Review Article

A comprehensive comparative analysis of articles retracted in 2012 and 2013 from the scholarly literature

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Abstract

Background: Science is a dynamic subject with ever-changing concepts and is said to be self-correcting. One of the major mechanisms of self-correction is retraction of flawed work. **Aim:** To study the various parameters associated with retraction of scientific articles in 2012 and 2013 and discuss the current trends in article retraction over the period of 2 years. **Materials and Methods:** Data were retrieved from MEDLINE (via PubMed) using the keywords retraction of articles, retraction notice, and withdrawal of article in January 2014, and analysis of articles published in 2012 and 2013 was carried out. **Results:** A total of 155 articles in 2012 and 182 in 2013 were retracted, and original articles followed by case reports constituted major part of it. The most cited reasons for retraction were mistakes, plagiarism, and duplicate submission, and the time interval between submission and retraction had reduced in 2013. **Conclusion:** Although retracted articles constitute the tip of an iceberg, they are still a matter of major concern in the scientific world. So, editors should follow the Committee on Publication Ethics (COPE) guidelines and make an effective strategy in order to reduce such misconduct, as it reflects very adversely not only in the scientific community but also in the general public.

Key words: *Plagiarism, retracted articles, scientific misconduct, self-correction*

INTRODUCTION

Science is an ever-changing subject that changes with the wind of changing time and is said to be self-correcting as scientific literature is never flawless.[1] One of the major mechanisms of self-correction is retraction of flawed work and retraction rate of scholarly articles has sharply risen in recent years.[2]

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Retraction is a public statement made about an earlier statement that withdraws, cancels, refutes, diametrically reverses the original statement, or ceases and desists from publishing the original statement. It may be initiated by the editors of a journal or by the author (s) of the papers (or their institution).[3] Committee on Publication Ethics (COPE) described retraction as a mechanism for correcting the literature and alerting readers to publications that contain such seriously flawed or erroneous data that their findings and conclusions cannot be relied upon.

The number of articles retracted each year has increased precipitously in recent years.[4-6] Furthermore, fraud was found to be involved in 94% of the 228 cases of misconduct identified by the US Office of Research Integrity from 1994 to 2012.[7] The number of retractions in journals covered by the Science Citation Index Expanded has increased 20 times, i.e. a 10-fold increase, since there was a

twofold increase in article production between 1990 and 2008.[8] A similar 10-fold increase was found when focusing on MEDLINE only (1999–2009), although retraction remains a rare event since it represents only 0.02% of publications.[9] So, we aimed to study the various factors governing retraction of scientific articles by analyzing all the retracted articles in 2012 and 2013.

MATERIALS AND METHODS

To obtain data regarding retraction of articles in the years 2012 and 2013, we retrieved MEDLINE (via PubMed), a bibliographic database of biomedical literature produced by the National Library of Medicine, using the keywords: Retraction of articles, retraction notice, and withdrawal of article in January 2014. We noted the number of articles retracted in the years 2012 and 2013. We assessed all the characteristics of retractions where the text was available in English. (Retractions are identified in MEDLINE as a specific category and we used this tag for searching.) For each retraction, we recorded the article type (e.g. original research, review article, case report, letter), number of authors, who issued the retraction (e.g. authors, editor, publisher), and the reason for the retraction [e.g. data fabrication or falsification, suspected fraud, scientific error, unethical, plagiarism, duplicate publication, other causes (e.g. publisher error, authorship disputes, copyright infringement), or unknown]. We also noted the time interval between publication and retraction of the particular article. We also performed the comparative analysis of the years 2012 and 2013.

RESULTS

Overall, 135 retraction notices in 2012 and 158 in 2013 were retrieved. Of these, 135 retraction notices presented 155 retractions and 158 notices presented a total of 182 retractions. Retraction notices represent a notice issued by a journal, which comprise notification of retraction of one or more articles by the journal at that particular time. Overall, 155 retractions in 2012 and 182 in 2013 were considered for evaluation [Table 1].

Of the 155 retractions available in 2012, the reason was not given for 32 articles (20.65%), and 182 retractions revealed no reasoning for 46 articles. For example, the only information given by some journals is that the article is being retracted.

In Table 1 is given the various reasons for the retraction of articles such as Mistakes (honest errors), Plagiarism, Duplicate publication, Fabricated data, Author dispute, Ethical issues and it showed that the most cited reasons were mistakes, plagiarism, and duplicate submission both in 2012 and 2013 [Table 1].

Table 1: Reasons for retraction of articles in the years 2012 and 2013

Reason for retraction	*n* (%)	
	2012	2013
Mistakes (honest errors)	46 (30)	52 (28)
Plagiarism	34 (22)	47 (26)
Duplicate publication	28 (18)	42 (23)
Fabricated data	22 (14)	20 (11)
Author dispute	3 (2)	5 (3)
Ethical issues	3 (2)	2 (1)
No reason	19 (12)	14 (8)
Total	155	182

Table 2 shows that in both 2012 and 2013, original articles followed by case reports and reviews constituted the maximum percentage of total retracted articles [Figure 1]. Time interval between submission and retraction reduced to a mean of 2.2 years in 2013 as compared to 2.8 years in 2012.

DISCUSSION

A retraction notice is issued to alert readers when a published study is no longer scientifically valid or trustworthy.

The present study showed that the incidence of retraction of articles increased from 155 in the year 2012 to 182 in 2013. Corbyn *et al*.[8] and Wagner *et al*.,[9] in their study of retraction of articles between 1990 and 2008 and between 1999 and 2009, respectively, observed nearly 10-fold increase in the incidence of retraction.

In our analysis, mistakes or honest errors constituted the commonest reason for article retractions than any other reason, as given in Table 1. However, plagiarism represents the second most common reason and this had increased significantly in 2013 as compared to 2012. Wager *et al*.[9] observed that the most common reasons for retraction were honest errors (28%), redundant publication (17%), and plagiarism (16%). The present study also revealed similar findings showing honest errors as the most common cause of retraction. Nath *et al*.[10] also examined the retractions listed in MEDLINE between 1982 and 2002 and found that 27% of articles were retracted because of misconduct and 62% because of errors, but they failed to provide more descriptive categorization for reasons of retraction. Decullier *et al*.[11] in their cross-sectional study in the year 2008 also observed similar results that the

Table 2: Various characteristics of the retracted articles

Year	Number of retractions	*n* (%)				Time interval between submission and retraction (in years)
		Original articles	Reviews	Case reports	Others	
2012	155	76 (49)	21 (11.5)	38 (24.5)	20 (13)	2.8
2013	182	91 (50)	18 (9.9)	49 (27)	24 (13.2)	2.2

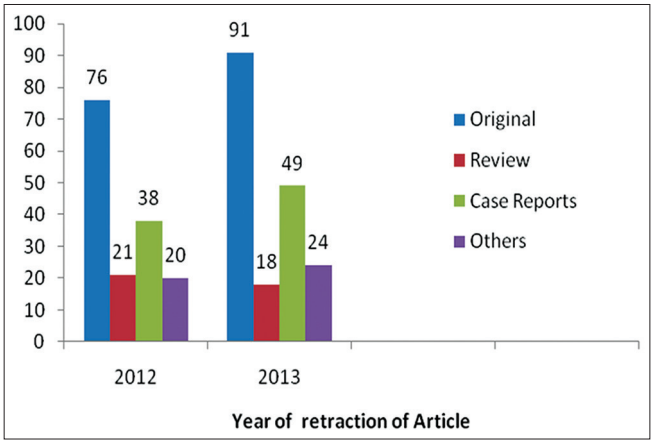

Figure 1: Representing the incidence of retraction of various types of articles

most cited reasons were mistakes (28%), plagiarism (20%), fraud (14%), and overlap (11%).

This is an alarming situation since it is a disgraceful act in a scientific writing and represents one of the biggest challenges faced by the scholarly world and andby far a grim form of delinquency in academics.

So, in the author's opinion, such forms of academic misconduct must be recognized and significant reduction of it can be brought about by awareness, objective check methods, and stringent punishment.

It is unfortunate that retractions may be due to genuine mistakes or misconduct. So, it is imperative to indicate the reason for the retraction, so that the authors who have acted responsibly and honestly are alerted by the journal about the flaws of their work and should not be stigmatized along with those who have committed gross misconduct. This is even emphasized in the retraction guidelines of COPE.[12,13]

If we take into account the number of publications worldwide, the first and second rankings are bagged by the US and the UK with 22,969 and 8069 publications, respectively, and India represents 2296 publications. However, retractions, as a whole, are quite rare and represent just a tip of an iceberg, i.e. mere upsurge in the quantity of publications does not indicate increased quality of research work in the country.[14] This goes in accordance to one very famous saying, "You can put millions of farmers to cultivate, but you need some real scientists to make green revolution."

Most of the articles retracted in biomedical literature are related to original articles, followed by case reports and review articles. Table 1 shows that retraction of original articles and case reports had increased in 2013 because of mistakes (honest errors), plagiarism, duplicate publication, and fabricated data. So, we can say that there is more potential of providing fraudulent data in experimental studies than in other types of articles. Fraudulent data are not new in science. Gregor Mendel, the Father of Genetics, may have selectively modified his data to support his conclusions, and statistical analysis suggests that Mendel's data are biased strongly in the direction of agreement with expectation.[15]

In 12 cases (12.2%) of 2012 and 8 (7.7%) of 2013, no reason for retraction was stated, or the language was so unclear that the reason could not be determined. Journal editors may be reluctant to print retractions with sufficient information either because others may doubt on the expertise of the editorial team or due to the fear of legal actions by discredited authors. This shows some discomfort on the part of authors and journals in admitting mistakes. However, the impact of published retractions is, in part, determined by the researchers seeking them out.[15] Wager *et al*.,[9] in their study of retractions between 1988 and 2008, found that 5% of the retracted articles did not state the reason for retraction.

According to COPE, authors usually would not have grounds for taking legal action against a journal over the act of retraction if it follows a suitable investigation and proper procedures. COPE also states that journal editors should consider at least issuing an expression of concern if an investigation is underway, but a judgment will not be available for a considerable period of time.[16] National Library of Medicine (NLM) implemented a policy for identifying and indexing published retractions. They chose to link the notice of retraction to the original article rather than delete the citation to the retracted article, because they felt that removal might affect the historical perspective.[17]

Unfortunately, retraction notices take a long time to reach the target readers after the article is published and this remains a chronic problem. In the present study, we observed that publication of notice for retraction of articles took a long mean time of 2.8 years in 2012 which reduced to 2.2 years in 2012. Steen *et al*.[2] in their study observed that for the 714 retracted articles published between 1973 and 2002, retraction required an average of 49.82 months. But for the 1333 retracted articles published after 2002, retraction took 23.82 months, and thus, the author concludes that retraction may be occurring more quickly now than in the past.

Present study revealed an ast-onishing observation that an article published in *Nature* by Bezouska *et al*. in 1994, was retracted after a long time of 19 years in 2013 as they failed to reproduce the results, and it has been cited 255 times, according to Thomson Scientific's Web of Knowledge.[18]

There is no sufficient evidence available that retraction notices make much difference to the citation behavior of authors. Retracted articles still continue to be cited as valid studies for years after retraction notices have been issued.[19-21]

Evidence shows that articles receive fewer citations after retraction compared to a control group and that highly cited articles continue to be frequently cited after retraction.[17] Steen in his study also observed that since 2000, there has been a progressive decline in the time-to-retraction, when analyzed by the year of publication. This substantial rapid increase in retraction can be because infractions have become more common or are more quickly detected. An apparent glut of retractions might be because editors began to reach further back in time to retract articles.[22]

The final, and the most important, lesson to be learned from the human error literature is that strategies for reducing error are very different from those used to detect and handle scientific misconduct. Whereas "naming, shaming, and blaming" may be appropriate for dealing with scientific misconduct, these approaches are not effective, and may even be counterproductive, in reducing unintentional errors. Reducing errors requires a commitment to building systems that can prevent, detect, and mitigate the effects of errors when they occur. Ultimately, research mistakes, like all human errors, must be seen not as sources of embarrassment or failure, but rather as opportunities for learning and improvement. It is very imperative that approach in handling unintentional errors should be different from that of intentional errors. "Naming, shaming, and blaming" does not seem to be appropriate for handling unintentional or honest errors, but rather it should be an opportunity for learning and improvement. At the same time, authors favor that misconduct should not be tolerated at all and there is need to build an effective system that can prevent, detect, and mitigate the effects of errors when they occur. The prime objective of retractions is to rectify the literature and to ensure its academic and research integrity, rather than punishing any authors.[10,15,22] This study has a limitation that it is restricted to retracted articles indexed in the MEDLINE database only.

CONCLUSIONS

We conclude that although retractions represent a small fraction of a percent of all publications in any given field in a year, this misconduct has been rising sharply in recent years. So, we suggest that editors should make some effective strategy by following the COPE guidelines to reduce such gross misconduct as it besmirches the image of scholarly research not only in scientific community but also in general public and sullies the ethical standards of scientific publications.

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