Special Article

Authorship criteria for scientific papers: a polemic and delicate subject

Critérios de autoria em trabalhos científicos: um assunto polêmico e delicado

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Abstract

Aspects related to the authorship of scientific publications, inherent responsibilities, unethical practices and criteria for definition are discussed in this article. Moreover, the article presents a reflection on the role of editors of scientific journals in respect to improper authorship, reinforcing the importance of the issue and suggesting ethical criteria for its determination.

Descriptors: **Authorship. Journal Article [Publication Type]. Periodicals. Scientific communication. Scientific production.**

Resumo

Este artigo discute aspectos relacionados à autoria em publicações científicas, responsabilidades inerentes, práticas não éticas e critérios para sua definição. Além disso, o artigo leva a uma reflexão do papel dos editores de revistas científicas na coibição de desvios de autoria, enfatizando a importância do assunto e divulgando critérios éticos para sua determinação.

Descritores: **Autoria. Artigo de Revista [Tipo de Publicação]. Publicações periódicas. Comunicação científica. Produção científica.**

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INTRODUCTION

The main benefit obtained from the publication of research results – and without doubt, the most honorable and commendable – is the progress of science. This is developed little-by-little and each step is based on and stimulated by the research of other scientists.

The advantages to the author are the recognition of intellectual endeavors, the establishment and solidification of the author's reputation as a researcher achieved through public endorsement, the guarantee of the continuity of projects, prestige and improvement of the academic career [l].

Moreover, scientific production is used as a parameter for the concession of financial resources issued by research development agencies, as an instrument of evaluation of graduation and post-graduation courses and as a criterion for the selection of teaching staff and members of research groups by many institutions.

The policy known as "publish or perish", in which major scientific productivity is translated as a mark of academic success, has created some deviations and irregularities [2,3]. However, the assessment of scientific production is a difficult and controversial process that goes beyond the number of publications and their impact [4].

A direct consequence of the over-valorization of publications is the increase of the average number of authors per article published in scientific medical journals [5,6]. Thus, with this increase, the credits and responsibilities have been diluted and become obscure.

It is clear that the multidisciplinary character and increase in the complexity of research, as well as the increased specialization, inevitably demands partnerships, in which researchers join with others to bring together their talents and abilities, without which the development of a project is frequently impossible [7-11].

Particularly in multicenter studies, the number of authors is frightening, occasionally, more than one hundred [12].

Hence the reason for this article, which intends to discuss aspects related to authorship of scientific publications, inherent responsibilities, unethical practices and criteria for their definition.

Deviations and unethical practices in the establishment of the authorship of scientific publications

The main explanation for the increase in the number of authors and the unwarranted inclusion of co-authors, as has been pointed out in several publications, is dishonest [1,5,13-16]. The principal incorrect inclusion of authors and co-authors are described as:

- Guest authors - people who have their names included as authors or co-authors in a work in which they did not participate. The reasons for this practice are very varied and include pleasing superiors; increasing the possibilities of the work being published by the inclusion of more prestigious names or those with greater scientific recognition and exchanging favors [5]. This is also a strategy used to increase the scientific production through the existence of "reciprocal agreements" among researchers who include the names of each other in their works. This type of authorship has been reported in between 17% and 33% of all published articles [1,5,13,16].
- Enforced authorship or co-authorship – This occurs when the leader of a group requires the inclusion of his/her name in all works performed by the members of the team, even those in which he/she did not read the final version. Sometimes, this attitude is considered a "departmental tradition", which is already too deeply rooted and is naturally transmitted, without the necessity of any explicit pressure [1,10].
- Ghost authorship or co-authorship – the non-inclusion of people who participated in important stages of the study. Frequently, students and other professionals, such as statisticians, even though they significantly contributed to the research, are not included. The reasons for this type of practice are also diverse and, generally, the most dishonest. For example, an employee of a company writes a review article with the aim of promoting a product. Respected researchers are invited to assume the responsibility of the authorship of the manuscript and submit it for publication, in exchange for payment without revealing any type of conflict of interest [1,7,17]. Other reasons for ghost authorship are disagreements and disputes for positions among researchers. There are also cases in which an author does not want his name connected to an article because the results of the study are not favorable to the industries with which the researcher has a good relationship as this may harm future financing. An investigation showed that 11% of published articles in six peer-reviewed journals involved ghost authorship [16].

This apparently inoffensive practice has significant implications. People are prejudiced in disputes for academic promotion and injustices are committed in the consideration of financing [15,18]. Moreover, this is against one of the basic principles of science that is transparency, putting all the credibility of research into question. According to Huth [13], irresponsibility in authorship rarely interferes with the scientific efficiency or reduces its sources, but, it corrodes the ethics and honesty.

Authorship responsibilities

Frequently, the advantage received by being included in a publication can put the image and credibility of the researcher who accepts this at risk [8]. A classic example occurred in the 1980s when a researcher from Harvard University, John Darsee, published nine articles based on invented data [19]. In

one of the articles, the author(s) described a family with a high incidence of a rare disease. A more accurate analysis revealed that a 17-year-old had four sons; the first one was born when he was between nine and ten years old. The co-author of this work – a respected researcher – affirms that he did not participate in the elaboration of the article, neither was he consulted about the inclusion of his name as co-author [8]. This is only one report among many others which have been published. When someone receives credit for a work of which he did not participate, it may not always be a good thing.

According to WOOLEY [20], when you write your name on a work, you are eternally tied to it. The authorship of a work establishes a direct link to its accountability, which means certification of its integrity and the ability to defend it publicly. MONTENEGRO and ALVES [21] affirm that it is necessary to understand that the inclusion as co-author of an article presupposes significant involvement in its development, knowledge of its contents and participation in its writing. In other words, the co-author is co-responsible for the work and must answer for it".

As, in most cases, the compensation of irregular authorship are greater than any possible disadvantages, this guarantees the continuity of the process and there is a perpetuation of the digressions and abuses committed.

Additionally, legal responsibilities are linked to authorship. Although the culture of patents is not normally considered in Brazil, it is a matter that authors should have in mind when they include others who did not participate in the studies, in particular, because the criteria defining authorship, intellectual propriety and patent laws are based on the same principles: substantial contribution in the conception and design of an invention [22].

Is it possible that the real authors will be inclined to share any possible royalties obtained through patents from publications with all the co-authors, even with those who were "invited"?

An interesting investigation was performed comparing the number of authors of scientific articles and the patents of the corresponding inventions. Forty pairs of patent-articles were analyzed, in which the average number of authors was 10, while the average number of inventors was three [22]. The data from this study seem to answer our questions, as probably only the inventors were the real authors of the articles, although not all authors are obligatorily inventors.

However, let it be a warning that the authorship or co-authorship of a published work constitutes convincing evidence of co-invention in a judicial disagreement [22].

Authorship criteria

Authorship criteria have been the object of heated debates. The International Committee of Medical Journals Editors (ICMJE) has discussed the theme since its first meetings when they were known as Vancouver Group.

Some authors, considering that authorship has legal and scientific implications, propose that only those who significantly participated in the conception of the study should be classified as authors in publications and the others should receive specific recognition and be called collaborators [22]. Other authors such as RENNIE et al. [23] also recommended the adoption of the term "collaborators", and the contribution of each one should be clearly specified. Hence the order in which the collaborators appeared would not be important as the readers would know exactly what the participation of each one was and this would improve the integrity of the publication. In its most recent edition, published in 2003, the document "Uniform requirements for manuscripts submitted to biomedical journals: writing and editing for biomedical journals" encourages editors to adopt contribution policies, as well as a description of the participation of each author in the study [24]. Moreover, they recommend a 'guarantor policy', where the individual, who is responsible for the integrity of the work as a whole, is identified [25].

As criteria of definition of authorship, the ICMJE recommends that the credit must be given based on the fulfillment of three conditions:

1. Substantial contribution in the conception and planning, or acquisition of data, or analysis and interpretation of data;
2. The writing and elaboration of the article or its critical intellectual review;
3. Approval of the final version to be published

The ICMJE also recommends that in multicenter studies, with a large number of participants, the group must identify the people that accept the direct accountability for the manuscript

Additionally, the document revised by the ICMJE ratifies that:

- The attainment of financial support, data collection or general supervision of a group of research is not, in itself, criteria to authorship or co-authorship.
- All people designated as authors or co-authors should be qualified and all those qualified should be listed.
- Each author or co-author should have participated in the work sufficiently to have public accountability about specific segments.
- The order of the authors and co-authors should be decided by the group that must be able to explain it decision.

In relation to the acknowledgements section, the ICMJE suggests:

- Other people who have substantially and directly contributed to the work, but who can not be

considered authors, should be mentioned in the acknowledgements section: and if possible their specific contributions should be described. Financial support should be mentioned in this section too.

- People that collaborated with the study, but whose contribution does not justify authorship or co-authorship, can be listed in the acknowledgements as "clinical investigators" or "participant investigators", followed by their functions or contributions, for example, "collection of data", referral or treatment the patients of the study", etc.
- Remembering that the readers can deduce that the people listed in the acknowledgements section endorsed the results and conclusions, all must give written permission to be included.

Other criteria have been discussed; PETROIANU [26] proposed a distinct points system for each task achieved during the development of a work, as an alternative to eliminate the implicit subjectivity in the definition of authorship and co-authorship.

Among the topics that would receive points, he suggested: idealization of the work and elaboration of the hypothesis, structure of the work methodology, writing of the manuscript, literature review, data collection, attainment of financial support, director of center where the work was performed, referral of patients or donation of material for the study, statistic analysis of the results, preparation of presentation of the work for scientific events, etc.

According to the suggested system, collaborators would have the right to authorship, when, after summing the points for each of the tasks performed, they obtained a predetermined minimum number of points. Thus, the sequence of authors would be determined using the number of points obtained. These elements would permit that the arrangement of authors and co-authors is established and would identify the people who should be mentioned in the acknowledgements section.

Role of editors and authors

Standardization, as the proposal of the ICMJE [24], must be encouraged as must be its adoption, as frequently, digressions in authorship are committed by a lack of understanding on the part of researchers, particularly the less experienced. This has been a constant concern as can be seen from an investigation of PubMed using 'authorship' and 'journal article" as key words. We found 1315 articles, some of them from the 1960s that have already considered this problem [27,28].

With the aim of evaluating the criteria of authorship utilized and to determine if the proposals by the ICMJE were known and applied, HOEN et al. [29] distributed a questionnaire to the authors of original articles published in the *Nederlands Tijdschrift voor Geneeskunde* (Dutch Journal of Medicine), over one year. As a result of this research, based on 352 questionnaires answered, the authors verified that the majority of the authors (59.8%) were unaware of the ICMJE criteria, which were adopted by the journal. Approximately 36% of the people listed as authors did not fulfill the authorship criteria.

Thus as the authorship criteria of the ICMJE are not sufficiently known, what should the role of the scientific editors and authors be? To improve knowledge of the criteria of authorship within the scientific community as a way of minimizing the digressions committed. How? This can be achieved by effectively adopting the rules of ICMJE, and by explaining the authorship criteria in the instructions for authors and discussing the theme in editorials and articles, etc. Additionally, "editors can require that authors justify their inclusion in the authorship of the work" [21].

In an attempt to investigate how this subject is dealt with, we performed a preliminary study of the instructions for authors of 40 journals that compose the health section of SciELO (www.scielo.br). We verified that the rules of ICMJE are only adopted by 20 (50%) of the journals (Table 1). Seven (17.5%) journals adopt a policy of a restricted number of authors permitted per article, as a way of controlling the abuses and seven (17.5%) explain in the guidelines the criteria defining authorship. Only four (10%) of the journals adopt the practice of demanding approval of the people whose names are listed in the acknowledgements section and five (12.5%) require a declaration of conflict of interest.

Similar to editors, the authors of scientific articles and medical societies [23] have an important role in the organization, by getting to know and employing the authorship criteria, as well as, maintaining the ethics in scientific research and publications.

In conclusion, there are several irregularities in the establishment of authorship of scientific articles, with the most important being the participation of the editors of scientific journals, the medical societies, the universities and other teaching and research institutions in the divulgation of the criteria and to make people aware of their importance.

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Table 1. Journals in the Health section on SciELO in May 2004.

JOURNAL	Adoption of ICMJE norms*	Limit to number of authors	Authorship description**	Approval of acknowledgements***	Conflict of interest
Acta Cirúrgica Brasileira	YES	NO	NO	NO	NO
Acta Ortopédica Brasileira	YES	NO	NO	YES	NO
Anais Brasileiros de Dermatologia	YES	NO	NO	NO	NO
Anais da Academia Brasileira de Ciências	NO	NO	NO	NO	NO
Arquivos Brasileiros de Cardiologia	YES	NO	YES	NO	NO
Arquivos Brasileiros de Endocrinologia & Metabologia	YES	NO	YES	NO	YES
Arquivos Brasileiros de Oftalmologia	YES	NO	NO	NO	NO
Arquivos de Gastroenterologia	YES	YES	NO	NO	NO
Arquivos de Neuro-Psiquiatria	YES	NO	NO	NO	NO
Brazilian Dental Journal	NO	YES	NO	NO	NO
Brazilian Journal of Infectious Diseases	NO	NO	NO	NO	NO
Brazilian Journal of Medical and Biological Research	YES	NO	YES	YES	NO
Cadernos de Saúde Pública	NO	NO	NO	NO	NO
Ciência & Saúde Coletiva	NO	NO	NO	NO	NO
História, Ciências, Saúde-Manguinhos	NO	NO	NO	NO	NO
International Brazilian Journal Urology	YES	YES	NO	NO	YES
Jornal Brasileiro de Patologia e Medicina Laboratorial	NO	NO	NO	NO	NO
Jornal de Pediatria	YES	NO	YES	YES	NO
Jornal de Pneumologia (atual Jornal Brasileiro de Pneumologia)	NO	NO	NO	NO	NO
Journal of Venomous Animals and Toxins including Tropical Diseases	NO	NO	NO	NO	NO
Journal of Venomous Animals and Toxins	NO	NO	NO	NO	NO
Memórias do Instituto Oswaldo Cruz	YES	NO	NO	NO	NO
Pesquisa Odontológica Brasileira	NO	NO	NO	NO	NO
Radiologia Brasileira	YES	NO	NO	NO	NO
Revista Brasileira de Anestesiologia	NO	NO	NO	NO	NO
Revista Brasileira de Cirurgia Cardiovascular	YES	YES	NO	NO	YES
Revista Brasileira de Ginecologia e Obstetrícia	YES	YES	YES	NO	YES
Revista Brasileira de Medicina do Esporte	YES	NO	NO	NO	YES
Revista Brasileira de Otorrinolaringologia	NO	NO	NO	NO	NO
Revista Brasileira de Psiquiatria	YES	NO	NO	NO	NO
Revista Brasileira de Saúde Materno Infantil	NO	NO	NO	NO	NO
Revista Latino-Americana de Enfermagem	YES	YES	YES	NO	NO
Revista da Associação Médica Brasileira	NO	NO	NO	NO	NO
Revista da Sociedade Brasileira de Medicina Tropical	NO	NO	NO	NO	NO
Revista de Nutrição	NO	NO	NO	NO	NO
Revista de Odontologia da Universidade de São Paulo	NO	NO	NO	NO	NO
Revista de Saúde Pública	YES	YES	YES	YES	NO
Revista do Hospital das Clínicas	NO	NO	NO	NO	NO
Revista do Instituto de Medicina Tropical de São Paulo	NO	NO	NO	NO	NO
São Paulo Medical Journal	YES	NO	NO	NO	NO

*Adoption of the ICMJE norms – when the journal considers the norms as a whole and not just as a model for the references; ** Description of authorship – considered if in the instructions for authors there is a definition of criteria of authorship; *** Approval of acknowledgements – when the journal requests that the people listed in the acknowledgements section gave their written authorization for this, as the Vancouver Group suggested in their last edition.

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