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AUTHORSHIP CRITERIA FOR SCIENTIFIC ARTICLES

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Abstract

Nowadays, most scientific articles are written by more than one author, and usually, each has a different contribution to the article. Overall, when a scientific article is ready to be published, the contributions of the authors in terms of actual involvement may be extremely different. Therefore, not all authors have equal, or even equivalent contributions, and this should be emphasized in the article. The purpose of this article is to review the International Committee of Medical Journal Editors criteria for authorship and to present a few ethical breaches in this regard, namely gift authorship, honorary authorship, prestige authorship, authorship exchange, the white bull effect, ghost authorship, and ghost management.

Keywords: authorship criteria, ghost authorship, scientific misconduct.

Introduction

Nowadays, most scientific articles are written by more than one author, and usually, each has a different contribution to the article. Some are more involved in developing the scientific protocol, others develop the hypothesis, some are more involved in data gathering, obtaining financing, or writing the actual article. Overall, when a scientific article is ready to be published, the contributions of the authors in terms of actual involvement may be extremely different, from purely formal functions (like a department head to only oversaw the overall production), to deeply involved researchers, who may be involved significantly in all aspects of the research staying at the base of the article and the actual manuscript drafting. Therefore, not all authors have equal, or even equivalent contributions, and this should be emphasized in the article. This is usually done through two methods: acknowledging only the authors having significant contributions as authors (and recognizing the importance of the work of other authors through an acknowledgment section), and/or underlining the contribution of some authors by putting them in key positions of the author's list (Hostiuc & Curca, 2014).

ICMJE criteria for authorship

The International Committee of Medical Journal Editors (ICMJE) has tried to standardize what authorship means (at least for medical scientific article). According to the

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latest guidelines, there are four main authorship criteria, which have to be fulfilled by all the authors, namely: (1) they must have significant contributions to the conception or design of the work or the acquisition, analysis, interpretation of data; (2) they must be involved in drafting the work or revising it critically for important intellectual work, (3) they must give approval for the final version of the article, and (4) they must agree to be held accountable for all aspects of the work, especially regarding the integrity and accuracy of its content("ICMJE | Recommendations | Defining the Role of Authors and Contributors," n.d.). Additionally, each author must know the actual contributions of each of the other co-authors and have confidence in the integrity of the other co-authors("ICMJE | Recommendations | Defining the Role of Authors and Contributors," n.d.).

Even if these criteria seem straightforward, there are two main difficulties with their application in practice, namely: (1) ensuring the authors actually respect them, and (2) establishing exactly what constitutes a significant contribution.

Respecting ICMJE criteria is established through an authorship statement, which can be general, e.g. "All authors were involved in the research protocol, in writing or revising critically the manuscript, approved the final version and agree to be held accountable for its contents", or specific, e.g. "Author 1 was involved in drafting the research protocol, writing the article, approved the final version and agree to be held accountable for its scientific content; Author 2 was involved in obtaining data and financing for the study, critically revised the contents of the article, approved the final version and agree to be held accountable for its scientific content; Author 3 was involved in statistical analysis and database creation, critically revised the contents of the article, approved the final version and agree to be held accountable for its scientific content". Moreover, many journal request authorship forms, in which each authors' contribution is specifically stated, and each sign the form, agreeing to be held accountable for its content. All contributors not fulfilling all four criteria for authorship must be listed as contributors, usually in an acknowledgment section. To be mentioned that criteria 3 and 4 do not have attached significant work, rather being means of ensuring trust and accountability between authors, and between the authors on one side and the scientific community on the other. Therefore, the first two conditions are those which actually need to be associated with significant involvement from the researchers. For accountability reasons, most journals nowadays require personal data for each author of the article (mailing address, phone number, institution, department, email), unlike previously, when most journals required only detailed data about the corresponding author. This is important because the presence of this information does not mean that each author is a corresponding author, but rather that each author understands to be accountable for the content of the article, and implicitly, that any issues (scientific or ethical) related to the article is in their specific responsibility.

What exactly represents a significant contribution is very subjective, and is prone to cultural and organizational bias. For example, in some countries, the fact that the chief of a laboratory had an idea, and made minor spelling recommendations could be considered, by all the other researchers involved in drafting the manuscript, as a significant contribution, while in other regions/laboratories, it might merely be considered relevant for a note in the acknowledgment section.

This issue had lead various authors to recommend the implementation of more objective authorship criteria. For example, Ahmed et al recommended that the contribution of each author should be evaluated through a numeric scale. There are seven parameters: study concept, study design, study implementation, data analysis, and interpretation, drafting the manuscript, revising the manuscript, public responsibility. Each parameter should receive 0, 1, 3, or 5 points. Depending on the number of points accumulated by each author, they should be ordered in the list of authors. This method also allows cut-off values, under which an

author should only be considered a contributor, and should not be listed in the author's list (Ahmed, Maurana, Engle, Uddin, & Glaus, 1997).

The QUAD system requires the authors to specify their contribution, in percentages, to each of the four analyzed parameters, namely: study design/concept, data collection, analysis/conclusions of the study/drafting the article. Afterward, the authors are listed depending on the sum of percentages (Verhagen, Wallace, Collins, & Scott, 2003).

Ethical breaches associated with authorship

There have been numerous types of scientific misconduct cases generated by authorship issues that have been presented in the scientific literature, which can be classified in two main categories: including in the authors' list persons not satisfying authorship criteria and not including as authors researchers having a significant contribution to the study/article. In the first category, we can identify a few more frequent instances that will be detailed below.

Gift authorship is characterized b**y** adding to the list of authors of researchers not complying with ICMJE criteria (partially or at all). This is a very common issue in many parts of the world. For example, a study from mainland China found inappropriate authorship (of which gift authorship was the most prevalent issue) was among the two most often type of research misconduct (together with plagiarism, 27.7% of the responders stating it as a significant problem) (Liao et al., 2018). This is such a prevalent problem that some authors have debated whether a baby could be list as a co-author. A debate from Academia/Stack Exchange began with this post "*I know it sounds disturbing, but it's a way of mine to protest against co-authors that haven't made any contribution (they haven't even read it or are part of the research area) to a paper, but they are part of the research group. What are the legal/ethic concerns? So technically I was writing the paper with my baby in my hand and the baby was talking with me in its own language. The baby even wrote a few characters in the paper when it managed to get near the keyboard while I was holding it*."("Can I add a baby as a co-author of a scientific paper, to protest against co-authors who haven't made any contribution?," n.d.). Other researchers have added pets as co-authors; for example, Jack Hetherington added his cat to an article submitted to Physical Review Letters (Teschke, Roy, & Paniagua Taboada, 2018; Willard, n.d.), while Polly Matzinger has added his Afghan hound, Galadriel Mirkwood as the last author in a medical paper (Matzinger & Mirkwood, 1978).

Honorary authorship is a particular type of gift authorship, in which a professor or some other researcher found in a position of authority requires, explicitly or implicitly, to be added as an author (usually last or first), in papers written by its subordinates, even if its contribution does not comply with ICMJE guidelines. For example, Yoshihiro Sato published an article in Movement Disorders, which was later retracted (Palus, 2016), as all six co-authors being honorary authors, according to the retraction notice *"The retraction has been agreed due to an acknowledgment from the authors that the co-authors did not participate in study design, data collection, data analysis, interpretation of data and drafting the manuscript. Thus all co-authors are honorary*."(Sato, Iwamoto, Kanoko, & Satoh, 2006).

Paid authorship appears when some authors buy their authorship, their actual contribution to the scientific study being absent(Hvistendahl, 2013). This issue seems to be more prevalent in China, where you can buy not only an authorship but also data needed to publish a scientific paper; the main red flags for this practice are: a cover letter with significantly worse grammar compared to the actual manuscript, a low number of co-authors shared with other papers, few authored papers for the authors, few or no citations to previous papers by the same authors, a different scientific domain than the one in which the author/s usually publish, the same email address for multiple authors, or plagiarism(McCook, 2016).

Prestige authorship is not a gift for the author, but rather as a method for increasing the changes of a certain article to be published, which can happen if one of the authors has very high visibility or impact (Shamoo & Resnik, 2009). For example, in an article regarding the dangers of using gluten-free diets in birds (Marcus 2018), published in the Scientifica journal and retracted in 2016, the journal notice states that "A*t the request of the authors, the article has been retracted. The article was found to contain a substantial amount of material from published sources. The first author confirmed that all the experiments were carried out in Pakistan, and the affiliation to the National Veterinary School of Toulouse, France, was added by mistake. X and Y did not contribute to this research and should not be considered as coauthors of this article. They were added by Dr. Z and the journal in error, without their knowledge or permission. The journal apologizes for the mistake of not confirming their authorship (Umar et al. 2016).*

Authorship exchange is a type of research misconduct in each there is a reciprocal exchange of authorship between two or more authors, without a corresponding involvement in the scientific or writing process (Hostiuc & Curca, 2014).

The white bull effect is a form of authorship-related scientific misconduct in which senior researchers abuse their younger collaborators, by imposing themselves as authors (or even main authors), without having a significant contribution according to the ICMJE criteria (Kwok, 2005). According to Breen, the main reasons for it are increased expectations regarding the number of scientific articles to be published by senior researchers, personal ambitions/vanity, greed, financial benefits generated by the publication of scientific papers, psychiatric conditions, Messiah complex, the inability to distinguish the good from the bad (Breen, 2003).

The noninclusion of authors with significant contributions is of two main types: ghost authorship and ghost management.

Ghost authorship appears when the author of the manuscript and/or a researcher with significant involvement in the study was not listed as an author/contributor(Gøtzsche et al., 2007). There are two major types of ghost authorship, depending on the entity requesting the authorship: researchers (who conducted the study but are unable to write a high-level scientific paper (Wager, 2007)) or third parties (usually from the Pharma industry) that hire ghostwriters, not listed as authors/contributors (often medical statisticians) (Gøtzsche et al., 2007). An example in this regard can be seen in the Iranian Journal of Allergy, Asthma and Immunology, which retracted an article from 2006, after the sole author of a manuscript, accused of plagiarism, admitted that a student actually wrote the article, and she was unaware of the issue (Gasparyan et al., 2013). Sometimes, an author willingly removed him/herself from the list of authors, even if she/he has a significant contribution, due to personal reasons. For example, a researcher excluded himself from a study showing a decreased efficacy of a certain procedure, as being listed would have decreased his chances to obtain private research financing (Durso, 1997).

Ghost management appears when the article and the underlying research are completely unlinked. For example, we can talk about ghost management when a pharmaceutical company designs a study, the article is written by ghostwriters, and the authors' list contains high visibility researchers, which were not involved in either study design or manuscript writing. A famous example in this regard is the "Advantage" study, in which Merck tried to promote Vioxx. The study was published in the Annals of Internal Medicine while omitting the fact that some participants have died. In the subsequent debated surrounding misconduct allegations, one of the authors listed in the article declared that "*Merck designed the trial, paid for the trial, ran the trial…Merck came to me after the study was completed and said, 'We want your help to work on the paper.' The initial paper was written at Merck, and then it was sent to me for editing*"(Berenson, 2005).

Conclusion

This paper has tried to summarize the main types of research misconduct associated with authorship. Their importance resides in their potential to skew academia promotions, but also access to scientific financing.

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