

Postmortem of Retracted Scientific Publications from Türkiye

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ÖZET

Amaç: Günümüzde bilimsel yayınların sayısı, kariyer basamakları ve bilim camiasında saygınlık açısından çok önemlidir. Araştırmacılar her yıl yayın sayısını artırmaya odaklandığından bazen yayınların kalitesinden ödün verilmektedir. Bu çalışma, Türk yazarlar tarafından yayımlandıktan sonra geri çekilen yayınların özelliklerini incelemeyi amaçlamıştır. **Yöntem:** “Geri çekilmiş yayın/lar” ile “Türkiye” MeSH terimleri ayrı ayrı ve kombinasyon halinde PubMed, Scopus ve Web of Science veritabanlarında tarandı. Çalışmaya dahil edilme kriterleri yayının geri çekilmiş olması ve ilgili yayının yazarlarından birinin Türkiye’deki bir kurumla bağlantısı olmasıydı. Seçilen yayınlar bibliyografik bilgiler açısından incelendi. **Bulgular:** Üç veri tabanından toplam 147 yayın alındı. Geri çekilen ilk makale 1996’da yayınlanmıştı ve sonraki yıllarda geri çekilen yayınlarda artış izlendi. Tam metne erişim 106 (%72,1) makalede sağlandı. Yayınlar toplam 127 ayrı bilimsel dergide yayınlanmıştı. Scientific Reports ve Aesthetic Plastic Surgery dergileri dört geri çekilmiş yayın ile en çok geri çekilmiş yayına sahip dergilerdi. Hacettepe Üniversitesi yedi yayımla toplama en çok katkı sağlayan enstitü oldu. Geri çekilen makalelerde en yaygın neden duplikasyondur ve 50 (%34) yayında saptandı, geri çekme bildirimlerinin 63 (%42,9)’ü editör tarafından yayımlandı. Yayınların çoğunluğu sağlık bilimleri alanında 93 (%63,3 makale) ve alt başlık olarak da 44’ü cerrahi alanındaydı. Çalışmalarda Türk yazarların 20 ülke ile uluslararası işbirlikleri vardı. **Sonuç:** Geri çekilen yayınların sayısı fazla olmamakla birlikte artış gösterme eğilimindedir. Bu durumu önlemek için araştırma metodolojisi ve araştırma etiği eğitimleri çok önemlidir.

Anahtar kelimeler: Araştırma eğitimi, araştırma etiği, araştırma metodolojisi, geri çekilmiş yayınlar, Türkiye

ABSTRACT

Aim: These days the number of scientific publications is crucial in career advancements and respect in the scientific community. The researchers focus on increasing the number of publications per year, which sometimes compromises the quality of publications. This study aimed to investigate the characteristics of retracted publications with contributions from Turkish authors. **Methods:** PubMed, Scopus, and Web of Science databases were searched with a combination of MeSH terms and free words relevant to “retracted publication/s” and “Turkey.” The inclusion criteria were (i) retracted publication and (ii) any authors of the study having affiliation with an institution in Turkey. Bibliographic information of selected publications was extracted. **Results:** A total of 147 publications were retrieved from three databases. The earliest retracted article was published in 1996, followed by an increasing trend of retracted publications. The study showed 106 (72.1%) articles have full-text Access. Overall 127 scientific journals have published these articles. Scientific Reports and Aesthetic Plastic Surgery were the top journals with four retracted publications. Hacettepe University, was the lead institute, contributing seven publications. The most common reasons for retractions were duplication 50 (34%) and most retracted notices were issued by editor 63 (42.9%). The majority of publications were from Medical Science 93 (63.3% paper) and the highest number, 44 were from surgery and allied. Turkish authors had international collaborations with 20 countries. **Conclusion:** The number of retracted publications is not high, the trend is increasing. To overcome this, research methodology and research ethics training are crucial.

Keywords: Research training, research ethics, research methodology, retracted publications, Türkiye

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INTRODUCTION

A scientific publication is based on a mutual trust of readers, reviewers, editors and publishers on researchers, who precisely collect and accurately analyses the data, and honestly keep the professional standards during writing of a paper. When this trust is misplaced and violate the professional standards, the published research paper is formally withdrawn with a mark of retraction showing a powerful evidence of breaking scientific integrity. These retraction notifications describe the readers that the previously published work has been found erroneous, not trustworthy source or does not reflect the real research work, therefore it should not be considered (1). Perhaps the papers are screened by editor and peer reviewers before publication. However, sometimes these issues are overlooked and found only after publication of the papers. Such overlooked papers are marked retracted in line with the policies of the Journal described by the committee of publication ethics (COPE). Therefore, the journals go in action when they find a clear evidence that the findings are unreliable, either as a result of major error (e.g., miscalculation or experimental error), fabrication (e.g., of data manipulation), falsification (e.g., image manipulation), plagiarism (taking someone else's work without proper citation), ethical misconduct, manipulated peer review process, or the author(s) has/have failed to disclose conflicts of interests (2). According to COPE guideline journals are required for explicitly preciseness and transparency regarding their retraction procedures with provision and issuance of detailed notices to the writers.

In parallel with the growth of scientific publications, the past decade observed a more than 10- fold rise in the number of publications retracted by journals (3). Although, many researchers have previously highlighted the issues of retracted publications yet the mention of retracted publications have gained high attention after the surge of accelerated open access publications during the COVID-19

pandemic. For instance, Nicole et al (4) have highlighted an alarming rate of retraction for scientific publications on COVID-19 pandemic. Existing studies on retractions showed that most of the retractions are the consequence of scientific fraud (fabrication, falsification, and plagiarism) or other kinds of misconduct such as fake peer review or failure to obtain ethical approval for research involving human beings or animals (3). A retraction does not always signal scientific misbehavior, some papers are retracted because of honest errors such as problems with data and erroneous analysis or interpretations of the results. Such retractions, do not carry stigma or threat to the career or reputation of authors (5).

Although identification of retractions is evidence about the scientific integrity of a journal but since there is not proper system to declare the retraction; therefore, sometimes consequences of retracted publication continue years even after the retraction. For instance, The Lancet retracted a study by Wakefield et al. (6). that suggested that correlation of combined vaccines of measles, mumps, and rubella with autism in children. However, due to information gap many parents continued to believe in it for a long time that ended up in a decline of vaccines for children in the United Kingdom, Canada, and the United States (7).

Misconduct that damages the integrity of the research process also results in serious consequences to all responsible entities., Authors are worst affected from retractions because they lose peer recognition and reputation in scientific world in terms of severity. According to a study conducted by Azoulay and Bonatti (8), authors and co-authors may experience a decrease in citations and future funding for research, after formal retraction of a paper The publishing journal also suffers, readers begin doubt the credibility of the journal and publisher and journal might loss indexing on prominent databases. Retraction also bring risk to institution/s of author/s in terms of responsibility and reputation/s (9).

Several studies have been conducted to analyze the characteristics of retracted publications in different countries, fields and databases (10-20). Yet little is known about the reason/s behind Scientific misconduct. Davis et al (21) has identified few social, situational, organizational, structural, and cultural reasons for scientific misconduct. Worldwide the researchers and academicians are under pressure to publish with or without provision of the necessary infrastructures and funds to maintain their careers. Perhaps one of the main reasons behind the rising trend of retraction is this “publish or perish” culture in academia and it is threatening the integrity of the research work (22).

The promotion criteria in the Turkish universities are built on bibliometric parameters (e.g. number of publications and the impact factor of the journals etc) (23). Academicians are also rewarded with cash incentives, based on the bibliometric parameters (24). Moreover, publication of research papers is a crucial factor for the award of postgraduate degrees in many universities in Turkey (25). Although Such institutional policies could be counted as steady positive moves towards the research and development. However, those working in universities with poor infrastructure compete with those working in the universities with the best infrastructure at an equal level. It is feared that this challenging environment could risk the research integrity. Presently news about research misconduct are highlighted in many national newspapers (26,27). Therefore, in this context it is necessary to identify the level, reason and trend in research misconduct by Turkish authors for evidence based recommendations to create a trustworthy research environment. In this background the aim of present study is to investigate bibliographic characteristics of retracted of publications contributed by the Turkish authors.

MATERIAL AND METHODS

A bibliometric analysis of retracted publication contributed by Turkish authors and co-authors was conducted. This included counting of papers with attribution by, authors, co-authors, institution, international collaboration and journal. It also includes the characteristics of publication such as field of study, research design, funding and citation counts (28).

Eligibility Criteria:

Present study considered all the retracted publications with no restrictions on the search period, field, discipline, publication type, and language. The two main inclusion criteria were; (i) publication has been retracted, and (ii) any authors of that publications have affiliation with an institution in Turkey. Publications with missing information about authors were excluded.

Data Source and Search Strategy:

Current study searched PubMed, Scopus, and Web of Science comprehensively without any restriction to language, publication type, and field of study. Main keywords for the search were “Retracted articles” and “Turkey” To make a complete and accurate search, the synonyms MeSH (Medical Subject Headings), and extracted keywords were also used. A detailed search strategy is presented in Supplementary Data found in Appendix I. The keywords were searched in the titles, abstracts, affiliations, and keywords of publications. To avoid bias caused by frequent database renewal, all the literature retrieval and data download were completed in a single day, December 18, 2021.

Data Extraction:

Current study merged the search result of three databases in Microsoft Excel and removed the duplicates. Two authors independently evaluated the article titles and abstracts for their suitability for inclusion in the study. Any disagreement about the studies was

resolved by consensus in consultation with a third author.

Bibliometric Indicators:

The bibliometric parameters recorded for retracted publication included; publication type, study title, name and affiliations of authors, year of the original publication, year of retraction, the reason for retraction, issuer of retraction (means who issued the retraction), name of the journal, name of publisher, the discipline of study, and funding source. If the retracted publication belonged to medical science the sub-discipline of the publication was attributed based on the available information in the title, or abstract of the study (See appendix II for the details and classification of sub-disciplines). Moreover, the type of study design was also recorded from abstract or full text if the publications belonged to the medical science,

The time to retraction is defined as the time passed between the article publication year and the year of the retraction notice. The reasons for retraction was reviewed independently by each author and then categorized according to COPE guidelines (2) as follows,

- ▶ Plagiarism: duplication of text from previously published articles (excluding self-plagiarism);
- ▶ Compromised peer review: compromises in the independent assessment of the manuscript by reviewer.
- ▶ Issue in data, analysis or methodology: Unintentional and honest error in the study design data collection, analysis or interpretation of results that was identified by author or co-author after the publication.
- ▶ Data falsification/fabrication: data was manipulated or made up;
- ▶ Published in error: article was accidentally published twice as a result of publisher error;

- ▶ Duplicate publication: article was published twice, or articles was published in English and Turkish or vice versa as a result of author misconduct;

- ▶ Authors unaware of manuscript submission: authorship dispute or not all co-authors were aware of manuscript;

- ▶ No ethical approval: the study had no ethical approval;

- ▶ No consent: the study involved people without their consent;

- ▶ Breach of editorial policy: the manuscript breached an editorial policy

Moreover, present study identified two publications that were retracted due to legal ruling and one by expert committee advise.

Present study also recorded the citation counts of the retracted publication (i.e. is the number of times the publications received a citation) and information regarding journal metrics. The information regarding journal Impact Factor and the Quartile were obtained from Clarivate Analytics' Journal Citation Reports (JCR) for 2020 and SCImago Journal & Country Rank respectively. International collaboration was also mapped in the present study. For each publication, Full-text PDF or HTML on the journal website was also searched for availability, and to identify the presence or absence of retraction watermark on the full text of the publication.

Analysis:

Descriptive statistics were calculated using Microsoft Excel.

RESULTS

Number and Year

The search retrieved a total of 1083 publications from all three databases. Out of which 667 publications were duplicates and 269 were not relevant to the topic of this study,

therefore they were removed. The remaining 147 publications are included in this analysis. The oldest paper was originally published in 1996, thereafter a rising trend was evident and the most number of retracted publications were

found during 2020. Figure 1 shows the distribution of retracted publications by year. The characteristics of retracted publications are summarized in Table 1 and given below.

Table 1: Characteristics of retracted publications

Characterstics	Number	Percentage
Field of study		
Medical Sciences	93	63.3
Engineering	27	18.4
Agricultural Sciences and Biotechnology	9	6.1
Chemistry	7	4.8
Mathematics	5	3.4
Physics	3	2.0
Economics	2	1.4
Social Sciences	1	0.7
Study Types		
Case Report/Case Series	18	12.2
Clinical Studies	14	9.5
Case-Control	12	8.2
Cross Sectional	12	8.2
Review	11	7.5
Randomized Controlled Trial	7	4.8
Cohort	5	3.4
Animal Studies	5	3.4
Mixed Methods	2	1.4
Scale	1	0.7
Not Available	6	4.1
Not Applicable*	54	36.7
Number of authors		
1	27	18.4
2 - 3	40	27.2
4 - 5	40	27.2
> 6	40	27.2
The geographical location of the first author's university		
Türkiye	126	85.7
International	21	14.3
Availability of Full-text		

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	Yes	106	72.1
	No	41	27.9
Watermark on full-text			
	Yes	84	57.1
	No	22	15.0
	N/A**	41	27.9
Funding			
	Yes	10	6.8
	No	109	74.1
	Not available	28	19.0
Issuer of retraction			
	Editor	63	42.9
	Editor and Publisher	22	15.0
	Author	20	13.6
	Author and Editor	14	9.5
	Publisher	5	3.4
	Author and Publisher	3	2.0
	Expert Committee or Legal Ruling	3	2.0
	Author, Editor, and Publisher	2	1.4
	Not Clear	15	10.2
Time-to-Retracton (year)	Median [IQR]	1 [0-2]	
Citation	Median [IQR]	2 [0-7]	
Total number of publication		147	100.0

* Non-Medical Science studies, **full-text was unavailable, IQR = Interquartile Range

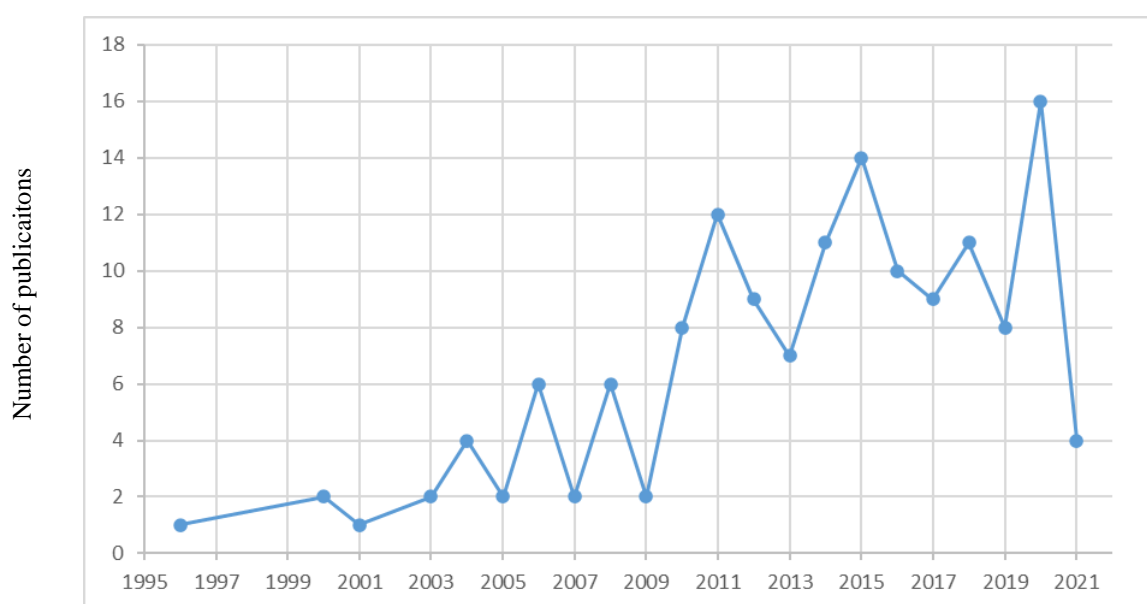


Figure 1. The distribution of retracted publications by year.

Discipline and Sub-discipline of Publication

The vast majority of publications in this analysis are from the medical sciences [93 (63.3%)] followed by engineering sciences [27 (18.4%)] and agricultural sciences and biotechnology [9(6.1 %)]. With regards to medical science the order of the retracted publications in Surgery and allied sciences, medicine and allied sciences and basic medical science sciences was [44/93 (47.3%)], [43/93 (46.2%)] and [6/93 (6.4%)] respectively.

Study Design

The study design was analyzed only for the medical sciences publications. Of the medical science publications, there were 18 (12.2%) case reports/ case series, 14 (9.5%) clinical studies, 12 (8.2%) case-control study, 12 (8.2%) cross-sectional studies, 11(7.5%) reviews, seven (4.8%) randomized controlled trial and, five (3.4%) cohort studies and other five (3.4%) belonged to animal studies.

Number of Authors

Regarding authorship, the results showed 27 (18.4%) papers were authored by

one author and rest of the three categories with 2-3, 4-5, and > 6 authors contained equally distributed 40 (27.2%) publications each. Present study did not analyze the collaborative work among different institutions in Turkey; but the general overlook indicated a substantial number of collaborative publications from more than one institutions.

It appeared that five first-authors on 147 publications were associated with more than one retraction. At the same time one author among all had five and another had four retracted publications.

Institutional Affiliations of First Author

From an institutional view, 21 of the first authors have affiliation with a university outside the Turkey. With regard to Turkey The largest number of seven retractions originated from the Hacettepe University and this university accounts for seven retracted publications. It was also found that 27 of the universities had more than one retracted publication. Figure 2 shows list of the universities with five and more retracted publications.

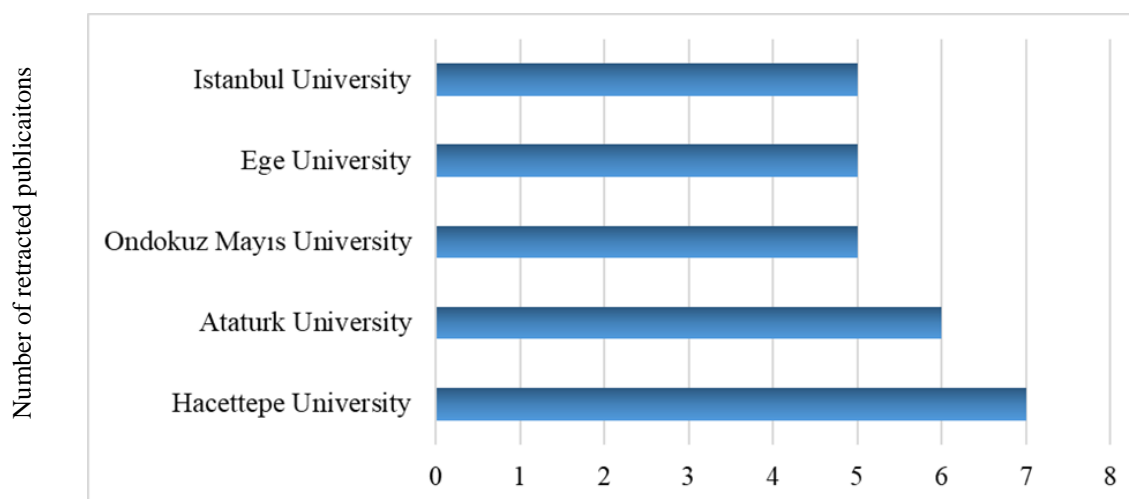


Figure 2. Top five Turkish universities with the most retracted publications

Journals in Which the Retracted Publication Were Published

The total number of 147 retracted publications were published by 84 different journals. The Scientific Reports and the Aesthetic Plastic Surgery both published the

four retracted publications, followed by the Journal of Biochemical Genetics that published three retracted publications. The impact factor and quartile of the journals that published more than one retracted publication are given in Table 2.

Table 2: Journal with more than one retracted publication

Name of Journal (Abrivation)	Number of retracted publications	Publisher	IF*	Q**	H-INDEX***
Scientific Reports (Sci Rep)	4	Nature Publishing Group	4.38	Q1	213
Aesthetic Plastic Surgery (Aesthetic Plast Surg)	4	Springer New York	2.32	Q2	67
Biochemical Genetics (Biochem Genet)	3	Springer New York	1.89	Q2	41
International Journal of Neuroscience (Int J Neurosci)	2	Taylor and Francis Ltd.	2.27	Q2	66
Avian Pathology (Avian Pathol)	2	Taylor and Francis Ltd.	3.38	Q1	82
European Journal of Anaesthesiology (Eur J Anaesthesiol)	2	Lippincott Williams and Wilkins	4.33	Q1	76
Pakistan Journal of Medical Sciences (Pak J Med Sci)	2	Professional Medical Publications	1.08	Q3	30
Journal of Obstetrics and Gynaecology Research (J Obstet Gynaecol Res)	2	John Wiley & Sons	1.73	Q2	50
Case Reports in Medicine (Case Rep Med)	2	Hindawi Limited	-	Q4	20

*IF = Impact Factor of journal, **Q = Quartiles for journal, ***H-Index = H-Index of Journal.

Availability of Full Text

Full texts were available for a large majority [106 (72.1%)] of the publications. Whereas, 22/106 (20.8%) publications were without any apparent water mark or clear indication on PDF/HTML files to inform readers that the paper was retracted.

Funding

It is significant to note a large majority [137 (93.2%)] of the publications with

retractions were not financed, or the funding source was not mentioned on the full text of the paper. Two publications were funded by The Scientific and Technological Research Council of Turkey (TUBITAK).

Issuer of Retraction

Retraction notifications were available for 132 publications included in this study. The analysis of retraction notice found that the largest proportions of retraction notices [63

(42.8%)] were issued by the editors, followed by the notices [22 (15%)] issued collectively both by editor/s and publisher/s

Time-to-Retracton

Comparing the time intervals between publication date and retraction notice date revealed that the minimum time lag was within one year and the maximum time lag was 13 years (median time = one year). The time interval between publication and retraction varied according to the cause of retraction, the publication retracted because of research misconduct took a substantially longer time to retract.

Reason for Retraction

The reason for the retraction of publications is presented in figure 3. Briefly, observing the data in this figure the most common reasons were duplicate publication [50 (34.0%)], followed by plagiarism [31 (21.1%)], and issue in data, analysis or methodology [25 (17.0%)]. It was found that one publication was retracted by expert committee advice while two were retracted due to legal ruling. Additionally, there were [9 (6.1%)] publications for which the reason for withdrawal was not described.

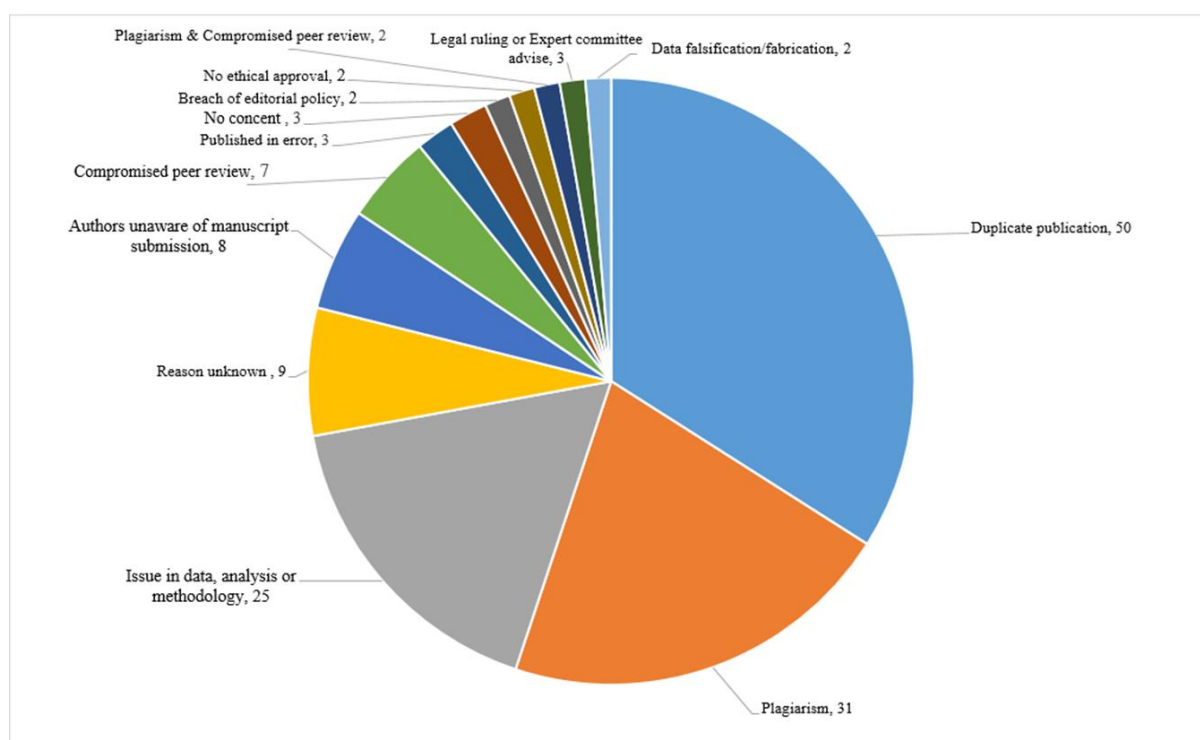


Figure 3: Reasons of retractions and number of retracted publications

Citation Count of Retracted Publication

Current study found that 27 articles were cited more than 10 times, whereas 31 articles received no citation at all. Rest of the article had variations in citation counts. The maximum number of citations received by an article was 175 and it was published in Journal

Renewable and Sustainable Energy Reviews. The median number of citation received by the available publications was two and IQR was 0-7.

International Collaboration

Figure 4 illustrates Turkish authors have international collaboration with 20

countries with the largest number of collaboration in terms of author and co-authors was with the Iran (n=16), followed by the

United States of America (n=11), and China (n=11).

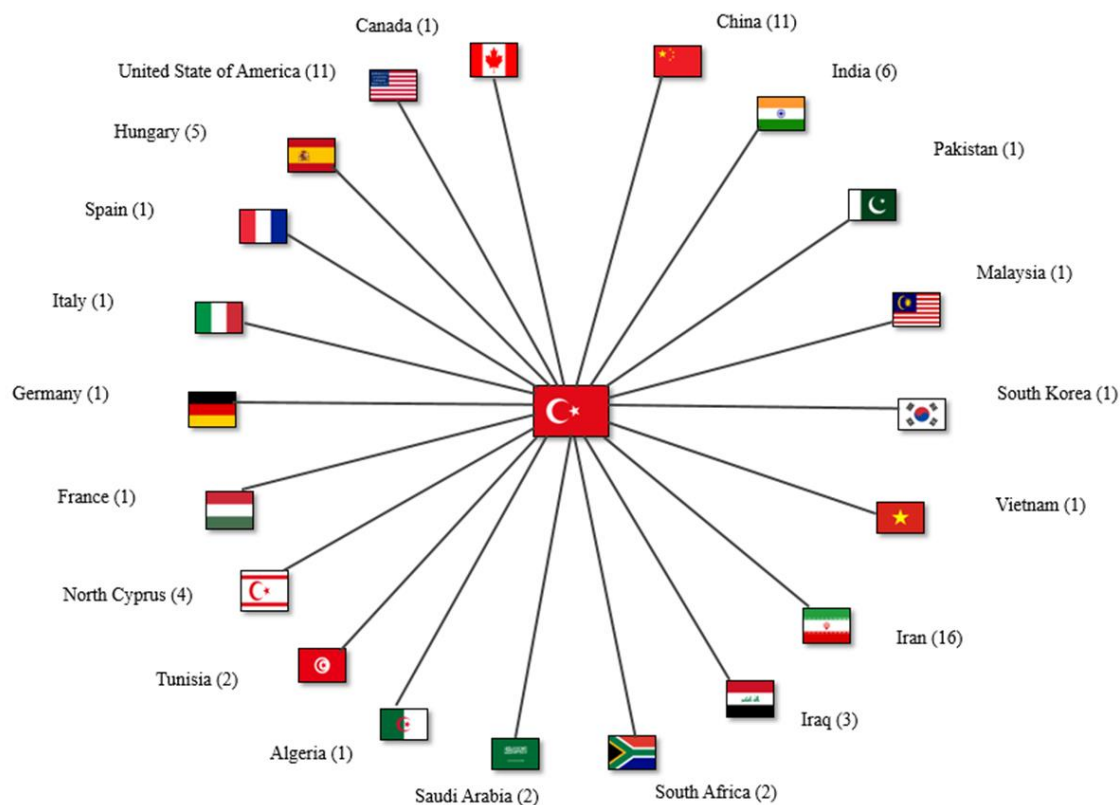


Figure 4: Network diagram of the international collaboration (number of collaborative authors).

DISCUSSION

The number of scientific publications is important source of reputation and respect in the scientific community (29). Besides this, a publication is mandatory criteria in Turkish Universities to achieve master and doctorate degree and a crucial factor for achieving associate professorship from the Turkish Council of Higher Education(YOK) (23-25). Together with this, the past few decades have observed a considerable growth in scientific publications from the Turkish authors and co-authors. Unfortunately, the "publish or perish" philosophy in academia are at the cost of increase in the retracted publications. Some researchers are choosing an easy path that

compromise the quality to attain quantity of articles to succeed in academic career (30) resulting in the devaluation of research integrity and publication ethics.

Plagiarism, is one of the most common forms of academic misconduct (31). As noted by Bakhtiyari et al (32) plagiarism was the commonest unethical methods in academic writing. Contrary to that; duplication or self-plagiarism is the most common misconduct and reason for retraction in the present study. Some authors misused the advantage of national journals in Turkish language and re-published translated primary papers in an international English journals or vice versa. Such unethical behaviors are hard to identify by plagiarism

software specially if the duplicate submission is with paraphrasing of primary article. Duplicate study is major issue in bilingual or multilingual publications (33,34). Translated duplication was previously reported for Chinese authors (20,33), and in Korean national database (19). Consequently, it can be estimated that the number of retracted Turkish article due to duplication might represent only a fraction of the broader issue of scientific misconduct. Indeed, translations of creative own work from foreign language to Turkish language or vice versa is appropriate for use by national stakeholders and national scientific community but this should be under publication ethics and copy right laws.

Present study indicated issuance of retraction notices by journal editor and/or publishers. The results of this study are in agreement with a study about retracted papers in Iran (15) and is due to the fact that most of retractions were due to research misconduct. However, Moylan et al. (13) found that most of the retracted notices in BioMed Central journals were issued by authors alone even though the most common reason for retraction was research misconduct. This difference may be due to journal policy or due to misconduct admitted by authors.

Present study shows that Hacettepe University was the institution with most retracted publications. However, it should be taken into account that this one of the best medical universities in Turkey with prolific scientific output. Moreover, the retraction phenomenon in present study is not institutional-dependent because five of retracted publications belonged to specific author and it skewed the result. In the era of globalization research activities have crossed national boundaries. International research collaboration provides opportunities for extensive sharing of research expertise (35). Research collaboration also affects the retraction. Current study shows a considerable number of the retracted publications having international collaboration with Iran-affiliated

authors. Previous study also highlighted that Iranian-affiliated authors have considerable numbers of retracted publications (14). Though this does not mean that Iranian scientific publications are suffering from serious misconduct but it was due to vigorous search about misconduct of Iran-affiliated authors. With this nexus it is important to understand that linking retraction phenomena to a specific country could be biased. Perhaps, country-specific retraction studies if conducted by the national authors show the responsibility to maintain research integrity and publication ethics in the global research community. Nevertheless, considering the vast number of international students, and researchers in Turkish universities, it is important to know the nationality of authors in retracted paper but it is nearly impossible to do so with bibliographic data.

The predominance of retracted publication from the discipline of medical sciences compared to other disciplines in the current study is by virtue of database selected for this review. These databases indices have larger share of journals from medicine and biomedical science disciplines (36).

Indeed, the quality in higher education is continuously improving in Turkey due to standards set by Turkish Council Of Higher Education (YOK). Honest conduct is an essential part of quality research and should be the part of higher education curriculum. Universities and higher education institutions have special responsibility in upholding and promulgating high standards in research. Researchers in all disciplines of science, social science and related fields are needed to be trained related research methodology, research ethics and publication ethics. Ideally this can be achieved, by developing good infrastructure for research and teaching, by adding subject oriented research curriculum, and implementing innovative and effective pedagogy in research methodology and ethics training (37).

Knowledge about research methods and research and publication ethics is critical. A previous study in Turkey highlighted that the lack of research education among physicians is one of triggering factor for research misconduct (38). This knowledge can be achieved collectively through discussion and debate in specially developed research teaching module. Faculty member and supervisors should exemplify responsible research practices in their teaching and relationship with their students. Moreover, faculty members and teachers can themselves gain new knowledge of professional standards in research by faculty development programmes. To increase awareness of research integrity, seminars about research misconduct including real example and their consequences should be delivered frequently. Furthermore, researchers should be encouraged to report their misconducts, instead of identifying by others. Additionally, increased collaboration is needed between The Turkish Language Association (TDK- a regulatory body for the Turkish language), and various private and public sector publishers for publishing the translation of scholarly works done by Turkish authors into Turkish language so that society and stakeholders in particular could benefit from the evidence based scientific findings and research.

For research related to medical science the Turkish Medical Association (TTB) carried out enquiry for research misconduct, and it is one of the main organizations that monitor the clinical and research activities of physicians. However, it lacks standardized procedures of conducting inquiries about scientific misconducts (38). Indeed, conducting enquiry of scientific misconduct is not easy. Universities and higher education institutions are vigilantly responding to these issues and investigate allegations of misconduct when committed by author from their affiliation. Nevertheless, standardization and transparency are core value of the inquiry process, and should not be overlooked. If the punishment is deemed

necessary, then it is their duty to decide appropriate penalties.

Finally, the pressure on researchers to publish should be reduced. This can be achieved by means of providing increased research opportunities by renovation, upgrading and modernization of existing laboratories as well as encouragement of institutional collaborations at national and international level specially in multi-disciplinary areas. Hereby, the researchers will get better opportunities for exchanging ideas, and work together for inter institutional collaborative research and publications (39). Reducing the financial issues to conduct the research and publish the finding will also support the production of original research output as compared to duplicating or coping others work. In current study 109 of retracted publications were without mention of any funding. No doubt there are various national and international research funding programs under The Scientific and Technological Research Council of Turkey (TUBİTAK), Turkish Council of Higher Education (YOK), Scientific Research Projects (BAP) European Union (EU), and various ministries. However, it is critical to build grant writing skills among researches this could help them secure funding for their work.

In conclusion, to be the best of our knowledge, this is the first study that analyses the characteristics of retracted publications contributed by Turkish authors. However, this study should be considered in light of its limitations. Despite all efforts to conduct a comprehensive study, there is a possibility of exclusion of some publications inadvertently without any bias. The search was limited to selected indexed international databases, which did not include many local data bases and national journals that's are published from Turkey in Turkish language. Moreover, the search databases include selective indexing, and therefore excluded non indexed journals. Future work might consider Google Scholar, Turkish Academic Network and Information Center (ULAKBİM), and Retraction Watch databases,

each has different approach for indexing and have its own strengths and weaknesses. Lastly, the present study did not assess the post retraction use of the publications, which is a ripe area for future research.

There are more than 200 universities in Turkey therefore the number of retracted papers published from the Turkish universities is not very large, yet concrete policies and timely actions are essential, overlook can impede an entire field of research or send it in a wrong direction, and thus the progress may slow (37). Since very little information is available regarding the challenges faced by researcher in

the changing environment of research focused criteria for obtaining the post graduated diploma and career development, thus studies are needed to explore challenges and actions to address these challenges.

It is hoped that this paper will be raise awareness about research misconduct and foundation for promoting debates among stakeholders on matters of honest research environment.

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Appendix I: Search strategy

“This paper was withdrawn”
“Retracted Publication”
“Retraction of Publication”
“Retraction Notice”
“Retraction notice to”
“Retraction of”
“Retracted Article”
“This article has been retracted”
“Article retracted”
“Publication retracted”
“Article withdrawal”
“Article removal”
“Expressions of concern”
Retraction
Withdrawal
Withdrawn
Correction*
Erratum
“Retraction statement”

AND
Turkey
Turkish

Appendix II: Sub Field of Medical Sciences

Sub Field of Medical Sciences	Number OF Retracted Publications
Obstetrics And Gynecology	9
Allergy And Immunology	1
Anesthesiology	3
Anatomy	2
Biochemistry	2
Cardiology	8
Cardiovascular Surgery	6
Chest Diseases	2
Dentistry	5
Dermatology	4
Ear Nose And Throat	1
Endocrinology	2
Gastroenterology	1
General Surgery	4
Hematology	1
Internal Medicine	1
Intensive-Care Units	2
Nephrology	1
Neurology	2
Oncology	4
Oncology-Pathology	1
Ophthalmology	3
Orthopedics	4
Pediatrics	4
Physics	3
Plastic Reconstructive And Aesthetic Surgery	5
Psychiatry/Psychology	3
Radiology	3
Rheumatology	4
Urology	2
Total	93