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Scientific Misconduct in Scientific Publications

Md. Nurul Amin[1]

Medical research is the mainstay of scientific research leading to the development of a more favorable state of mental and physical health. Therefore, it is essential that medical research should be guided by the scholarly method (body of principles and practices used by scholars and academics to make their claims about the study as valid and trustworthy as possible and to make them known to the scholarly public) and moral philosophy (a philosophy that involves systematizing, defending, and recommending concepts of right and wrong behavior). When conducting medical research, one, therefore, must follow the ethical and moral obligations as stated by the Nuremberg Code in 1947[1] and the subsequent Declaration of Helsinki 1964 (and later revised in 2002 and 2013)[2,3] which explicitly explain the responsibilities of scientists and physicians when conducting medical research on human and animal beings. However, despite the morality guiding medical research, the media's coverage of instances of fraud and deception as well as discussions held in the working sessions of concerned regulatory governing bodies around the world,[4-8] scientific research has a long history of fraud and deception, besides many fraud and deception cases go unreported. One reason for this might be the absence of a consensus definition of what constitutes scientific misconduct,[9] which makes it more challenging to spot instances and put an end to wrongdoing. We need to talk about the definitions at our disposal in order to completely comprehend this.

The Oxford English Dictionary describes fraud as "wrongful or criminal deception intended to result in financial or personal gain" and deceit as "the action or practice of deceiving someone by concealing or misrepresenting the truth".[10] In 1999, The Royal College of Physicians of Edinburgh hosted the Consensus Conference on Misconduct in Biomedical Research, which aimed to address the issues of research misconduct.[11,12] Their definition was the broadest yet from the UK and was stated as: "Behaviour by a researcher, intentional or not, that falls short of the good ethical and scientific standard." The UK Committee on Public Ethics (COPE) describes misconduct as the "intention to cause others to regard as true that which is not true".[13] Additionally, the United States of America's key regulatory body, the Office of Research Integrity (ORI), defines research misconduct using the FFP model, i.e., the serious aspects of misconduct.

Thus, Scientific misconduct is the violation of the standard codes of scholarly conduct and ethical behavior in the publication of professional scientific research. Any divergence from these norms undermines the integrity of research for that individual, lab, university/corporation, and the field as a whole. The diverse research misconducts are tabulated below in descending order of seriousness (Table I).

Author's information:

[1] ***Dr. Md. Nurul Amin,*** *Associate Professor (Research & Development) & Executive Editor (Ibrahim Cardiac Medical Journal), Ibrahim Cardiac Hospital & Research Institute, Shahbag, Dhaka, Bangladesh.*

Correspondence : ***Dr. Md. Nurul Amin,*** *Mobile: 01753178452, E-mail: mdamin01@yahoo.com*

Table I. Research misconduct
(Source: Evans, 2000)[12]

- Fabrication: Invention of data or cases
- Falsification: Willful distortion of data
- Plagiarism: Copying of ideas, data, or words without attribution
- Failing to get consent from an ethics committee for research
- Not admitting that some data are missing
- Ignoring outliers without declaring it
- Not including data on side effects in a clinical trial
- Conducting research in humans without informed consent or without justifying why consent was not obtained from an ethics committee.
- Publication of post-hoc analyses without a declaration that they were post hoc
- Gift or Ghost authorship
- Not attributing other authors
- Redundant publication
- Not disclosing a conflict of interest
- Not attempting to publish completed research
- Failure to do an adequate search of existing research before beginning new research[12]

Major scientific misconducts also known as three "cardinal sins" of research conduct, are falsification, fabrication, and plagiarism (FFP). These are the primary concerns in avoiding research misconduct while proposing, performing, or reviewing research, or in reporting research results. Falsification connotes changing or omission of research results (data) to support claims, hypotheses, other data, etc. It can include the manipulation of research instrumentation, materials, or processes. It can also be manipulating research materials, images or representations, instrumentation, equipment, or processes, or changing or omitting data or results in such a way that the research is not accurately represented in the research record. Fabrication is the construction and/or addition of data, observations, or characterizations that never occurred in the gathering of data or running of experiments. Fabrication can occur when "filling out" the rest of the experiment runs, for example. Claims about results need to be made on complete data sets (as is normally assumed) If claims are made based on incomplete or assumed results, they are a form of fabrication. Using or representing the work of others as your own work constitutes plagiarism, even if committed unintentionally. More clearly, it is the practice of taking someone else's work or ideas and passing them off as one's own. Appropriation of another person's ideas, processes, results, or words without giving appropriate credit constitutes plagiarism.[14]

Whilst being recognized as morally wrong, it is debatable as to whether the third branch of the FFP model, plagiarism the use of published or unpublished material without due acknowledgment of the primary author constitutes research misconduct in the same way as does the fabrication and/or the falsification of data. Arguably, the repercussion of plagiarism is merely damage to the ego of the individual whose ideas/words are taken. Moreover, since the work is already published and in the public domain, there is, arguably, no harm in utilizing the same information, saving on further expense and time. Daniel David, editor of The Journal of Cognitive and Behavioural Psychotherapies, believes, "if duplication of content helps the author to reach a new or larger readership and if text recycling within these constraints helps to present the same idea more accurately across several publications, they become legitimate conduct".[15] Referring to the United States' ORI definition of plagiarism, which is "unattributed textual copying," many have questioned its applicability in real-life situations. One definition of plagiarism suggests it is the repetition of 11 words or the overlap of 30 letter strings,[16] although this is by no means a standard definition. What happens when these three major sins are done in the research? They breach the trust that allows scientists to build on others' work, as well as erode the trust that allows

policymakers and others to make decisions based on scientific and objective evidence. Research institutions can refuse to address such cases, which can undermine both the credibility of the research process and the self-governance of the research community.

Determining the extent of the prevalence of "Research Misconduct" is difficult, for there is a scarcity of accurate data on the prevalence of research misconduct.[8] The absence of a standardized definition of "Research Misconduct" in the academic world has made it even harder to define.[17] Besides, some critics are not inclined to concede that there is misconduct in research. Koshland goes ahead stating that almost cent percent of all research reports are accurate and truthful and that science should not impose any barriers in practice in the propagation of academic knowledge.[18] However, there are ample instances of substantial harm to the nations, where research misconduct has become a norm, as reported by numerous cases in the global media.

In 2005 Martinson et al. conducted a survey on research practices with a total of 3247 mid-career (majority at associate professor level or above) and early-career (majority at post-doctoral level) scientists working in the United States. The findings revealed that only a small fraction of people (less than 2%) engaged in the more serious end of the research misconduct (that is falsifying or fabricating data). Over one-third of the respondents did, however, mention engaging in research misconduct that called for an institution- or government-wide probe. It's interesting to note that the more senior group showed a higher propensity to participate in dubious behavior than did their juniors.[19] The first meta-analysis looking into the prevalence of research misconduct examined the "scientific behaviors of the researchers that distort scientific knowledge" only. According to the survey, 2% of the scientists admitted to major misconduct (data fabrication or falsification) at least once, while 34% admitted to engaging in other dubious research methods. The results were significantly higher when participants were asked about the actions of their coworkers on the same issue (14% for data fabrication and 72% for other dubious acts).[5] Fanelli cautions, however, that these findings might only be a modest estimate of the true prevalence of research misconduct. A similar argument was made by Ranstam et al who found that the majority of respondents to their research of biostatisticians reported knowing of at least one substantial breach of a fraudulent project in the previous 10 years.[20] Geggie describes how the vast majority of recently certified medical consultants showed evidence of previous misconduct.[21] This may be the case given that 17% of participants, despite their seniority, reported not having received any training in research ethics.[21] There are a number of levels (individual researchers, departments, institutions, journals, and funding bodies) at which research misconduct can occur.[22] When examining the causes of research misconduct, there is a covert desire to succeed in advancing one's career as well as a fear of failing.[23] The pursuit of grants and financial incentives from pharmaceutical industries as well as the advancement of one's professional career are all mentioned as reasons for misconduct.[24] It might be argued that many departments and researchers may have weighted "quantity" rather than "quality" with the success of a study. There has long been a link between the number of publications and eligibility for financing or career advancement.[25]. Surgical trainees are routinely questioned about their publishing history when seeking for senior positions, regardless of the journal's or publication's standard. This mindset has contributed to a sharp increase in journal titles, many of which are of poor quality and are not well-maintained.[25,26]

The question arises why does scientific misconduct occur? Sarwar and Nicolaou[14] described a number of reasons for scientific misconduct, which among others are "academic pressure, personal desire for fame (an underlying desire to be successful in career competition), sloppy science, financial gain, and an inability to determine right from wrong due to lack of training on "Research Misconduct". Besides, there are other reasons as well. These are a lack of

self-criticism, encouragement of novel scientific research by the institutions, Government policies and proper training to build the capacity of the potential researchers in different institutions, and pharmaceutical pressure. The preponderance of misconduct occurs because many authors are not informed on ethics, as these issues have generally not been addressed in medical undergraduate or postgraduate education. In order to prevent research misconduct, further discussion of the definition of research misconduct and its diverse facets is required, leading to an international consensus on a single, universal definition of what constitutes research misconduct. Furthermore, ethical norms must be made explicit so that researchers can assess whether their study breaches certain codes of scientific conduct. Moreover, organizations' probing into research misconduct must be fair, prompt, and transparent, and allow for retractions to be made promptly once misconduct is evident.

The International Committee of Medical Journal Editors published the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing & Editing for Biomedical Publications",[27,28] defining the rules for authorship credit. Accordingly, authors must meet all three criteria given below:

1) substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data, 2) drafting the article or revising it critically for important intellectual content, and 3) final approval of the version to be published.

However, not all journals use these consistently. Peer review also checks for issues of misconduct and guarantees that the study is of high quality. The editor can seek the raw data for confirmation if they have any doubts. Last but not least, there is an urgent need to educate academics and aspiring researchers about what constitutes research misconduct and the significance of its consequences. Finally, we would like to conclude the issue of our discussion with the statement of an English Statistician, "The length of a list of publications is a dubious indicator of ability to do good research; its relevance to the ability to be a good doctor is even more obscure".[29]

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