

Research Misconduct: A Neglected Plague

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Summary

Truthfulness and honesty are absolute essentials of research. But to sustain in the not-so-pleasant “publish-or-perish” environment and “cut-throat” competition to increase the credibility associated with one’s name, many individual researchers as well as research groups are turning towards research misconduct and this plague is gradually reaching epidemic and pandemic proportions. This overview highlights the various types and means of research misconduct and gives suggestions aiming to curb this academic menace so that research sanctity and integrity can be preserved and scientific research does not get polluted by the dirt of misreported or fabricated data.

Key words: Plagiarism, research misconduct, truthful

INTRODUCTION

Creativity, critical thinking, honesty, scientific quest, integrity, truthfulness, determination, and dedication play a pivotal role in our search for scientific truth. These are the pillars which should be employed in any scientific endeavor, so that the sanctity of scientific literature for the progress of mankind is maintained and perpetuated. The publication of a scientific manuscript is the result of several months of careful planning and execution of a project. In the best interests of science, the work has to be carried out honestly and objectively without bias and the results should be reported truthfully. However, deviations may occur from the ideal due to ignorance or, at times, they may be willful deceptions. These deviations from the ideal, willful, or otherwise, constitute what is known as scientific misconduct.^[1] Although research misconduct has been around the corner since the primitive ages of the evolution of art and science, it is the recent surge in academic competitiveness, the urge to succeed instantly using shortcuts and the thirst of publications to increase the credit associated with one’s name that has led to a steep rise in this practice. Perhaps, the most comprehensive and legally-tenable definition on research misconduct comes from the United States Public Health Service: “Fabrication, falsification, or plagiarism, in proposing, performing, or reviewing research, or in reporting research results. It includes: (a) fabrication is making up data or results and recording or reporting them; (b) falsification is manipulating research

materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record; (c) plagiarism is the appropriation of another person’s ideas, processes, results, or words without giving appropriate credit.”^[2] Research misconduct does not include honest error or differences of opinion. Scientific literature helps science to advance further.^[3] However, research misconduct pulls it back and adversely affects the sanctity, robustness, and applicability of scientific data.

Although falsification, fabrication, and plagiarism are the more serious types, the term “Research Misconduct” can be used for an array of issues:

TAXONOMY OF RESEARCH MISCONDUCT (IN DESCENDING ORDER OF SERIOUSNESS)

- Fabrication
- Falsification

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- Plagiarism
- Failure to get ethical approval
- Not admitting that some data are missing
- Ignoring outliers without declaring it
- Not including data on side effects in a clinical trial
- Conducting research on humans without informed consent
- Publication of *post hoc* analyses without declaring it
- Gift authorship
- Not attributing other authors
- Redundant publication
- Not disclosing a conflict of interest (COI)
- Not attempting to publish completed research
- Failure to do an adequate search of existing research before beginning new research.^[4,5]

Fabrication

Fabrication is the invention of data or information.^[6] Fabricating data involves creating a new record of data or results. Most commonly fabricated documents are informed consent forms and patient diaries.

Falsification

Falsification is the alteration of the observed result of a scientific experiment.^[6] Falsification of data includes a spectrum ranging from fabrication of a small amount of data to the falsification of entire experiments. Falsifying data means altering the existing records. It is the deliberate distortion or omission of undesired data or results.^[7] Examples can be intentional inflation of sample size to increase the credibility of the study or the studies simply not performed but published.

Falsification can be very difficult to detect. Retrospective detection of such a paper leads to retraction of several years of published articles.^[8] This can be done at the lowest level by statisticians or laboratory assistants and technicians to the highest level by the investigators themselves.

Plagiarism

Plagiarism is the most frequent type of misconduct.^[9] Plagiarism involves copying another's work and projecting it as own without proper citations and indexing. Thus, it involves the dual crime of stealing someone else's work and also lying about it afterwards. It is a major breach of ethics. Some dictionaries treat the etymology of the word plagiarism as coming from the Latin, *plagiarius* (hijacker or kidnapper). Skandalakis and Mirilas (2004) argue that the word originated from the Greek *plagios* (obliquity, in the sense that whom presents a skewed moral).^[10] The meaning of the word "plagiarize" from "The Merriam-Webster Online Dictionary," defines it as – to steal and pass off (the ideas or words of another) as one's own; to use (another's production) without crediting the source; to commit literary theft; to present as new and original an idea or product derived from an existing source.^[11] According to the World Association of Medical Editors strict definition, plagiarism is when six consecutive words are copied, 7–11 words are overlapping in set of 30 letters.^[12]

Plagiarism is difficult to detect and poses significant threat to the health of scientific literature. Mostly, the plagiarism is suspected by knowledgeable reviewers and their expertise in a particular field helps them catch subtle defects easily. Editorial staff uses electronic plagiarism-checks to detect plagiarism.^[13] Availability of internet facilities and free online journals are the main sources of today's plagiarism among the students, faculty, and researchers of any profession.^[14] In the today's "publish or perish" scientific environment, everybody is in a hurry to publish their articles by hook or by crook, and hence, they succumb more commonly to plagiarism. Plagiarism has become an easy escape-way for academicians and clinicians as well. They fail to recognize that quality of scientific literature is more important than quantity. As opposed to fabrication and falsification, plagiarism has the characteristic of having direct "victims" in individuals whose work was unattributed, and who should be involved in the review of new material in their field.^[15] Berk^[16] called plagiarism as "a serious violation of collegial trust, the fundamental principle on which the integrity of medical journalism depends." He called it "deception and the theft of intellectual property." It harms the unattributed author's interest.^[1]

Plagiarism of words can be divided into: (a) the direct form completely or partially copying of text, computer files, audio or video recordings without acknowledging primary source; (b) mosaic form borrowing ideas and opinions from the original source, few words, and phrases without citing this source; (c) self-plagiarism—copying one's own part of text for other piece of work.^[12]

Plagiarists may be identified as one of the following three types:

- The lazy plagiarist: The lazy plagiarist is generally an academically weak and otherwise under-motivated student, the type who would happily take the work of someone else in its entirety, do little more than to change the name on the paper, and claim it for their own
- The cunning plagiarist: The cunning plagiarist is more sophisticated than the lazy plagiarist and takes full advantage of these abundant opportunities. They are quite clear about what plagiarism is, but work hard to avoid detection. Content is cut and paste from a variety of sources on the Web and possibly from other papers
- The accidental plagiarist: the accidental plagiarist is not in the least bit devious. Their transgressions arise typically as a consequence of inexperience, poor study skills, local academic norms, or some combination thereof. Such students typically insert slabs of unattributed text in their essays and when challenged, will be either embarrassed by their sloppy referencing or genuinely surprised that they have been challenged at all, claiming ignorance of the system.^[17]

How to detect plagiarism? Although detection of plagiarism is not a child's play, even an iota of it can make a voluptuous

difference in our efforts to maintain the integrity of scientific quest.

- All the medical and dental ethical writers must check for the text duplication unintentionally using plagiarism detection software before submitting to any journal office^[14]
- One of the important responsibilities of a reviewer is detection of plagiarized text due to his/her familiarity with published material in his/her area of interest^[1]
- The availability of dedicated websites designed to provide information on plagiarism (Eg: <http://www.plagiarism.org>) and softwares to detect plagiarism (e.g.: Ithenticate, turnitin, Viper, SafeAssign, Crosscheck, etc.,) has made it easier for reviewers and editorial staff of journals to detect copying.^[1]

Fabrication, falsification, and plagiarism are the most common types of research misconduct and they have been called the “Unholy trinity of Scientific Writing.”^[18]

Templating

This is another form of plagiarism which occurs when similar material is being submitted to a journal where the outline of a previous article is being closely followed with sometimes similar or identical phrases being used, thus giving two very similar articles.^[6] This adds only a meager, if any, weight to the ocean of scientific literature.

Salami-slicing (salami publishing)

“Salami-slicing” is the term used to describe the practice of dividing the results of a research project into a series of articles to maximize the number of publications.^[6] Instead of publishing one hefty work of substantial value, the research project or the manuscript is split and published to increase the number of publications and the credit associated with one’s name.

Authorship

The Harvard Medical School states that an author “should have made a substantial, direct, intellectual contribution to the work.”^[6] Authorship issues are the recent types of research misconduct practiced widely.

Following are the various types of authorship issues described by Kevin Strange:^[19]

- Coercion authorship, where intimidation is used to gain authorship. This type of authorship can occur when a senior person pressures a more junior person or a student to include their name on a paper to which they have not contributed enough to qualify for authorship
- Honorary, guest or gift authorship that is awarded to acknowledge friendship, to gain favor, and/or to give the paper a greater sense of legitimacy. It is still quite common for authors to add well-known senior investigators as authors to their papers, even though the senior person may not have made significant contributions to the paper
- Mutual support authorship, whereby two or more investigators place their names on each other’s papers to enhance their perceived productivity

- Ghost authorship, where papers are written by people who are not included as authors or are not acknowledged
- Denial of authorship, where a work is published without providing authorship or acknowledgment to people who made substantial contributions to the work.

Even the rank or order of authorship in a single article is sometimes a matter of debate. Only those authors who have substantially contributed to the research work should get the credit and the order of their names should be governed by the share of responsibilities each one of the authors shouldered.

Shot-gunning

This is another common malpractice most commonly attributed to the impatience and over-competitive nature of professionals. It is the dual or multiple submissions of manuscripts.^[20] That is, the same manuscript is simultaneously submitted to two or more journals. This ultimately culminates in “Duplication” or “Redundant publication.”^[21]

Conflict of interest

COI in the biomedical research is defined as “a set of conditions in which professional judgment concerning a primary interest (such as patients’ welfare or the validity of research) tends to be unduly influenced by a secondary interest (such as financial gain).”^[22] Similar to other forms of misconduct like fabrication or falsification, COI can also adversely affect and bias the research outcomes. Hence, the lack of transparency to editors, reviewers and readers about the conflicts of interest associated with a study of article should be considered as an entity of scientific misconduct.^[23]

Authors’ recommendations

1. There is a need to assess the mindsets of students, clinicians and academicians which instigate them to practice research misconduct so that measures can be taken in the direction to cease this bane. Hence, surveys need to be conducted on a larger scale for the same
2. A value-based approach in the practice of scientific research and publications needs to be stamped on the minds of young researchers. They should be taught the difference between searching and researching. Faculty members should educate and motivate students to perceive honest research and ethical practice of publications to preserve the integrity of science
3. Cooperative efforts on the part of authors, reviewers, editors, software developers, students and faculty members are possibly the only means towards maintaining the originality and sanctity the scientific literature
4. Interventions such as workshops and CDE programs should to be conducted to raise the awareness about research misconduct amongst students and also for faculty members so that they can educate their students about it
5. Use of plagiarism detecting softwares such as Viper, Turnitin, iThenticate, Plagiarism Checker X, Citeplag, Plagiarism detect, Plagium, eTBLAST, and Plagiarisma^[24] which are doing their bit to cease this ever-increasing epidemic of plagiarism, should be promoted

6. Ineffective mentoring seems to be an important predisposing factor for the occurrence of scientific misconduct. Too few senior mentors relative to the large number of junior scientists reduce the efficiency of mentoring and lead to scientific misbehavior by those mentored. Hence, recommendations to increase the ratio of senior to junior scientists, based on the available resources, can be a welcome step^[25]
7. Periodic auditing of scientific records, publications and workloads can also be an important strategy for prevention of scientific misconduct.^[25]

These ideas go valid because as Martinson *et al.* stated, “it is time to consider what aspects of the research environment are most salient to research integrity, which aspects are most amendable to change, and what changes are likely to be most fruitful in ensuring integrity in science.”^[5]

“Scientific research has been overtaken by careerism and a management culture to the detriment of originality and discovery,” laments Peter A. Lawrence in “The politics of Publication.”^[26] Researchers should to be genuine, honest and truthful and should report only authentic data. In a nutshell, they should practice integrity in their research projects. But unfortunately, Research Misconduct is threatening our search for truth in science. To emphasize its severity, it would not be wrong to say that research misconduct is the ghost haunting the delicate souls of health sciences.

CONCLUSION

Research misconduct poses a significant threat to the health of patients as well as to the scientific literature and is difficult to detect. Only genuine, perfect and accurate research aimed at patient benefit should find its way onto publications so that it improves the vast, almost infinite ocean of scientific literature. Research misconduct can have deleterious effects not only on patients but also on the researchers, funding agencies, affiliated institutes and the entire scientific community. The major driving force for research misconduct is “careerism.” The not-so-pleasant “publish or perish” environment in the medical field, coupled with the decreasing publishability of negative results, drives the researchers, students as well as practitioners to fondle unintentionally with the greener pastures of research misconduct. To survive the “cut-throat” competition, one should not succumb to fraudulent research and compromise with the depths of scientific quest and ethics of publications.

“Many people say that it is the intellect which makes a great scientist. They are wrong: It is the character.”

—Albert Einstein

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