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Analysis of Retracted Publications in The Biomedical Literature from Turkey

Burhan Fatih Kocyigit [1] **and Ahmet Akyol** [2]

[1]Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Kahramanmaraş Sütçü İmam University, Kahramanmaraş, Turkey
[2]Physiotherapy and Rehabilitation Application and Research Center, Hasan Kalyoncu University, Gaziantep, Turkey

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Address for Correspondence:
Burhan Fatih Kocyigit, MD
Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Kahramanmaraş Sütçü İmam University, Avsar Campus, Kahramanmaraş 46100, Turkey.
Email: bfk2701@hotmail.com

ORCID iDs
Burhan Fatih Kocyigit
https://orcid.org/0000-0002-6065-8002
Ahmet Akyol
https://orcid.org/0000-0002-8953-5196

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ABSTRACT

Background: Retraction is a process for correcting the literature and provides a barrier to the dissemination of publications that include major faults or false-misleading data. The aim of this study was to examine the characteristics of retracted articles in the biomedical field sourced from Turkey.
Methods: In this descriptive cross-sectional study, all retracted publications from Turkey on PubMed were listed without date restriction. Data covering the article title, authors, publication date, retraction date, time between publication and retraction dates (in months), journal, article type, country of the corresponding author, peer review timeline (in days), reason for retraction, and subject area of the retracted item were recorded. Citation data were obtained using the Scopus database. The altmetric attention scores of the articles were recorded.
Results: A total of 102 articles were listed and after the implementation of exclusion criteria, 86 articles were included for analysis. The first retracted article was published in 2000 (n = 1), while the most retracted articles were published in 2020 (n = 11). The median time lag between publication and retraction was 10.33 (0.73–144.06) months. The main factors causing retraction were plagiarism (n = 23), duplication (n = 22) and error (n = 17). The total number of citations was 695. A total of 224 citations were in the pre-retraction period and 471 citations were in the post-retraction period.
Conclusion: The retracted article counts showed a rising trend over the years. The leading causes of retraction for articles from Turkey were plagiarism, duplication, and error. It was found that the articles continued to be cited after the retraction. Researchers in Turkey should be educated on retraction, particularly plagiarism and duplication. Strategies should be developed to prevent articles from being cited after retraction.

Keywords: Retraction; Turkey; Article; Publication; Plagiarism; Duplication; Ethics

INTRODUCTION

Producing scientific publications is an essential step in sharing research findings and their potential ramifications around the world. The most important motivation for submitting a scientific paper is the desire to disseminate knowledge.[1] The detailed assessment of the

articles before publication, unbiased peer-review process, and prioritization of the selected scientific papers are indispensable steps of scientific communication.[2] Retracted papers are items removed from the literature due to substantial scientific misconduct (plagiarism, falsification, and fabrication), errors in data processing, researcher and journal carelessness and negligence, and other causes.[3,4] Retraction is a critical tool to correct erroneous and misleading information and data in the literature, to alert researchers about articles presenting considerably flawed or biased data, and to prevent the spread of erroneous information.[5]

The content of the retraction notes should provide adequate information on who retracted the article and why the results and data were classified as unreliable. Additionally, while providing sufficient information on the retraction, care should be taken to avoid defamatory statements and a balance should be created. Retractions should be simple to understand; they should be free and easily accessible and linked to the original retracted paper.[6]

The percentage of retracted articles has been rising over the years. The retraction rate of articles listed on PubMed increased from 0.002% in the 1980s to 0.02% in 2009.[7] More and detailed evaluation of scientific articles after publication, increased awareness of retraction, easy access to articles on electronic platforms, expanding the boundaries of retraction and accelerating the process may be the factors that influence this result.[8]

Despite growing awareness of the problems posed by retracted articles in the scientific community, the evaluation of retracted articles in Turkey is still in its early stages. In this article, it is aimed to evaluate the biomedical literature on PubMed. Turkey has unique academic issues. Although there are numerous high-level institutions, universities that are attempting to improve scientifically cannot be ignored. Access to research budgets is relatively difficult. The number of researchers with an advanced level of English is limited. Considering the unique problems of Turkey, this article seeks answers to the following questions:

- What are the characteristic features of retracted articles originating from Turkey?
- What are the main reasons for the retraction of articles originating from Turkey?
- What is the status of retracted articles in terms of the number of citations and altmetric attention score (AAS)?

We aimed to determine the distribution of retracted articles from Turkey over the years. Another purpose was to list the reasons for retraction. Thus, it was intended to reveal the most common reasons for retraction. Additionally, it was aimed to evaluate the effects of the retracted articles on the academic environment and society by evaluating the number of citations and AAS.

METHODS

In this descriptive cross-sectional study, articles classified as “retracted publication” sourced from Turkey were searched without time limitation. Data were last updated on March 15, 2022. Articles on PubMed were listed using the search terms *"retracted publication"[publication type] [pt] and Turkey*. The presence of at least one Turkish author affiliated with institutions in Turkey was determined as the inclusion criteria. Articles not directly related to the biomedical literature were excluded.

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Data extraction

The bibliographic information of the retracted publications was transferred to an Excel file and recorded. These data covered the article title, authors, publication date, retraction date, time between publication and retraction dates (in months), journal, article type, country of corresponding author, peer review timeline (in days), reason for retraction, keywords of the article, and subject area of the retracted item.

The Scopus database was used to obtain citation data of the retracted publications. Scopus citation data are extensive, and the data supplied by Scopus can be easily imported to Microsoft Excel for analysis.[9] Therefore, the Scopus database was preferred to acquire citation data. The total number of citations, the number of citations before retraction, and the number of citations after retraction were noted for each article.

The Altmetric toolbar was downloaded to obtain the altmetric data of the retracted publications. If it was accessible, the AAS of the article was recorded. AAS is a tool designed to assess the societal influence of articles. This tool combines data from numerous web platforms to calculate the overall score.[10]

Classification of retraction reasons

The classification was planned as follows[11-13]:

a) Error (incorrect design of a study, inappropriate data gathering, presentation or report)
b) Fraud (manipulation of data, figures, cases or images, fabrication, and falsification)
c) Author disagreements and conflicts (publication without the knowledge and approval of an author, determination of fictitious authors, or disagreement between authors and funder)
d) Duplication (publishing the same article more than once)
e) Ethical issues (lack of ethics committee approval, not obtaining consent from the participants)
f) Peer-review issues (fake or biased peer review processes and other matters related to this process)
g) Plagiarism (inappropriate use of scientific properties of individuals, including articles, texts, study designs, tables, graphs, figures, and ideas. Self-plagiarism is also included under this heading)
h) Unknown (retraction reason was not specified)

Publications with multiple causes for retraction were included in the classification separately for each reason. Two researchers (BFK and AA) independently assessed all the article data. The information gathered by the two researchers was compared. If there was an inconsistency, the two researchers collaborated and made the final decision.

No human or animal was considered as a participant. Open data analysis was performed so ethics committee approval is not required.

The data were entered into Microsoft Excel and expressed as number and median (minimum–maximum) values.

Ethics statement

No human or animal was considered as a participant. Open data analysis was performed so ethics committee approval is not required.

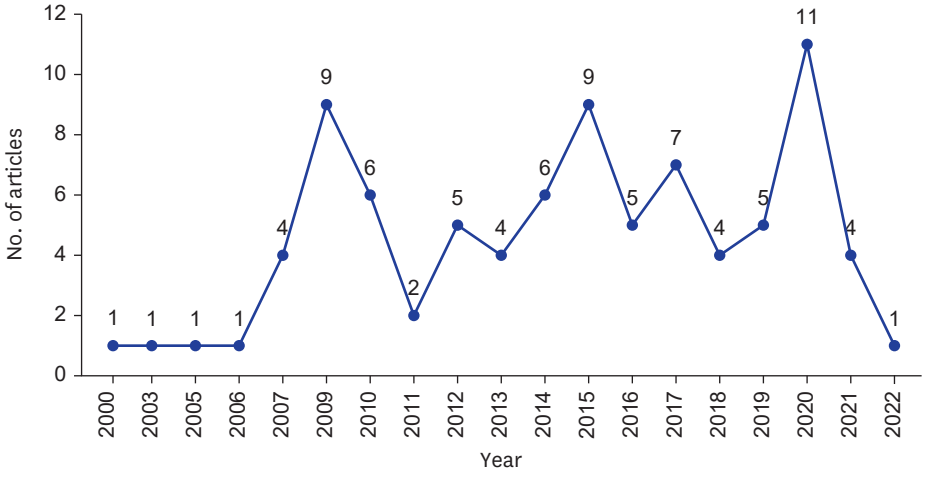

Fig. 1. Retracted publication trend from 2000 to 2022 originating from Turkey.

RESULTS

A total of 102 articles were listed on PubMed with the specified search strategy. First, articles not related to the biomedical literature (physics, chemistry, engineering, agriculture, veterinary medicine, plant science, etc.) were excluded. Then, authors and affiliations were checked. Articles not originating from Turkey were removed from the list. At the end of the whole process, 86 articles were obtained. The distribution of retracted articles over the years is shown in **Fig. 1**. The first retracted article was published in 2000 (n = 1), and the maximum number of retracted articles was published in 2020 (n = 11). There were no retracted articles published before 2000.

The median duration between the first publication date of the articles and the date of retraction was 10.33 (0.73–144.06) months. The median peer review time was 82 (15–794) days.

Journals that published more than one retracted article were listed as follows: *Aesthetic Plastic Surgery* (n = 4), *Case Reports in Medicine* (n = 2), *Pakistan Journal of Medical Sciences* (n = 2), *Scientific Reports* (n = 2), and *The Journal of Obstetrics and Gynaecology Research* (n = 2). The same author was responsible for the four articles published in *Aesthetic Plastic Surgery*. Of the articles, 14 were case reports, 64 were original research, and 8 were reviews (**Fig. 2**).

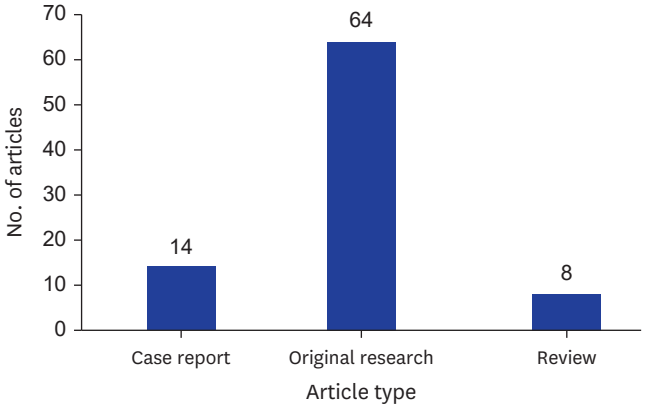

Fig. 2. Distribution of retracted publications according to the article type.

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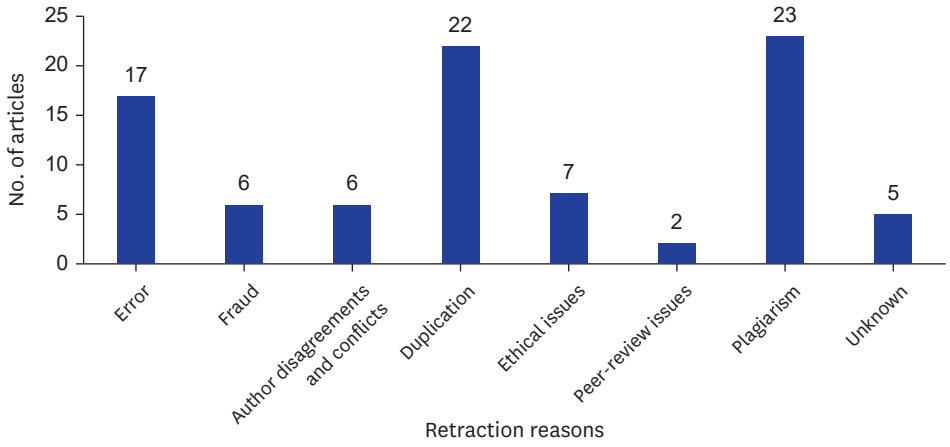

Fig. 3. Number of articles by reasons for retraction. Multiple reasons are available.

In 80 of the articles, the corresponding author was from Turkey (3 articles from the United States, 2 articles from China, and 1 article from Iran).

The reasons for retraction of the articles were listed as follows: plagiarism (n = 23), duplication (n = 22), error (n = 17), ethical issues (n = 7), fraud (n = 6), author disagreements and conflict (n = 6), unknown (n = 5), and peer review issues (n = 2) (**Fig. 3**).

The main subject areas of the retracted articles were cardiology (n = 7), obstetrics and gynecology (n = 6), oncology (n = 5), psychiatry (n = 5), anesthesiology (n = 5), and plastic and reconstructive surgery (n = 5) (**Fig. 4**).

The total number of citations of the retracted articles was 695 (8.08 citations per article). A total of 224 citations were in the pre-retraction period (2.60 citations per article) and 471 citations were in the post-retraction period (5.48 citations per article) (**Fig. 5**).

There were 39 retracted articles with an AAS of one or more. The AAS per retracted article was 26.70. The three highest scores were '2065,' '78' and '13.'

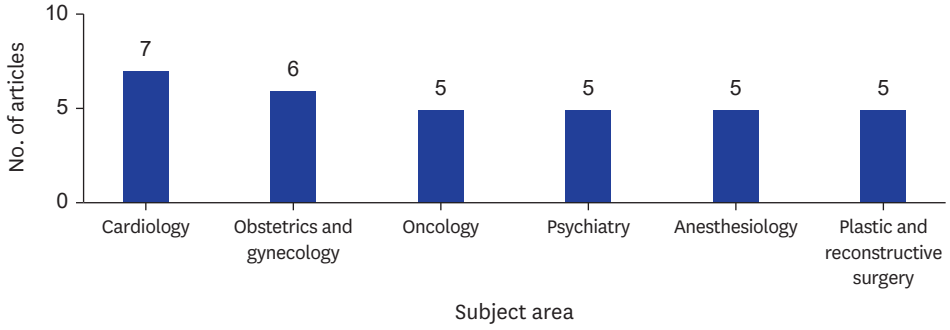

Fig. 4. The main subject areas of the retracted publications.

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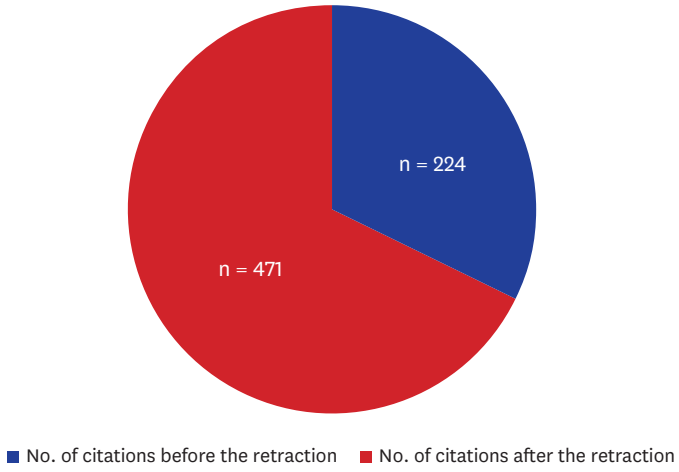

Fig. 5. Distribution of pre-retraction and post-retraction citations.

DISCUSSION

In the biomedical literature, the number of retracted articles sourced from Turkey shows an increasing trend over the years. The most common retraction reasons were plagiarism, duplication, and error. The main subject areas were cardiology, obstetrics-gynecology, and oncology. One of the striking findings was that the citation counts of the articles continued to increase after they were retracted.

The first retracted article originating from Turkey was in 2000 and the number of articles tended to increase over time, reaching a peak in 2020, with 11 retracted articles. Considering that the peak in 2020 may be related to the coronavirus disease 2019 (COVID-19) process, the articles were reviewed, but no article on COVID-19 was detected. Contrary to our results, it has been reported that the number of retracted publications in the international arena has decreased slightly in recent years.[14] On the other hand, an increasing trend has been demonstrated in different studies.[6,15,16] The growth in the overall number of published papers over time may be a reason behind this result. As a reflection of this, the number of retracted articles may be displaying an upward trend. A potential factor is increased retraction awareness among editors, researchers, reviewers, and publishers. Published articles in this field mediate the increase in awareness.[17-19] Another aspect could be the easier detection of retractions through software. Researchers under pressure to publish more articles in high-impact journals may resort to unethical methods to improve their careers. The increase in the number of retracted articles can be attributed to high academic competition and pressure. The effort to obtain more research budgets is also a possible reason.

The median time lag between publication and retraction was 10.33 months. Although there were studies showing longer intervals,[15,20] it is apparent that this period must be kept to a minimum to prevent the spread of incorrect and misleading information.

Aesthetic Plastic Surgery was identified as the journal that published the most retracted articles. The explanation for this is that the same author preferred to publish his articles in this journal. The vast majority of retracted articles were original research, which was consistent with the literature data.[12] This could be due to the high rate of original research among the total articles. Another possible explanation is that the authors tended to behave in ways

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that can cause retraction of the original research. Data manipulation, fabrication, ethics committee approval issues, and lack of obtaining informed consent forms from participants are more common in original articles than other article types.

The main retraction reasons were determined as plagiarism, duplication, and error. In parallel with these results, three main causes were reported as plagiarism, duplication, and error in a study that examined articles from Brazil.[11] In another study in which biomedical articles from Spain were evaluated, duplication was the leading reason for retraction.[21] Chen et al.[22] assessed retracted articles on biomedical literature from China and identified the three most common reasons as plagiarism, errors, and duplication. By far the most common reason mentioned in articles from Malaysia was violation of publication principle.[23] It has been proposed that retraction reasons differ depending on geographic region and are influenced by scientific infrastructure. A significant portion of the articles retracted due to fraud originated from countries with established scientific traditions, the reason for which has been stated to be the efforts made in these countries to publish articles in high-impact journals.[24] In contrast, plagiarism and duplication are more common in countries that do not have a historical scientific background and publish articles in low-profile journals.[1] Despite the growing number of articles to raise the awareness of researchers and editors on plagiarism and duplication,[25-27] it is obvious that there is still a long way to go in this regard. Researchers in scientifically developing countries should be educated on retraction involving plagiarism and duplication. Collaborations should be established between experienced editors and universities and scientific organizations, and awareness should be increased with webinars.

The main subject areas of the retracted articles were cardiology, obstetrics-gynecology, and oncology. There may be various reasons for this situation. The researcher profile in these areas may also affect the results. Some researchers in these areas may be prone to plagiarism, duplication, or data manipulation. The academic competition in these areas may be more intense. As a result, researchers who want to stand out may be inclined toward unethical ways. Efforts to obtain high research budgets in these areas could be another factor.

The evaluation of citations before and after retraction demonstrated that publications continued to be cited after retraction, as has been reported in similar articles in the literature.[6,28,29] Inexperienced researchers are more likely to cite this because of their lack of knowledge about the retraction. Retracted papers may be cited if the retraction notes are not identifiable and clear, and there is no direct link to the article. Citation after retraction is a considerable problem for the scientific world as it can result in the spread of inaccurate, erroneous, and misleading information. Methodologies based on retracted articles can waste researchers' time and result in unnecessary use of research budgets and may raise suspicion about articles citing retracted publications.

The AAS per retracted article was 26.70 and the highest score was 2065. This result shows the potential for dissemination of data, results and information presented in retracted articles on various internet and social media platforms.[30] This can trigger the spread of misleading information not only in the scientific world but also in society. It can go one step further and induce undeniable problems that threaten public health, such as anti-vaccination attitudes.

The article has several limitations. The biomedical literature was evaluated on a single database, which could prevent the generalization of the results. Retraction notes were unclear in some articles. Furthermore, retraction notes were not formatted consistently among the journals.

These data reflect a snapshot. It should be kept in mind that data may change over time. The descriptive data are presented and further statistical analysis was not performed.

In conclusion, taking into account the total publication pool, the number of retracted articles can be considered low,[31] but the rising trend in the number of retracted articles over the years is remarkable. Authors should be more informed and educated about the consequences of scientific publication misconduct to prevent this situation, with young researchers at the beginning of their scientific careers as the primary targets. The primary determinants should be highlighted as plagiarism, duplication, and error. Editors should make maximum efforts to adhere to the retraction conditions set out in the Committee on Publication Ethics (COPE) guidelines. New strategies are required to ensure that retracted articles are not cited by authors. Another aim should be to prevent the dissemination of retracted articles on social media platforms.

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