

Bibliometric analysis of retracted papers in the field of hypertension

Hipertansiyon alanında geri çekilen makalelerin bibliyometrik analizi



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Abstract

Retraction is the act of withdrawing an academic article. The aim of this study was to comprehensively evaluate retracted publications on hypertension, one of the most prevalent chronic diseases worldwide. A search strategy was conducted in the Web of Science database. Information such as publication and retraction dates, the duration between them, the journal, the document type, the country of corresponding author, the reason for retraction and the requesting party, and the citation count were recorded. Trend analysis was used to illustrate the evolution of retracted papers over the years. The median duration of retracted papers was 681 days, with a median citation count of 6. The number of retracted publications has tended to increase over the years. The most frequently identified reasons for retraction were errors, fraud, and peer review issues. A total of 33.0% of the manuscripts mentioned funding. In terms of country distribution, China led with 29.1% retracted papers, followed by Japan and the USA. These findings underscore the detrimental impact of the length and increasing number of retraction periods on the reliability of the literature. Additionally, it highlights that this is a global issue prevalent among researchers' publications in different countries, emphasizing the need for universal attention to scientific publication ethics and research standards.

Keywords: Hypertension, high blood pressure, retraction, retracted papers

Özet

Geri çekme, akademik bir makalenin geri çekilmesi eylemidir. Bu çalışmanın amacı, dünya çapında en yaygın kronik hastalıklardan biri olan hipertansiyon ile ilgili geri çekilen yayınları kapsamlı bir şekilde değerlendirmektir. Web of Science veri tabanında bir arama stratejisi uygulanmıştır. Yayın ve geri çekilme tarihleri, aralarındaki süre, dergi, belge türü, sorumlu yazarın ülkesi, geri çekilme nedeni ve talepte bulunan taraf, atıf sayısı gibi bilgiler kaydedilmiştir. Geri çekilen makalelerin yıllar içindeki gelişimini göstermek için trend analizi kullanılmıştır. Geri çekilen makalelerin medyan süresi 681 gün, medyan atıf sayısı ise 6 olarak bulunmuştur. Geri çekilen yayınların sayısı yıllar içinde artma eğilimi göstermiştir. En sık belirlenen geri çekilme nedenleri hatalar, sahtekârlık ve hakem değerlendirme sorunları olmuştur. Makalelerin %33,0'u fonlama belirtmiştir. Ülke dağılımı açısından, Çin %29,1 oranıyla en fazla geri çekilen makaleye sahip olup, onu Japonya ve ABD takip etmektedir. Bu bulgular, geri çekilme sürelerinin uzunluğu ve artan sayısının literatürün güvenilirliği üzerindeki olumsuz etkilerini vurgulamaktadır. Ayrıca, bunun farklı ülkelerdeki araştırmacıların yayınlarında yaygın olan küresel bir sorun olduğunu, bilimsel yayın etiği ve araştırma standartlarına evrensel düzeyde dikkat edilmesi gerektiğini göstermektedir.

Anahtar Kelimeler: Hipertansiyon, yüksek tansiyon, retraksiyon, geri çekilen makaleler

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Introduction

Retraction is the act of withdrawing an academic article by the journal that originally published it. Plagiarism, duplication, fraud, author disagreements and conflicts, ethical concerns, and errors are among the various reasons why different forms of misconduct can result in the retraction of a scientific paper (1). Retracting an article after publication is among the most undesirable outcomes for a manuscript, yet it serves as a crucial indicator of the validity and authenticity of the published data. In 2009, the Committee on Publication Ethics (COPE) issued guidelines on retractions, stipulating that an article should be retracted if it is deemed unreliable, plagiarized, or for various other reasons (2). The retraction of articles in the literature serves several purposes of correcting misleading information, alerting researchers, and preventing the dissemination of erroneous data (3). Recently, there has been a heightened emphasis on retracting scientific papers in response to revelations of scientific misconduct. As instances of authors fabricating data, plagiarizing, or engaging in other forms of misconduct come to light, the scientific community has grown increasingly vigilant. For example, a paper on cancer treatment that incorporates false and fraudulent data not only jeopardizes the integrity of scientific research but also poses risks to patients (4). The time period during which retracted publications linger in the public domain poses a risk. For example, the prevalence of misinformation surrounding diseases such as COVID-19, fueled by retracted studies, contributes to the formation of a misinformation community, particularly when these retractions are not promptly addressed in the media (5). Scientific errors, not to mention moral failings, can have significant consequences for

patients, as demonstrated by the findings of studies such as these (6). Over the years, the increasing number of retracted articles has drawn attention. For instance, the retraction rate of articles listed in the PubMed database rose from 0.002% in the 1980s to 0.02% in 2009 (3).

To better understand the significance of the increase in retracted manuscripts in recent years, it is necessary to identify retraction notices and reasons for retraction (7). We believe that articles in the medical field are not thoroughly assessed for both retractions and events leading to retractions. Our aim was to comprehensively evaluate retracted publications on hypertension, examining its cause, distribution, and trends over time.

Material and Method

Search strategy

On February 5, 2024, we conducted a search on the Web of Science (WoS) database via the search strategy hypertension OR "high blood pressure" in the topic field. We then filtered the results by document type, specifically 'retraction, retracted publication, withdrawn publication, item withdrawal'.

The Web of Science search method was "hypertension" or "high blood pressure" (all fields) and retracted publication or retraction or withdrawal or item withdrawal (document types).

Initial identification of retracted publications on hypertension was performed, and the relevant articles were saved for further evaluation. The inclusion criteria encompassed all time periods, with no restrictions. That is, all retracted articles published until our search dates of February 5, 2024, were included, covering all time periods without a specific start date. The studies excluded off-topic, repeated, and non-English articles. Two researchers (R.G. and E.K.) reviewed the titles and abstracts of the articles,

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and 57 articles related to pulmonary hypertension, portal hypertension, or intracranial hypertension in the search results were considered off-topic,

with only those focusing on systemic hypertension being included. A total of 18 articles were excluded because of duplication (Figure 1).

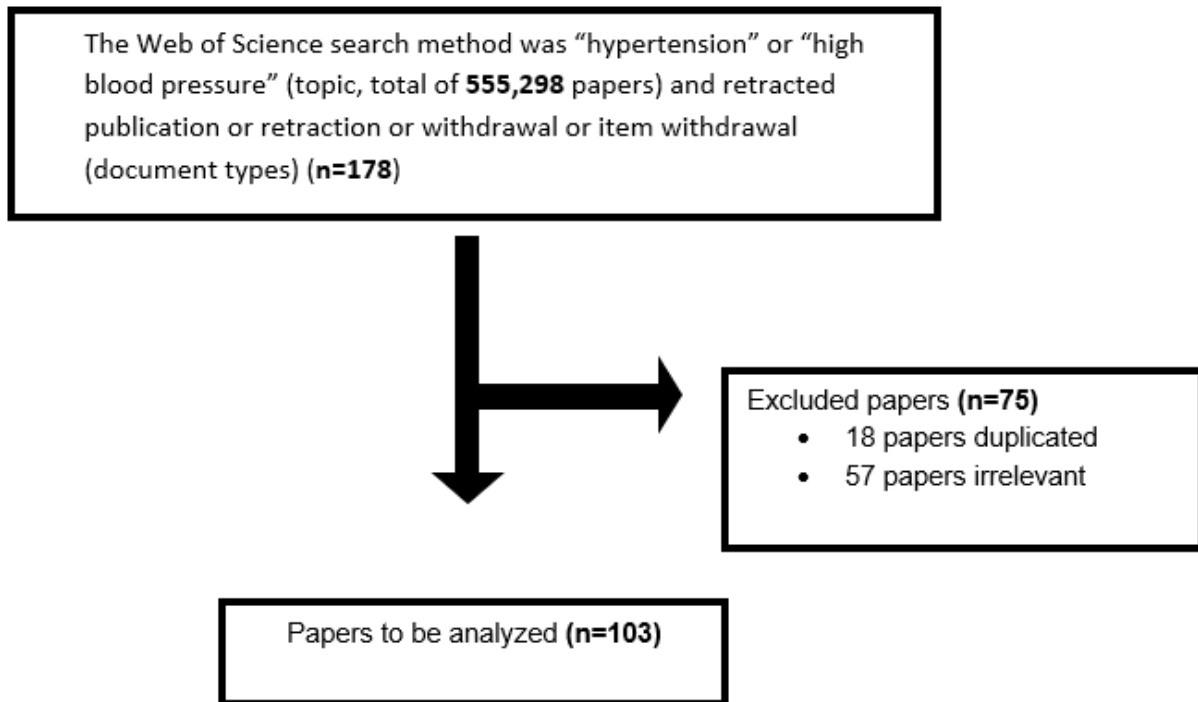


Figure 1: The flow-chart of study

Data collection and coding

In the subsequent analysis for each article, we calculated the publication date, retraction date, and duration between these dates in days. This duration was then coded as the time remaining in publication. Information such as the journal names where the retracted papers were published, the manuscript document type, the country, and the journal index of the corresponding author were recorded, along with the number of citations. In the final stage, we meticulously examined the retraction notes to identify the reasons for retraction and the author of the retraction request. The reasons for retraction were independently assessed by two researchers (R.G. and E.K.), in cases of disagreement, a final decision was reached through collaboration by the researchers. These two independent researchers came together again to discuss and finalize the decision-making process for the areas where they disagreed, both in determining the articles to be included in the study on hypertension and in the process of determining the reasons for retraction of the included articles. The median, minimum, and maximum values were calculated and presented for

the variables of time in publication and the number of citations.

The criteria for retraction were determined by reviewing the literature as follows. Numerous studies with comparable methodologies exist in this field (3, 8).

- i) Error (incorrect study design, inappropriate data collection, presentation, or report)
- ii) Fraud (Manipulation and falsification of data, figures, cases, or images)
- iii) Author disagreements and conflicts (publication without author clearance, use of bogus names, or disagreement between authors and funders)
- iv) Duplication (double publishing of the same article)
- v) Ethical issues (failure to acquire ethics committee clearance or participant consent)
- vi) Peer-review issues (fake or biased peer review methods and other issues associated with this process)
- vii) Plagiarism (individuals' scientific works, such as papers, texts, designs, tables, graphs, figures, and ideas, and facial misuse, including

self-plagiarism)

viii) Unknown (the reason for retraction was not explicitly stated)

Visualization tools and analysis

Trend analysis was employed to illustrate the evolution of retracted papers over the years. Minitab software was utilized for visualizing changes and predicting the number of retracted papers in future years. As the data processing occurred in 2024, the graph excluded the number of retracted papers for that year, considering that it was incomplete.

VOSviewer version 1.6.20 was utilized for visualizing corresponding author countries, journal sources, and keywords in retracted papers. This software is commonly employed in bibliometric research (9, 10). The node size on the map denotes the frequency density, whereas the line thickness indicates the strength of the interaction. In the overlay visualization map, node color reflects the average frequency and its variations across the years. These visualizations provide an opportunity

to illustrate the distribution of parameters over time.

Ethics

This study utilized publicly available data. Since it did not involve any human or animal participants, ethics committee approval was not needed.

Results

After screening the data with the search strategy, total of 178 retracted articles were recorded. In the initial stage, 18 duplicate articles were excluded. Fifty-seven articles were excluded because they were deemed irrelevant, leaving 103 articles for analysis.

The median duration of retracted papers was 681 days (min=9, max=6696), with a median number of citations of 6 (min=0, max=1967). Retracted publications exhibited a rising trend over the years ($Y_t = -2.236 + 0.3744 \times t$). According to the linear trend model, there is a predicted increase in the number of retracted papers in the future (Fig 2).

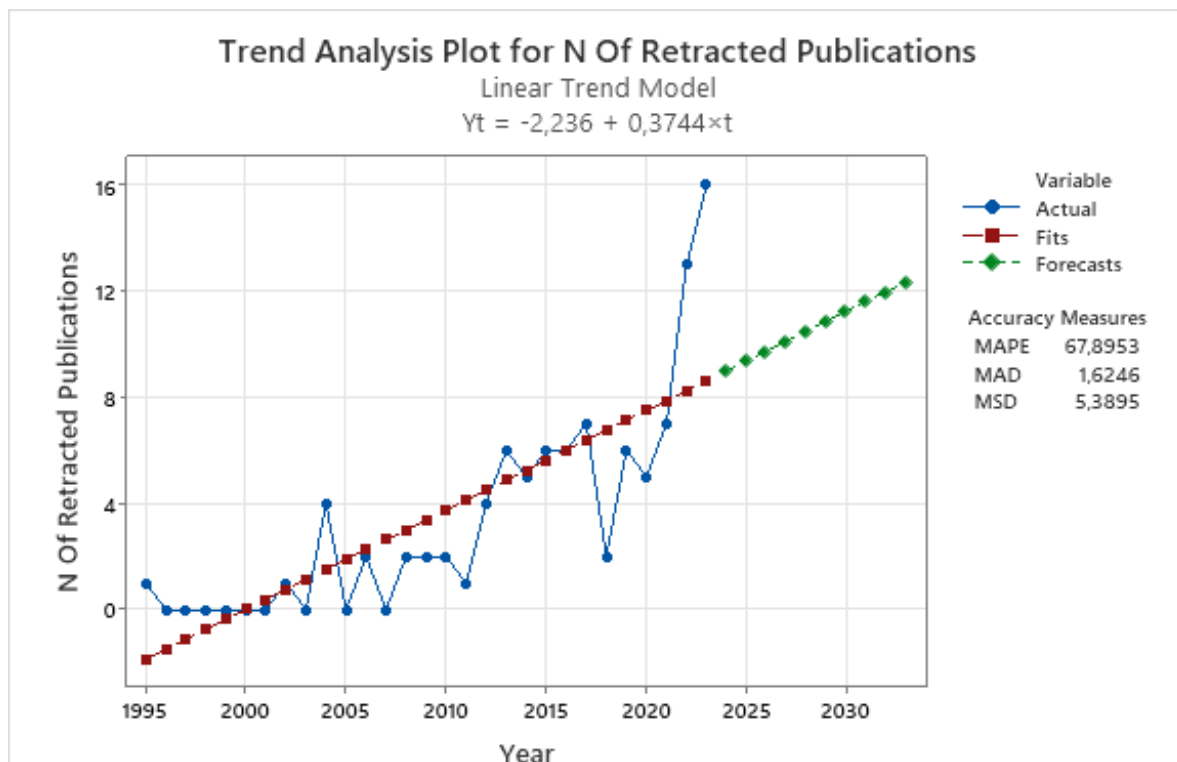


Figure 2: Trend analysis of retracted publications

After the retraction notes of the 103 papers were analyzed, the distribution in Figure 3 illustrates the reasons for retraction. The most frequent reasons identified were errors (31 papers, 30.1%), followed

by fraud (18 papers, 17.5%), and peer review issues (12 papers, 11.6%). In 16 retracted papers, the reason could not be determined on the basis of the retraction notes.

Retraction reasons (number of papers)

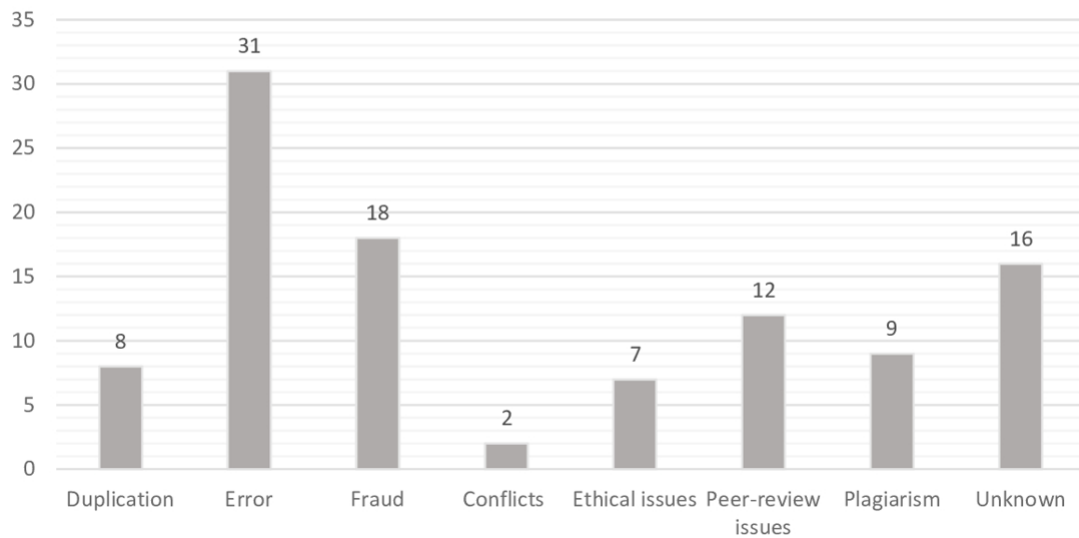


Figure 3: Retraction reasons (number of papers)

In Figure 4, the visualization depicts the type of retracted papers, the Web of Science index, and the source of the retraction request. Accordingly, the majority of retracted papers were of the original article type. Overall, 87 papers (84.5%) had Science Citation Index-expanded (SCI-e) indices, 2 papers (2.0%) had SCI-E/Social Sciences Citation Index (SSCI), 4 papers (3.9%) had SCI-E/Conference Proceedings Citation Index-Science (CPCI-S), and

10 papers (9.7%) had Emerging Sources Citation Index (ESCI) indices. In the analysis of retraction requests or decisions, 68 (66.0%) requests were initiated by publishers, 30 (29.1%) requests were initiated by authors, 1 (0.9%) request involved both publishers and authors, and 4 (3.9%) requests or decisions were unknown. Additionally, a total of 34 manuscripts (33.0%) mentioned funding in some capacity.

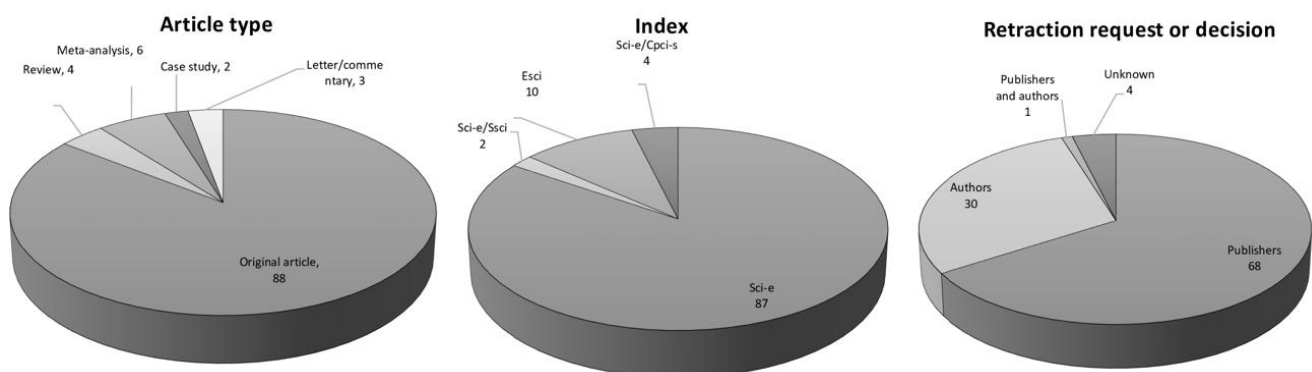


Figure 4: Representation of the Article type, Index and Retraction request or decision

Table 1 presents the countries of corresponding authors with the highest number of retracted papers. China had 30 (29.1%) retracted papers, followed by Japan (14 papers, 13.6%) and the United States of America (USA) (13 papers, 12.6%). An overlay visualization map was generated for these countries via VOSviewer. Coauthorship was chosen as the type of analysis, and countries were set as the unit of analysis. Figure 5a displays the

resulting map, including 37 countries with at least one documented case. In the overlay map, which examines the distribution of retracted writings by country starting from the 2000s to the present day, China, representing the most recent years, is colored green, while the USA and Japan are colored purple, following China in terms of width but chronologically defining the older years.

Table 1: List of countries with the most retracted paper.

Countries	N*	%
China	30	29.1
Japan	14	13.6
USA	13	12.6
Italy	7	6.8
Australia	4	3.9
Germany	3	2.9
India	3	2.9
Pakistan	3	2.9
Saudi Arabia	3	2.9

*Data with 3 and more were portrayed

Table 2 provides a list of journals where retracted papers were published. Among the 6 journals with at least 3 papers, Biomed Research had the highest

number of retractions (10 papers, 9.7%), followed by the Journal of Hypertension (6 papers, 5.8%) and Hypertension (5 papers, 4.9%).

Table 2: List of journals with the most retracted paper.

Journal	N*	%
Biomed Research International	10	9.7
Journal of Hypertension	6	5.8
Hypertension	5	4.9
Journal of Human Hypertension	4	3.9
Hypertension Research	3	2.9
Journal of the American Society of Hypertension	3	2.9

*Data with 3 and more were portrayed

In Figure 5b, an overlay visualization map was generated for the most frequently used keywords in retracted articles, illustrating the distribution of keywords extending to 2024. When the overlay map was made according to the most common

keywords of the retracted articles included in the study, the graph of the keywords represented by purple and green colors in terms of time and frequency was shown.

**Figure 5a:** Co-authorship (type of analysis) countries (unit of analysis) overlay visualization map

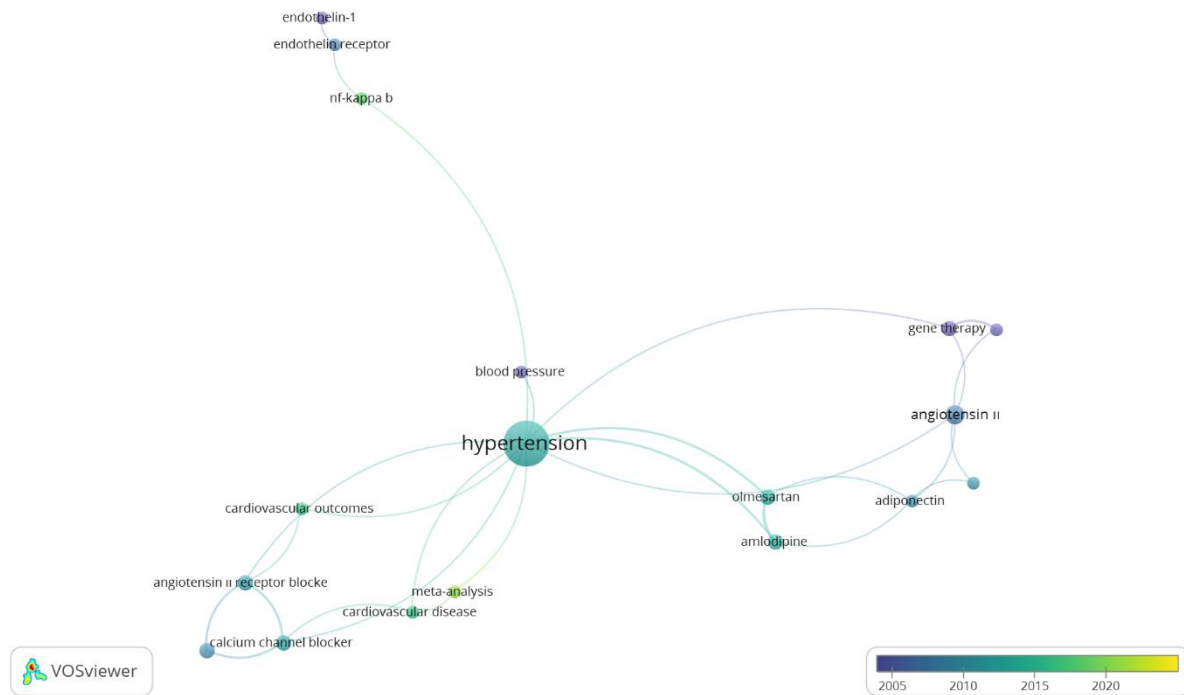


Figure 5b: Co-occurrence (type of analysis) of keywords (unit of analysis) overlaid on the visualization map

Discussion

Retraction contributes to the enhancement of the literature by rectifying inaccurate and misleading information, notifying researchers about papers containing substantially flawed data, and impeding the dissemination of erroneous information (11). This study, encompassing the analysis of 103 papers, is recognized as the first known attempt to scrutinize retracted literature related to hypertension. Our findings reveal an upward trajectory in retracted papers over the years, and the applied linear trend model suggests a prospective surge in their numbers. The increasing retraction of manuscripts in recent years may be attributed to various factors, including heightened awareness in the scientific community or an increase in profit-driven practices such as scientific errors, fabrication, plagiarism, and interference in the peer-review process. These increases may also be due to the increase in the number of articles in the literature (12) or to the increased use of the internet and software and the increased examination of articles in electronic media. The integration of artificial intelligence in article production poses potential scientific hazards (13). New experiences have been gained regarding why and how artificial intelligence usage poses scientific risks today. In recent years, numerous

cases have been observed where AI produced undesirable outcomes. The use of artificial intelligence in academic writing can lead to both errors and ethical violations. Researchers, as well as journal editors and reviewers, are responsible for identifying, defining, mitigating, and controlling AI-related errors. However, it is challenging to determine the extent and manner of AI usage in the present day (14, 15).

Ensuring the accuracy and reproducibility of scientific articles is paramount. Therefore, we advocate the implementation of rigorous control mechanisms to maintain the integrity of scientific outputs. Both the editorial and referee processes, as well as postpublication scrutiny, could benefit from more stringent multistage controls, and the integration of artificial intelligence may aid in uncovering scientific errors and distortions. In our study, the predominant reasons for retraction were identified as errors (30.1%), fraud (17.5%), and peer review issues (11.6%). While our categorization of reasons for retraction aligns with similar methodologies found in the literature, it is important to acknowledge that the spectrum of reasons for retraction may extend beyond those we have specified. Gaudino et al. reported different primary reasons for retraction in the biomedical literature, with duplication

(23.5%), plagiarism (13.9%), and data fabrication (12.1%) being the most prevalent factors (16). In a neurology study, fabrication emerged as the predominant reason, constituting 29.11% of the retracted articles (17). The most common reasons for retraction in the ophthalmic literature are fraud, plagiarism and data error (2). Koçyiğit et al. identified plagiarism, duplication, and error as the most prevalent reasons for retraction in the Turkish biomedical literature (3). In the PubMed database for 2012, out of 2,047 retracted biomedical and life sciences research articles, 21.3% were attributed to errors. The most prevalent reasons for retraction included fraud (43.4%), double publication (14.2%), and plagiarism (9.8%) on the basis of this extensive search (18). While the causes of retraction may exhibit slight variations across different scientific fields, countries, or subjects in the literature, they generally share similarities with each other.

The median number of citations for the retracted papers in our study was 6 (min=0, max=1967). The withdrawal of an article from publication involves a series of control processes, and this procedure can sometimes be extended over several years. Retracted papers, on average, remained in publication for a median duration of 681 days. This poses a significant concern, as even though the dissemination of misinformation from retracted paper ceases, numerous papers referencing it continue to be published without a proper warning system in place. This cumulative effect contributes to the unregulated propagation of misinformation. Therefore, it is crucial to place a high emphasis on scrutinizing citations to retracted manuscripts. Despite the general rule that retracted scientific papers should not be used or cited, we observed a considerable number of citations to retracted articles on hypertension. Some papers, even though retracted, continue to be cited, and they remain in circulation. In certain instances, the citing article is cited instead of the original article, further perpetuating the dissemination of incorrect information (19).

The retracted papers identified in our study were primarily of the original article type, with a majority falling under the Sci-E/SSCI/CPCI-S category. In terms of retraction invitations, a significant proportion (66.0%) originated from publishers,

whereas authors were less commonly involved. In certain instances, both publishers and authors were involved in the retraction process. The loss of citations in prior studies is mitigated when authors self-report errors (20). The importance of retraction notes is paramount; they should offer comprehensive details regarding the reason for retraction and specify who initiated the retraction. To be clear, freely accessible, and easily located, retraction notes should be seamlessly linked to the original retracted article for transparency and accessibility (3).

The corresponding author country of the retracted articles was taken into consideration, with China leading at 29.1%, followed by Japan and the USA. The 103 analyzed articles were sourced from 70 different journals across 37 countries. The excess in retracted articles in these countries can be explained by the total article volumes of these countries. As a reference, in the study in which 90,308 original articles in the field of hypertension were included over a 20-year period between 1998 and 2018, the USA represented 30.3% of all articles, Japan 10.8%, China 9.1%, the United Kingdom 6.9%, and Germany 6.4% (21). A study conducted in the field of orthopedics revealed that the articles with the highest number of retractions originated from China (31%), followed by the USA (17%) and Italy (14%) (22). In a comprehensive report covering various subjects and analyzing scientific articles from 2001--2010, the top-ranking countries were the USA, China, Germany, Japan, and India, in that order (23). Retractions can be compiled from the Retraction Watch website, and certain studies utilize data from this source. A study conducted between 2013 and 2015, which analyzed retractions listed on the website, identified the USA, China, and Japan as the countries with the highest number of retracted papers (24). When examining retraction numbers, it becomes apparent that leading countries facing this challenge are consistently similar. Factors such as a nation's high overall volume of articles, developmental level, or cultural influences may contribute to the increased occurrence in specific regions. The data reveal that retracted papers constitute a global issue and are prevalent among researchers across various countries. Addressing this issue necessitates

universal attention to upholding scientific publication ethics and research standards.

Upon analyzing the journals publishing the retracted papers, Biomed Research, Journal of Hypertension and Hypertension emerged as the most common. The reasons for a greater number of retractions in these journals may vary significantly, ranging from peer review issues to a well-developed scientific accuracy control mechanism within the journal. The journals that most frequently had retracted publications in the field of hypertension were generally journals with a hypertension mission. The reason for the high number of retracted articles in these journals may be that, as expected, articles on the subject of "hypertension" are published more in these journals.

In our study, 34 out of 103 retracted manuscripts had some form of funding, representing a potential economic loss for these papers in terms of their contribution to the scientific literature. Notably, comprehensive bird's eye view studies on funding in the literature are lacking. This could be a potential avenue for future research, prompting researchers to focus on the economic implications and contributions of funding to retracted manuscripts. In our study, we exclusively utilized the Web of Science as a singular database. While other databases, such as PubMed, EMBASE, COMBASE, and Scopus, could have been considered, our decision was influenced by the perceived reliability of citation indicators within the WoS database, on the basis of our experience and findings in the literature (25). In our study, two of the reasons for retraction were either unclear in the retraction notes or absent altogether, posing challenges in determining the cause of retraction. Additionally, it is crucial to acknowledge that this study is observational, and despite efforts to ensure objectivity with two independent assessors, the assessments inherently carry a subjective element. Different assessors might interpret the reasons for retraction differently.

Conclusions

Ensuring the accuracy and reproducibility of scientific articles is paramount. Therefore, an effective review mechanism for manuscripts is essential. Editors and reviewers bear significant

responsibility not only in the acceptance process but also in the retraction process. To prevent erroneous manuscripts from persisting in publication, sharing raw data files in the appendices of publications and transforming readers into auditors can serve as proactive measures against manuscripts that may have evaded the peer review process.

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