

Research and scientific publication integrity

Integridade na pesquisa e publicação científica

Ethical issues in conducting and reporting research, especially with regards to plagiarism, have brought progressively concerning to the editors of scientific journals. These issues, which are usually referred to as academic misconduct, directly affect the credibility of scientific findings, as well as bring social and economic harmful consequences, miscarry to contribute to the advancement of knowledge and also delay the work of other researchers whom need to allocate extra time to revalidate the results that have already been published².

This problem has also concerned the research funding agencies. Recently, the Conselho Nacional de Desenvolvimento Científico e Tecnológico-CNPq (http://www.cnpq.br/normas/lei_po_085_11.htm#relatorio) and the Fundação de Amparo à Pesquisa do Estado de São Paulo-FAPESP (<http://www.fapesp.br/6566>) have provided reflections and guidelines to discourage fraudulent practices in research and encourage the production and dissemination of knowledge within the principles of integrity. We suggest the consultation of these documents. The document from the Commission of Research Integrity by the CNPq recognizes as the major academic misconduct the production or invention of data, the plagiarism and self-plagiarism. Besides to the consequences for the knowledge, this research funding agency consider that the academic misconduct may facilitate the acquisition of improper financial aid.

This topic has also motivated academic institutions to discuss the matter with the purpose to implement educational actions on the topic. In this context, we took part in the discussions board of the Research Chamber of the Universidade Federal de São Carlos (UFSCar), São Carlos, SP, Brazil, which we had the opportunity to write a document (not published), which part of this editorial has been taken.

Seeking a more contextual approach of the topic, we found a text by Pimple³, in which the author believes that ethical conduct in research is guided by three simple questions: 1) "Is it true?": this question refers to the aspects related to the veracity and validity of research results, the basic technical competence (including experimental design), data manipulation, statistical methods, unintentional bias, falsification and fabrication of data; 2) "Is it fair?": refers to the relationship between researchers, such as authorship, data sharing, plagiarism, peer review, confidentiality and impartiality. There are also aspects of the relationship between researchers and research participants (such as, ethical principles in research with humans, access to treatment, informed consent, acquiescence, confidentiality and anonymity, deception, risks and benefits of research, among others), the welfare of animals (pain, suffering and animal "rights"), relationship between researchers and their institutions, research funding agencies and the government (conflict of interest, regulations, data retention, support and institutional demands) and finally 3) "Is it wise?": the question refers to issues related to social responsibility, such as research priorities towards better implementation of the available resources, fiscal responsibility, public service, environmental impact, among others.

This overall scope provides a framework that covers the main ethical domains in research. However, it is only a theoretical framework, as there is an overlap between these domains. There are also variations in the definitions available for academic misconduct in literature. Respecting these reservations and without naturally wanting to exhaust the topic, I will briefly describe some common ethical issues in research.

Academic misconduct: it is the intention of taking other people to think that something is real when it is actually not. Therefore, it involves not only an act or an omission, but also a deliberate intention of the researcher, author or editor^{1,2}. It usually refers to fabrication, falsification, plagiarism or other practices that seriously deviate from those that are accepted by the scientific community as the integrity for the proposition, conduct and reporting research⁴.

Fabrication of data: is the report of a set (complete or partial) of data that do not exist (i.e.that were invented). As a result, it frauds the way to get the data including the description of experiments that were never performed^{1,3}.

Falsification of data: is the manipulation of research materials, equipment, processing or changing or omitting results, in order not to represent the research with precision³. An example of this is the “cooking”, where only the results that support the hypothesis investigated are kept and analyzed, ignoring the data that might weaken the research. Also as a minor offense, there is the “trimming”, which involves soften irregularities of the data in such a way as to make them more convincing to publication¹.

Plagiarism: is the use of ideas, words, or any other intellectual property owned by others, published or unpublished, without the consent, permission or quotation presenting them as new and original rather than stemming from a known source⁵. Plagiarism refers to a wide range of academic misconduct ranging from the use of non-referenced ideas from others to projects submitted to research funding agencies, text books, scientific articles, abstracts, figures and tables¹.

Self-plagiarism: refers to the practice of an author to use previous parts of his/her own writings on the same topic in another publication, without citing them or quoting them formally. This practice is relatively common and often unintentional. However, according to the World Association of Medical Editors (WAME)⁵, there are several ways of saying the same thing for different particularities when writing, for example, the method section of an article, which would make the self-plagiarism unnecessary. Other examples of self-plagiarism involve the use of the same literature review in the introduction or discussion of multiple manuscripts⁶ or on larger projects that share the same planning, the use of data or theoretical contextualization, which result in multiple articles. This fragmentation of the set of data is a practice known as *redundant publications* or *salami slicing*¹. Some cases of redundancy would be considered legitimate, for example, when the reports have clearly distinct aims, reproduce results for different audiences or represent data in review articles, since the original publication is properly cited⁷.

Right of authorship: there are no universally consensus criteria for the definition of authorship in an academic work^{2,5}. This gap has promoted the proposition of separate parameters by different scientific societies. The International Committee of Medical Journal Editors⁸, also known as the Vancouver Group, discussed and performed several revisions in their criteria. In a recent review (April 2010), the Committee believes that the authorship credit should be based on three requirements, which should be met simultaneously: 1) substantial contribution to the design and planning, acquisition or analysis and interpretation of data; 2) writing the article or critically revising most important intellectual content of the article; 3) final approval of the version to be published. To avoid the problem of inappropriate authorship, there are guidelines and recommendations provided by different authors^{7,9,10} and associations^{2,5,8}.

Conflict of interest: generally they are issues that may not be very apparent and that influence the judgment of authors, reviewers and editors and may be of personal, commercial, political, academic or financial nature^{2,5}. These conflicts can introduce different levels of bias in research or in its publication. In the case of research, are examples of this problem the choice of the procedures, data collection and data analysis and the choice of statistical methods⁷. In the case of journals, blind peer review is usually used to minimize these problems.

Penalties for academic misconduct: they have been more often described mainly for cases of plagiarism in scientific journals. The American research integrity agency (*US Office of Research Integrity*, <http://ori.hhs.gov/policies/plagiarism.shtml>) suggests penalties in relative of severity, which can be adopted by the journal editor separately form or combined. The *Committee on Publication Ethics* (COPE)² also offers recommendations. Briefly, the sanctions suggested by both agencies are: 1) a letter to authors stating that there was an innocent misunderstanding of principles; 2) a letter of reprimand stating the possible consequences on a diversion that does not seem to be innocent; 3) a formal letter to an official of the institution or funding agency requesting investigation; 4) publication of a note on the redundant publication or plagiarism, giving details about the deviation; 5) refusal to accept future submissions from the author, group or institution for a period of time; 6) formal withdrawal of the article of the scientific literature.

Finally, it seems important that this topic could be further disseminated, discussed and well understood by all of us. These initiatives, as well as educational actions engendered by educational institution, will promote research to be conducted with integrity, which therefore will strengthen the society as a whole, the academic and the clinical communities and the researchers.

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