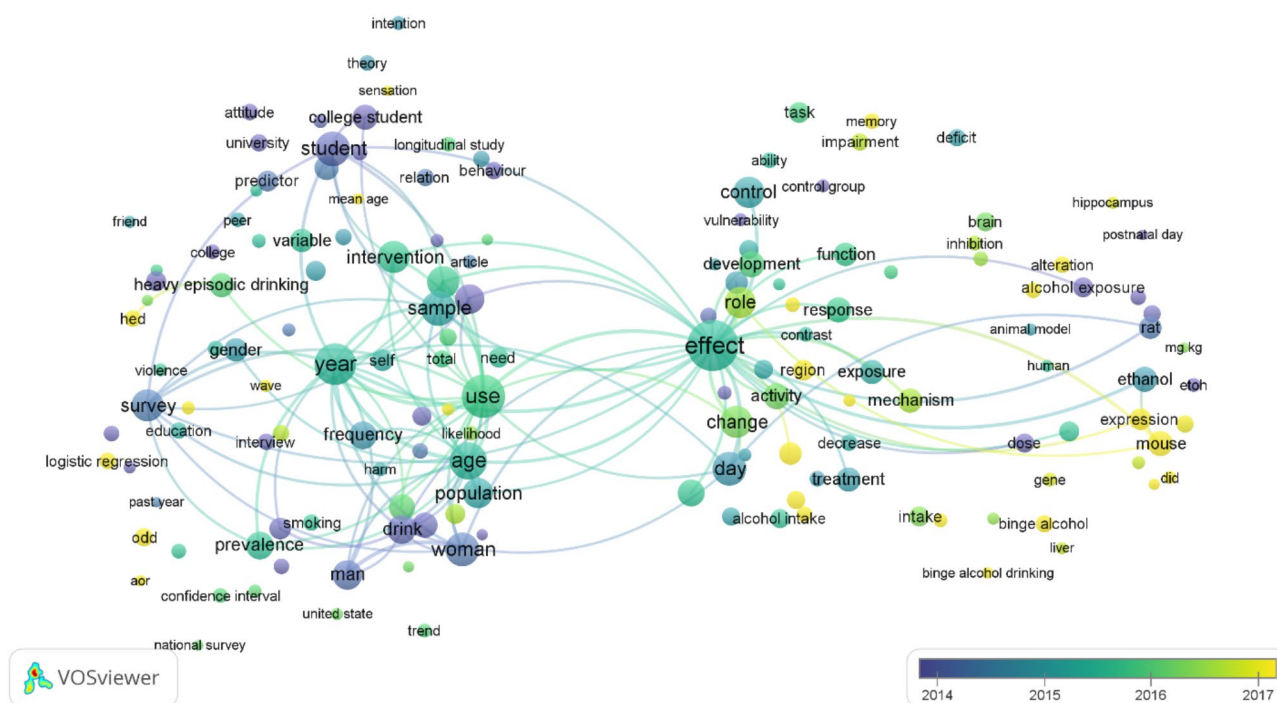
Fig. 5 Visualization of Term Analysis in Publications on Binge Drinking (1980–2024): A Network Analysis of the Title and Abstract Terms. The map illustrates the frequency of term usage, with earlier instances shown in blue and later occurrences in yellow. This map was generated via VOSviewer software version 1.6.20

increase in research on binge drinking over the course of several decades, indicating the possibility of future growth. The interdisciplinary character of the research, the changes in trends over time and socioeconomic inequality were found to be some of the factors influencing this increase in publication output.

Numerous nations, including the United States, the United Kingdom, Spain, and Australia, have conducted in-depth studies on binge drinking. Various factors, such as government policies, social pressures, cultural norms, and economic disparities, influence this behavior. The distinct cultural and social contexts of each nation significantly shape research methods and priorities. For instance, studies in the UK and Australia have linked binge drinking to long-standing drinking customs, peer pressure, and the accessibility of alcohol [50]. Additionally, the rise of nightlife cultures and the relaxation of alcohol licensing regulations have been associated with shifts in binge drinking patterns in England [51].

Policy decisions heavily influence the direction and scope of research in this area. For example, the high prevalence of episodic heavy drinking in Victoria, Australia, across various age and gender groups underscores the need for targeted interventions [52]. In the United States, evidence-based preventive measures have been implemented to address underage drinking and its associated problems [53]. A global analysis of research on driving after drinking reveals that a substantial proportion of

published articles on the topic originate from the United States [54], highlighting the country's significant focus on alcohol-related issues.

Research on binge drinking employs diverse methodologies across different fields and nations. Approaches such as regression analysis, experimental methods, and descriptive research have been utilized, shedding light on the need for further theoretical studies and research conducted outside Western contexts [55].

In this study, two research themes related to binge drinking were found. These themes were connected. The themes of social and cultural factors and interventions for binge drinking were especially noteworthy. There are many different social and cultural factors that can influence binge drinking [56, 57]. Excess alcohol consumption is normalized by peer pressure, cultural rituals, and social norms, which are particularly common among young adults [58, 59]. Public perceptions are further shaped by the glamorization of alcohol consumption in the media and in advertisements, as well as by celebrity endorsements [60, 61]. Social and cultural elements, such as the cost and accessibility of alcohol, financial stress, and local communities, have a great impact on binge drinking habits [62, 63]. Adolescents' drinking habits, including parental drinking patterns, are also significantly influenced by family dynamics [64, 65]. Community-based interventions, such as public health education campaigns and support groups, are considered crucial for reducing

binge drinking because they offer vital information and assistance [66, 67].

The recent scientific literature has revealed an increase in the use of phrases related to "Mechanistic and Animal Model Research for Binge Drinking," indicating a growing interest in the behavioral and biological underpinnings of binge drinking [68–73]. This pattern emphasizes the growing emphasis on using animal models to understand the mechanics underlying binge drinking [72, 73]. The primary objective of these studies is to apply these findings to improve interventions and treatment strategies for individuals who binge drink [74–76]. This focus on mechanistic research is in line with larger attempts in the field of alcohol studies to understand the intricacies of excessive alcohol use and lessen its detrimental impacts on the general public's health [77–79].

A thematic analysis of highly cited publications [10, 41–49] on binge drinking revealed a concentration of research on subtopics closely related to established areas of inquiry. This finding further suggests a growing emphasis and scholarly interest in this field in recent years.

Bibliometric analysis of binge drinking research over the last four decades has revealed significant trends and shifts in focus, as well as important research gaps and future opportunities. By addressing the following gaps and opportunities, future research can help us better understand alcohol consumption and guide the development of more effective prevention and intervention strategies [80–82]. The solution to this global public health problem will rely heavily on collaboration among nations, organizations, and disciplines. Since 2016, research on mechanistic factors has received increased attention, but the neurobiological and molecular pathways involved in alcohol consumption remain largely unexplored. The long-term effects of alcohol use on brain structure and function, particularly in adolescents and young adults, have not been thoroughly investigated. Although early studies concentrated on social and cultural influences, more in-depth research is needed to understand how cultural norms, socioeconomic status, and peer influences interact to shape drinking behaviors in various populations. Although social interventions are becoming increasingly important, there are few evidence-based and scalable programs tailored to specific groups (such as college students or low-income populations) or settings (such as rural or urban areas). High-income countries (e.g., the United States and the United Kingdom) primarily shape the current research landscape, whereas low- and middle-income countries (LMICs) have little influence, despite an increase in disturbances caused by alcohol consumption in these regions [83, 84].

Strengths and limitations

This pioneering bibliometric analysis explores the emerging field of binge drinking research, offering a comprehensive examination of current trends and prominent areas of investigation. However, it is essential to acknowledge certain inherent limitations, akin to those encountered in previous bibliometric studies [35, 36, 85].

First, the analysis is limited to articles sourced exclusively from the Scopus database. Although Scopus encompasses a substantial majority of publications on binge drinking research, other databases, such as PubMed and Web of Science (WoS), may contain relevant articles, introducing potential limitations.

Second, restricting the search to article titles containing the term "binge drinking" poses a constraint. Our experience indicates that incorporating search terms within abstracts significantly reduces sensitivity, yielding minimal additional articles, if any. In contrast, including unrestricted abstract terms in the search query resulted in the retrieval of a significant number of irrelevant publications.

Third, the findings inherently reflect the nature and composition of the Scopus database. Consequently, research output from prolific institutions with multiple Scopus profiles may be fragmented, potentially leading to their exclusion from the active list. This issue is also evident when published documents employ variant spellings for funding agency names. Therefore, interpretations concerning the most active institutions and funding agencies should be confined to the results derived from the aforementioned Scopus search methodology.

Despite these limitations, the findings are believed to offer a credible representation of global trends in binge drinking research.

Conclusions

This study represents the first comprehensive bibliometric analysis of publication trends in binge drinking research. Over the past decade, a significant increase has been observed in the number of publications dedicated to binge drinking. The United States, the United Kingdom, and Spain have emerged as the leading contributors to this field, with the United States spearing research efforts and achieving notable advances. Prior to 2016, the research focused primarily on social and cultural factors and interventions for binge drinking. However, a post-2016 shift toward "Mechanistic and Animal Model Research for Binge Drinking" was identified, reflecting the current trajectory of research interest. This timely exploration of research hotspots and emerging trends has the potential to substantially impact the advancement of the field. The insights presented provide a fresh perspective on binge drinking, which could shape future research in areas such as etiology, assessment, diagnosis,

prevention, and treatment. Furthermore, we highlight the importance of conducting longitudinal studies to better understand the long-term effects of binge drinking and stress the need for targeted interventions to reduce its prevalence in high-risk populations. We conclude with a call to action for researchers and policymakers to prioritize interdisciplinary collaborations and focused interventions in underrepresented regions.

Abbreviations
MeSH   Medical Subject Headings
RCA   Reference Citation Analysis
WoS   Web of Science
LMIC   Low- and middle-income countries

Author contributions
S.Z., the sole author, read and approved the final manuscript.

Data availability
All the data generated or analyzed during this study are included in this published article. In addition, other datasets used during the current study are available from the author upon reasonable request (saedzyoud@yahoo.com).

Declarations

Ethics approval and consent to participate
Given that this was a bibliometric study without human involvement, there was no need for ethical approval.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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References
1. GBD 2016 Alcohol Collaborators. Alcohol use and burden for 195 countries and territories, 1990–2016: a systematic analysis for the global burden of disease study 2016. Lancet. 2018;392(10152):1015–35.
2. Martinotti G, Lupi M, Carlucci L, Santacroce R, Cinosi E, Acciavatti T, Sarchione F, Verrastro V, Diotaiuti P, Petruccelli I, et al. Alcohol drinking patterns in young people: A survey-based study. J Health Psychol. 2017;22(14):1889–96.
3. Kuntsche E, Kuntsche S, Thrul J, Gmel G. Binge drinking: health impact, prevalence, correlates and interventions. Psychol Health. 2017;32(8):976–1017.
4. Nazareth I, Walker C, Ridolfi A, Aluoja A, Bellon J, Geerlings M, Svab I, Xavier M, King M. Heavy episodic drinking in Europe: a cross section study in primary care in six European countries. Alcohol Alcohol. 2011;46(5):600–6.
5. Valencia Martín JL, Galán I, Segura García L, Camarelles Guillem F, Suárez Cardona M. Brime Beteta B: [Binge drinking: the challenges of definition and its impact on health]. Rev Esp Salud Publica 2020, 94.
6. Gowin JL, Sloan ME, Morris JK, Schwandt ML, Diazgranados N, Ramchandani VA. Characteristics associated with High-Intensity binge drinking in alcohol use disorder. Front Psychol. 2021;12:750395.
7. White AM, Tapert S, Shukla SD. Binge drinking. Alcohol Res. 2018;39(1):1–3.
8. Jones SC, Gordon CS, Andrews K. What is 'binge drinking'? Perceptions of Australian adolescents and adults, and implications for mass media campaigns. Aust N Z J Public Health. 2016;40(5):487–9.
9. Hasselgård-Rowe J, Senchyna A, Broers B, Haller DM. Heterogeneity of definitions and measurements of binge drinking in research on adolescents and young adults. Drug Alcohol Depend. 2022;241:109650.
10. Courtney KE, Polich J. Binge drinking in young adults: data, definitions, and determinants. Psychol Bull. 2009;135(1):142–56.
11. National Institutes of Health, National Institute on Alcohol Abuse and Alcoholism. Understanding Binge Drinking. 2025. https://www.niaaa.nih.gov/publications/brochures-and-fact-sheets/binge-drinking (accessed January 28 2025).
12. Castelló-Cogollos L, Bueno Cañigral FJ, Valderrama Zurián JC. Bibliometric and academic network analysis of Spanish theses on drug dependence in the TESEO database. Adicciones. 2019;31(4):309–23.
13. Cortés-Tomás MT, Giménez-Costa JA, Martín-Del-Río B, Gómez-Íñiguez C, Solanes-Puchol Á. Binge drinking: the top 100 cited papers. Int J Environ Res Public Health 2021, 18(17).
14. Johansson M, Romero D, Jakobson M, Heinemans N, Lindner P. Digital interventions targeting excessive substance use and substance use disorders: a comprehensive and systematic scoping review and bibliometric analysis. Front Psychiatry. 2024;15:1233888.
15. Junyue J, Siyu C, Xindong W, Qinge X, Jingchun Z, Liming L, Guohua L. Complementary and alternative medicine for substance use disorders: A scientometric analysis and visualization of its use between 2001 and 2020. Front Psychiatry. 2021;12:722240.
16. Liu W, Li H, Lin S. Research hotspots and frontiers of alcohol and epilepsy: A bibliometric analysis. Neuropsychopharmacol Rep. 2024;44(2):342–55.
17. Mano-Sousa BJ, Ribeiro LAL, Alves BC, Gonçalves ACA, Silva LM, Duarte-Almeida JM. Bibliometric analysis of Cannabis sativa research: trends, challenges, and future directions. Cannabis Cannabinoid Res. 2024;9(1):21–34.
18. Sweileh WM. Contribution of researchers in the Arab region to peer-reviewed literature on mental health and well-being of university students. Int J Ment Health Syst. 2021;15(1):50.
19. Valderrama Zurián JC, Bueno Cañigral FJ, Castelló Cogollos L, Aleixandre-Benavent R. The most 100 cited papers in addiction research on cannabis, heroin, cocaine and psychostimulants. A bibliometric cross-sectional analysis. Drug Alcohol Depend. 2021;221:108616.
20. Wang K, Duan Y, Duan W, Yu Y, Zheng N, Hu J, He J, Chen H, Liang M. Bibliometric insights in genetic factors of Substance-Related disorders: intellectual developments, turning points, and emerging trends. Front Psychiatry. 2021;12:620489.
21. Sweileh WM. Substandard and falsified medical products: bibliometric analysis and mapping of scientific research. Global Health. 2021;17(1):114.
22. Sweileh WM. Analysis and mapping of global research publications on shift work (2012–2021). J Occup Med Toxicol. 2022;17(1):22.
23. Sweileh WM. Global research activity on mathematical modeling of transmission and control of 23 selected infectious disease outbreak. Global Health. 2022;18(1):4.
24. Sweileh WM. Bibliometric analysis of peer-reviewed literature on antimicrobial stewardship from 1990 to 2019. Global Health. 2021;17(1):1.
25. Falagas ME, Pitsouni EI, Malietzis GA, Pappas G. Comparison of pubmed, Scopus, web of science, and Google scholar: strengths and weaknesses. FASEB J. 2008;22(2):338–42.
26. Gourlan M, Ricupero S, Carayol M, Cousson-Gélie F. Efficacy of theory-based interventions aimed at reducing binge drinking in adolescents: A systematic review and meta-analysis of randomised controlled trials. Soc Sci Med. 2023;317:115571.
27. Yussof A, Yoon P, Krkljes C, Schweinberg S, Cottrell J, Chu T, Chang SL. A meta-analysis of the effect of binge drinking on the oral Microbiome and its relation to Alzheimer's disease. Sci Rep. 2020;10(1):19872.

28. Lange S, Probst C, Rehm J, Popova S. Prevalence of binge drinking during pregnancy by country and world health organization region: systematic review and meta-analysis. Reprod Toxicol. 2017;73:214–21.

29. Sampedro-Piquero P, Zancada-Menéndez C, Bernabéu-Brotons E, Moreno-Fernández RD. The relationship between binge drinking and binge eating in adolescence and youth: A systematic review and Meta-Analysis. Int J Environ Res Public Health 2022, 20(1).

30. Sweileh WM. Global research publications on irrational use of antimicrobials: call for more research to contain antimicrobial resistance. Global Health. 2021;17(1):94.

31. Shakhshir M, Zyoud SH. Global research trends on diet and nutrition in Crohn's disease. World J Gastroenterol. 2023;29(20):3203–15.

32. Zyoud SH. Research landscape on COVID-19 and liver dysfunction: A bibliometric analysis. World J Gastroenterol. 2023;29(27):4356–67.

33. Zyoud SH, Shakhshir M, Abushanab AS, Koni A, Shahwan M, Jairoun AA, Abu Taha A, Al-Jabi SW. Gut microbiota and autism spectrum disorders: where do we stand? Gut Pathog. 2023;15(1):50.

34. Zyoud SH, Shakhshir M, Abushanab AS, Koni A, Shahwan M, Jairoun AA, Al-Jabi SW. Bibliometric mapping of the landscape and structure of nutrition and depression research: visualization analysis. J Health Popul Nutr. 2023;42(1):33.

35. Al-Jabi SW. Current global research landscape on COVID-19 and depressive disorders: bibliometric and visualization analysis. World J Psychiatry. 2021;11(6):253–64.

36. Al-Jabi SW. Global research trends and mapping knowledge structure of depression in dialysis patients. World J Psychiatry. 2023;13(8):593–606.

37. Sweileh WM. Technology-based interventions for tobacco smoking prevention and treatment: a 20-year bibliometric analysis (2003–2022). Subst Abuse Treat Prev Policy. 2024;19(1):13.

38. Arruda H, Silva ER, Lessa M, Proença D Jr., Bartholo R. VOSviewer and bibliometrix. J Med Libr Assoc. 2022;110(3):392–5.

39. van Eck NJ, Waltman L. Software survey: VOSviewer, a computer program for bibliometric mapping. Scientometrics. 2010;84(2):523–38.

40. Bukar UA, Sayeed MS, Razak SFA, Yogarayan S, Amodu OA, Mahmood RAR. A method for analyzing text using VOSviewer. MethodsX. 2023;11:102339.

41. Chassin L, Pitts SC, Prost J. Binge drinking trajectories from adolescence to emerging adulthood in a high-risk sample: predictors and substance abuse outcomes. J Consult Clin Psychol. 2002;70(1):67–78.

42. Miller JW, Naimi TS, Brewer RD, Jones SE. Binge drinking and associated health risk behaviors among high school students. Pediatrics. 2007;119(1):76–85.

43. Naimi TS, Brewer RD, Mokdad A, Denny C, Serdula MK, Marks JS. Binge drinking among US adults. JAMA. 2003;289(1):70–5.

44. Wechsler H, Davenport A, Dowdall G, Moeykens B, Castillo S. Health and behavioral consequences of binge drinking in college. A National survey of students at 140 campuses. JAMA. 1994;272(21):1672–7.

45. Wechsler H, Dowdall GW, Davenport A, Castillo S. Correlates of college student binge drinking. Am J Public Health. 1995;85(7):921–6.

46. Wechsler H, Dowdall GW, Davenport A, Rimm EB. A gender-specific measure of binge drinking among college students. Am J Public Health. 1995;85(7):982–5.

47. Wechsler H, Dowdall GW, Maenner G, Gledhill-Hoyt J, Lee H. Changes in binge drinking and related problems among American college students between 1993 and 1997. Results of the Harvard school of public health college alcohol study. J Am Coll Health. 1998;47(2):57–68.

48. Wechsler H, Lee JE, Kuo M, Lee H. College binge drinking in the 1990s: a continuing problem. Results of the Harvard school of public health 1999 college alcohol study. J Am Coll Health. 2000;48(5):199–210.

49. Wechsler H, Lee JE, Kuo M, Seibring M, Nelson TF, Lee H. Trends in college binge drinking during a period of increased prevention efforts. Findings from 4 Harvard school of public health college alcohol study surveys: 1993–2001. J Am Coll Health. 2002;50(5):203–17.

50. Keatley DA, Ferguson E, Lonsdale A, Hagger MS. Lay Understanding of the causes of binge drinking in the united Kingdom and Australia: a network diagram approach. Health Educ Res. 2017;32(1):33–47.

51. Twigg L, Moon G. The Spatial and Temporal development of binge drinking in England 2001–2009: an observational study. Soc Sci Med. 2013;91:162–7.

52. Matthews S, Dietze P, Room R, Chikritzhs T, Jolley D. The social location of heavy episodic alcohol consumption in the Victorian population. Drug Alcohol Rev. 2013;32(2):157–61.

53. Esser MB, Clayton H, Demissie Z, Kanny D, Brewer RD. Current and binge drinking among high school Students - United States, 1991–2015. MMWR Morb Mortal Wkly Rep. 2017;66(18):474–8.

54. Valderrama-Zurián JC, Melero-Fuentes D, Álvarez FJ, Herrera-Gómez F. World-wide research output trends on drinking and driving from 1956 to 2015. Accid Anal Prev. 2020;135:105364.

55. D'Alessandro S, Carter L, Webster C. Binge drinking: A review and research agenda. J Consumer Behav. 2022;22(1):177–98.

56. Sudhinaraset M, Wigglesworth C, Takeuchi DT. Social and cultural contexts of alcohol use: influences in a Social-Ecological framework. Alcohol Res. 2016;38(1):35–45.

57. Sanchez ZM, Martins SS, Opaleye ES, Moura YG, Locatelli DP, Noto AR. Social factors associated to binge drinking: a cross-sectional survey among Brazilian students in private high schools. BMC Public Health. 2011;11:201.

58. Morris H, Larsen J, Catterall E, Moss AC, Dombrowski SU. Peer pressure and alcohol consumption in adults living in the UK: a systematic qualitative review. BMC Public Health. 2020;20(1):1014.

59. Ross-Houle K, Quigg Z. Content, perceptions and impact of alcoholic drink promotions in nightlife venues that are targeted towards students. Addict Behav Rep. 2019;9:100163.

60. Jackson KM, Janssen T, Gabrielli J. Media/Marketing influences on adolescent and young adult substance abuse. Curr Addict Rep. 2018;5(2):146–57.

61. Moreno MA, Whitehill JM. Influence of social media on alcohol use in adolescents and young adults. Alcohol Res. 2014;36(1):91–100.

62. Hogan SP, Perks KJ, Russell-Bennett R. Identifying the key Sociocultural influences on drinking behavior in high and moderate Binge-Drinking countries and the public policy implications. J Public Policy Mark. 2014;33(1):93–107.

63. Collins SE. Associations between socioeconomic factors and alcohol outcomes. Alcohol Res. 2016;38(1):83–94.

64. McMorris BJ, Catalano RF, Kim MJ, Toumbourou JW, Hemphill SA. Influence of family factors and supervised alcohol use on adolescent alcohol use and harms: similarities between youth in different alcohol policy contexts. J Stud Alcohol Drugs. 2011;72(3):418–28.

65. Rüütel E, Sisask M, Värnik A, Värnik P, Carli V, Wasserman C, Hoven CW, Sarchiapone M, Apter A, Balazs J, et al. Alcohol consumption patterns among adolescents are related to family structure and exposure to drunkenness within the family: results from the SEYLE project. Int J Environ Res Public Health. 2014;11(12):12700–15.

66. Holder HD. Community prevention of young adult drinking and associated problems. Alcohol Res Health. 2004;28(4):245–8.

67. Fagan AA, Hawkins JD, Catalano RF. Engaging communities to prevent underage drinking. Alcohol Res Health. 2011;34(2):167–74.

68. Fritz BM, Boehm SL 2. Rodent models and mechanisms of voluntary binge-like ethanol consumption: examples, opportunities, and strategies for preclinical research. Prog Neuropsychopharmacol Biol Psychiatry. 2016;65:297–308.

69. Yuan TT, Li S, Wu Y, Wu HT. [Establishment and behavioral evaluation of a mouse model of long-term free-choice alcohol drinking]. Beijing Da Xue Xue Bao Yi Xue Ban. 2023;55(2):315–23.

70. Ghosh Dastidar S, Warner JB, Warner DR, McClain CJ, Kirpich IA. Rodent models of alcoholic liver disease: role of binge ethanol administration. Biomolecules 2018, 8(1).

71. Hiller-Sturmhöfel S, Spear LP. Binge drinking's effects on the developing Brain-Animal models. Alcohol Res. 2018;39(1):77–86.

72. Flayelle M, Lannoy S. Binge behaviors: assessment, determinants, and consequences. Addict Behav Rep. 2021;14:100380.

73. Almeida-Antunes N, Crego A, Carbia C, Sousa SS, Rodrigues R, Sampaio A, López-Caneda E. Electroencephalographic signatures of the binge drinking pattern during adolescence and young adulthood: A PRISMA-driven systematic review. Neuroimage Clin. 2021;29:102537.

74. Jeanblanc J, Rolland B, Gierski F, Martinetti MP, Naassila M. Animal models of binge drinking, current challenges to improve face validity. Neurosci Biobehav Rev. 2019;106:112–21.

75. Spanagel R. Animal models of addiction. Dialogues Clin Neurosci. 2017;19(3):247–58.

76. Nieto SJ, Grodin EN, Aguirre CG, Izquierdo A, Ray LA. Translational opportunities in animal and human models to study alcohol use disorder. Transl Psychiatry. 2021;11(1):496.

77. Rehm J, Rovira P, Manthey J, Anderson P. Reduction of alcoholic strength: does it matter for public health?? *Nutrients* 2023, 15(4).

78. Jernigan DH. Alcohol and public health: failure and opportunity. Milbank Q. 2023;101(S1):552–78.

79. Knox J, Hasin DS, Larson FRR, Kranzler HR. Prevention, screening, and treatment for heavy drinking and alcohol use disorder. Lancet Psychiatry. 2019;6(12):1054–67.
80. D'Alessandro S, Carter L, Webster C. Binge drinking: A review and research agenda. J Consumer Behav. 2023;22(1):177–98.
81. Patrick ME, Terry-McElrath YM, Lanza ST, Jager J, Schulenberg JE, O'Malley PM. Shifting age of peak binge drinking prevalence: historical changes in normative trajectories among young adults aged 18 to 30. Alcohol Clin Exp Res. 2019;43(2):287–98.
82. Pérez-García JM, Suárez-Suárez S, Doallo S, Cadaveira F. Effects of binge drinking during adolescence and emerging adulthood on the brain: A systematic review of neuroimaging studies. Neurosci Biobehav Rev. 2022;137:104637.
83. Pantoja T, Opiyo N, Lewin S, Paulsen E, Ciapponi A, Wiysonge CS, Herrera CA, Rada G, Peñaloza B, Dudley L, et al. Implementation strategies for health systems in low-income countries: an overview of systematic reviews. Cochrane Database Syst Rev. 2017;9(9):Cd011086.
84. Bonsu L, Kumra P, Awan A, Sharma M. A systematic review of binge drinking interventions and bias assessment among college students and young adults in high-income countries. Glob Ment Health (Camb). 2024;11:e33.
85. Zyoud SH, Al-Jabi SW, Shahwan MJ, Jairoun AA. Global research production in neonatal abstinence syndrome: A bibliometric analysis. World J Clin Pediatr. 2022;11(3):307–20.

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