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Editorial

Ethics in Scientific Publication
Plagiarism and other Scientific Misconduct

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"The true Doctor will be found to be a friend of temperance and a companion of truth."
Claudius Galen 130 - 210 AD[1]

As doctors, we need to be guided by our oath that we took upon graduation from medical school, and by the Hippocratic Oath.[2] Those of us practicing in Oman should also be guided by the "Oman Code of Medical Ethics",[3] and the International Code of Medical Ethics published by the World Medical Association in 1949.[4] All these, either directly refer to, or include the ethics of speaking and publishing the truth in medicine. Those of us involved in medical journal publishing unfortunately ostensibly observed *medical publication misconduct* far more often than we would wish.[5] Such occurrence is perpetuated by the concept of "publish or perish" that is rampant in many universities and particularly so in Western universities. Studies have shown that the incidence of plagiarism is higher among industrialized countries of Western Europe, North America, and Asia-Pacific compared to Arab countries and other emerging economies. This is according to Errami and Garner in their now famous study "A Tale of two Citations".[5-7]

An ethical manuscript is one which is free from any form of *plagiarism*, *duplicate publication*, *ghost authorship*, *copyright laws infringement*, *any form of bias* or *conflict of interest*, *fabrication* or *falsification*, and perhaps most importantly, an ethical manuscript should be *free of unethical research*.[8-11]

An ethical manuscript must be free from any forms of scientific misconduct mentioned above, but plagiarism is by far the commonest of these. *Plagiarism* is defined by the Office of Research Integrity (ORI) of the United States as being "theft or misappropriation of intellectual property and the substantial unattributed textual copying of another's work."[12] It is basically an unattributed, verbatim or nearly verbatim copying of sentences and paragraphs, which materially misleads the ordinary reader regarding the contribution of the author. Thus, the "cut and paste" done by students is plagiarism, unless it is in quotation marks and adequately referenced. Just including the source in the reference list without putting the original author's words in quotation marks is not good enough; it is still theft of words and ideas—theft of intellectual property.[12] The Committee on Publication Ethics (COPE) of the United Kingdom has defined plagiarism as "the unreferenced use of others' published and unpublished ideas…."[13] Dr. Berk, in an article featured in the American Journal of Roentgenology called plagiarism a "serious violation of collegial trust", "a deception and theft of intellectual property, it harms unattributed author's interest."[14] The World Association of Medical Editors goes further in defining plagiarism by adding that "The intent and effect of plagiarism is to mislead the reader as to the contributions of the plagiarizer. This applies whether the ideas or words are taken from abstracts, research grant applications, institutional review board applications, or unpublished or published manuscripts in any publication format (print or electronic)."[15] Thus, plagiarism is wrong in any form whether it is the whole manuscript, or just a paragraph or even a sentence, whether it is cyber-plagiarism or self-plagiarism. All these forms are wrong and unethical.

Medical editors should not accept plagiarism and should be vigilant in taking active steps to discourage it. COPE recommends that journals reprimand the authors, by not accepting the offending author's articles for 2-5 years, and by simultaneously informing their heads of department and the dean of the authors' medical schools.[16] Rather than taking this relatively more drastic step, many editors take the attitude of educating their authors by just rejecting the tainted manuscript and presenting to them the evidence that there is plagiarism in their submission. In fact, several plagiarism-detection computer programs such as *Turnitin*, which is used by the Sultan Qaboos University Medical Journal (SQUMJ) and currently many journals, can actually tell the author the exact percentage of the manuscript that is plagiarized from a specific reference. It is hoped that by showing the authors the evidence of their plagiarism, they will learn not to plagiarize in future submissions. Clearly, plagiarism is one of the "big three" crimes of research fraud as defined by the USA ORI – up there in partnership with "fabrication" and "falsification".[12] Basically, plagiarism is a combination of theft and lying. Even if some words are changed but copying of the structure of the sentence, if those words or ideas make up a large proportion of the author's work without giving credit to the source, constitutes plagiarism. This includes even self-plagiarism, i.e., republishing one's own previously published work without referencing it.

Medicine is a profession based on trust and integrity. The medical profession is a noble profession based on philanthropy and

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altruism. "A doctor must always maintain the highest standards of professional conduct and he or she must practice the profession uninfluenced by motives of profit. A doctor should certify or testify only to that which he has personally verified."[4]

Another type of publication misconduct is *ghost authorship*. This is when an individual has not written the manuscript at all, but his/her name is included in the list of authors. It happens commonly with clinical trials that are conducted by drug or equipment vendors who generally like to write the manuscripts themselves, so that it suits their purpose but invariably using the investigators' names. This is equally unethical and constitutes major scientific and publication misconduct. The above example is one type of ghost authorship but there are others, for example, when the name of the writer is omitted completely from the list of authors. SQUMJ insists on a declaration of contribution of all authors which must be signed by all participating authors—as do most reputable international journals. It is also wrong to include a name of any author who has not contributed to all the three components of authorship that are required by the World Association of Medical Editors. The three components required for authorship include: intellectual contribution to the study, a contribution to the writing, and a contribution to the final approval of the manuscript as written. For example, just to add the name of one's head of department is indeed unethical, unless the head of the department has contributed to all the above three aspects of the manuscript as required by the definition of authorship.[17] Credit and responsibility are inseparable. While it is unethical to include an author who has not intellectually contributed, it is equally unethical to leave out an author who has made a significant contribution to the manuscript.

Prospective authors ought to be conscious of the *copyright laws*. The publishers of a journal normally own the copyright to any manuscript they publish but the copyright of the raw data still belongs to the author. Even though the author has copyright to the raw data, to reproduce a figure from one's own manuscript needs written permission from the publisher, and to do so without permission breaks copyright laws. The language that the article is written in is irrelevant when it comes to copyright laws which will protect the article from being copied into any other language.

Somewhat related to plagiarism and the infringement of copyright laws is *duplicate publication*. Duplicate publication in any form is wrong. Whether it is "double submission" or a "republication" of a previous work but in a different language, still falls in the realm of duplicate publication. It is also unethical for authors to submit their manuscript to two publishers at the same time hoping that one publisher will accept it earlier, or that one of them will accept it while the other rejects it. This is absolutely wrong, but fortunately in publishing, such practice appears to be uncommon.

Conflict of interest and *bias* come next in line of ranking unethical publication habits. Many journals now insist that the author declares any conflict of interest, for example, with the manufacturer of the product under study. This is particularly important with clinical trials, and that is why all clinical trials must be registered either with International Registry of the World Health Organization or in the United States with the ClinicalTrials.gov or with the EU clinicaltrialRegister.eu. in Europe.[18] Financial interest of any sort must be duly declared. As long as it is declared, it does not nullify the validity of the manuscript as such. However, any conflict of interest or bias e.g., affiliation bias, or any other type of bias, is unethical if not declared.

There are many forms of unethical Research including *fabrication and falsification*. These are very serious forms of unethical science in publication but fortunately they are relatively uncommon. A relatively common category of scientific misconduct is *unethical research*. Here in the Middle East, unethical research is not uncommon as sometimes researchers are afraid to explain fully to the patient, the nature of their research with all the possible side effects and dangers that may be involved—from the effects of the drugs to radiation hazards. They are afraid that the patient/volunteer may refuse to participate if a full explanation is provided. Unfortunately, this is based on underestimating the intelligence of patients and of the subjects being asked to volunteer. When the patient is not told that it is research they are participating in—but left to believe it is a form of regular investigation or treatment—the ethical situation is even worse. Informed consent is an absolute necessity in research involving human subjects. The authors should clearly indicate that this has been obtained for any research involving human subjects. Also, the authors should indicate that they have obtained the permission of the institutional ethical research committee or the institutional research board for any human or animal experimentation or study. This includes permission for questionnaires, and any review of records of patients that are not the authors' patients.[19] It is generally accepted that it is adequate for the authors to indicate in the manuscript that permission from the institutional ethical research board has been obtained as well as informed consent. However, if the editor is not satisfied with any ethical aspect of the research, the responsibility rests on the editor to investigate further.

Other types of scientific misconduct include *unrealistic claims, over-interpreted data, authors' self-praise, over self-referencing and salami science*. Editors must investigate any suggestion that the author is deceptive or has plagiarized. Another type of scientific misconduct is the omission of relevant authors. This happens in cases of multidisciplinary research submitted by only a single or two authors while a relevant specialty is not represented in the authorship. Lastly, editors have to be very careful about *salami science*.[20] Editors can readily detect incomplete data or data that has clearly been split into two or more parts as in *salami slicing*—a way to publish more than one manuscript on the same study.[21] This is clearly necessary at times but it has to be declared and must be appropriate.

The various scientific misconducts from plagiarism to salami slicing which have been discussed above are rife in the world of publication; however, authors should always consciously strive to do the right thing. In a meta-analysis of multiple surveys of authors in the literature, D. Fanelli has concentrated on one type of scientific misconduct i.e., *fabrication and falsification*.[22] She found

a pooled weighted average of 1.97% of scientists who admitted to have fabricated, falsified or modified data of results at least once—a serious form of misconduct by any standard. She also found that up to 33.7% of the surveyed scientists admitted to other questionable research practices. In surveys asking about the behavior of colleagues, admission rates were 14.12% for falsification and much higher percentages for other questionable research practices. These are figures that should be painful for any of us in the medical profession to quote. It is thus the responsibility of the editorship to educate our authors and the upcoming medical professionals about the various forms of scientific misconduct. When necessary, editors should involve the appropriate authorities such as the Committee on Publication Ethics (COPE) who are always willing to help publishers and editors of peer review journals by discussing issues related to the integrity of the work submitted—both the scientific components and the authorship.

Editors are limited in what they can do, as it is ultimately the responsibility of the author to give credit to the originator of the work that is being quoted—be it published or unpublished data or just thoughts and ideas. Furthermore, the author has to be acutely aware of not committing any of the above-described types of scientific misconducts. Let us all collaborate in keeping the medical profession firmly established on its base of trust and integrity so that it retains its reputation of being a noble profession based on philanthropy and altruism—as well as retaining the trust that the public has placed on us as a profession.

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