Methodology and Ethical Principles Interrelation in Scientific Research and Publication

Over one century ago the great physiologist Claude Bernard extended the Hippocratic precept to scientific investigation establishing that not only the patient should be benefited but kept safe from harm. Therefore, moral integrity and mastery of research methods are two necessary qualities of researchers.

It is therefore, not without reason, that the World Medical Association established rules for the scientific and ethical conduct of researchers, among them the following:

"Medical research involving human beings should be consistent with the complete knowledge of scientific literature, other relevant sources of information and adequate laboratory findings, and when appropriate, animal experiments". Or "... any medical research project involving human beings should take place following the careful assessment of predictable risks and costs in comparison with expected benefits to the subject or others."

The second rule quoted above, as part of the 196/96 Resolution of the National Council of Health (Brazil), as the non-malfeasance principle, requires acute sensitivity from researchers to perceive the consequences of research procedures that could harm participants. It requires the ability of assessing predictable damages, and naturally the recognition of what characterizes damage.

Once this is established it will permit to evaluate to what extent benefits justify possible malfeasance. It is evident that researchers'sensitivity does not stem exclusively from their standing as human beings, but also from the degree of knowledge and experience of their particular work area. As for knowledge, it is fundamental to know how to optimize research procedures to obtain more reliable results with less aggression or risk to participants' integrity. Nevertheless, considering the complexity of investigation, to restrict invasiveness and increase subjects' physical and psychological respect is not always easy. In reality, difficulties tend to appear in the boundary of adequate methods and techniques and ethical requirements. On the other hand, it is very important to establish this boundary given the possibility of crossing over the dim line between what is and what is not permitted. So, even if difficult it is not acceptable to stop pursuing this boundary at any cost. The issue is: what are the criteria for establishing a line of conduct that could base methodological and technical procedures and at the same time assure the precept of non-malfeasance? What are the basic tools enabling researchers to guide their procedures?

Here we have another pertinent rule because it is related to a basic element of scientific methodology. This is called the Principle of Parsimony that when carefully employed contributes, and very much so, not only to the quality of research but in preserving participating subjects. Proposed in the Fourteenth Century by William Occam (1285-1347) is one of the foundations of scientific epistemology and is enunciated the following way: "... do not multiply things unnecessarily (entia non multiplicanda praeter necessitatem"). Based on this principle, operational guidelines are created that not only simplify work but also enables pertinent conclusions - and to use a colloquial term - makes research more straight-forward. That is why this principle is also known as "Occam's blade".

Where do we find it in our day to day work as researchers?

In practice what better defines the Principle of Parsimony is related to the establishment of hypotheses. Two alternative statements for the same phenomenon and when there is no difference between them, the simplest one has more chance of being the correct one. In other terms Einstein said the same thing, even more precisely than Occam: "... all should be made as simple as possible, but not simpler than this." It is relatively common to find, in papers and scientific articles, recurring or elaborate hypotheses or data interpretation that do not assist in the clarification of the problem focused. To meet the criteria of parsimony, aspects such as scientific fundaments with data justifying research, adequate hypotheses, and detailed project's description taking into account, materials, methods, case studies and expected results - issues that are part of the regulation of ethics in research organizations, - should be well dimensioned, in such a way they do not fail because they are excessive or insufficient. As a consequence the lack or exaggeration of information (including redundant infor-
mation) on the scientific background of issues researched, technical procedures insufficiency (data collection and analysis) or inadequate size and selection of samples are serious problems in a Scientific Research. This last point is a crucial one in quantitative research for a too small or badly selected sample will constrain or even annul the conclusions (and in this case, subjects were unnecessarily exposed to risks). On the other hand an excessive sample will unnecessarily expose to risk subjects that could be kept out of the research. We should not forget that sample size determination is difficult and delicate even to a statistics professional due to the subtlety of employed methods, accepted assumptions etc. It then results that an investigator needs, to protect participant human beings, not only knowledge of ethical rules, but also rigorous application of scientific methodology. This rigor is closely associated to the requirements of the Principle of Parsimony.

It is very important that Authors concede to this fact for such recognition will facilitate the acceptance of the work performed. It's never too much to emphasize that to publish a scientific article with the assumption of qualified research, methodological principles, as well as ethical principles (not only non-malfeasance) is indispensable. Therefore, there are requirements in the publication norms of journals to guarantee researches comply with ethical requirements. Thus, it is part of the role of editors and reviewers to identify all of these elements when a manuscript is submitted for review.

Finally it is important to recall that the good writing of a scientific paper requires the application of the Principle of Parsimony. Really, from introduction to conclusion it should permeate the paper. Reasons such as available space in the journal, clarity, simplicity (and if possible, elegance) in style, elimination of ad hoc hypotheses and interpretation are determining factors in writing. But, precisely these criteria offer the article a good structure enabling pleasant reading and the adequate transmission of research's findings.

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