Authorship in Medical Research: What Should Authors Know?

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Abstract

Authorship means both credit and responsibility. Authorship has several related terms that confuse researchers, especially the most junior ones. This narrative review summarizes the definition and criteria of authorship as well as types, number, order, and responsibilities of authors in the medical research. Most of the medical journals endorse the Uniform Requirements for Manuscripts Submitted to Biomedical Journals. However, there is a disagreement about the criteria of authorship. Acknowledgments should include the names whose contributions did not qualify them for authorship. Some forms of authorship are considered acceptable, for example, group author, deceased or incapacitated authors, and co-contributors (e.g., co-first author). While, forms of inappropriate authorship include, among others, honorary author, gift author, ghost author, and guest author. Remedies for authorship misconduct are mentioned in the review.

1. Introduction

Authorship is rewarding and it builds a good academic career for creative and motivated researcher1,2. An author or coauthor is a person who has contributed sufficiently to the scientific contents of a paper to be listed on the byline of the publication. Authorship means both credit and responsibility3. Problems with authorship are common and can threaten the integrity of the research4. Editors are responsible for ensuring accurate reporting and disclosures of authorship. Authorship standards should be clearly stated in the journal guidelines. At present, several guidelines had been formulated to simplify the complex decision of authorship in a scientific publication.

2. Criteria of Authorship

There is a disagreement about the criteria of authorship; these criteria are narrow in medical research. Most of the medical journals endorse the Uniform Requirements for Manuscripts Submitted to Biomedical Journals. According to these requirements, the author must have (1) substantial contributions to conception, design of research, acquisition, analysis, or interpretation of data; (2) contributed to drafting or revising the manuscript critically for its intellectual content; (3) approved the version to be published, and (4) he/she must be accountable for all aspects of the study ensuring its accuracy or integrity5,6.

3. Number of Authors

Shared or multiple authorship either of the same or different specialties, rather than sole authorship, is common in biomedical research without upper limit to the number of authors. In large multicenter studies, authorship is often used as a reward for recruiting patients7. Over the past decades, the average number of authors in research had dramatically increased complicating the authorship process8,12.

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4. Order of Authors

This is a collective decision of the research team, and any disagreements should be resolved before submitting the article to a journal. The first author, corresponding author, and last author should be named in the study proposal signed by all contributors. Rules varied between different fields of research. In biomedical research, the principal investigator or supervisor is the last author, and the order is based on the authors’ contribution to the study. Alphabetical order of authorship is rarely applied in medical research.12,13

5. Changes to the Author Byline

Any changes in the authors’ list (deletions, additions, change of order, or contributions) after the submission of a manuscript should be accepted only after submitting a written document approved and signed by all authors, including author(s) being changed, along with reasoning for this change. The editor has the right to contact any of the authors/contributors to ascertain whether they have approved these changes or not. The change in the authorship or the name of an author after publication is usually amended as a post-publication notice.

6. Author Responsibilities

Originality of research is crucial as many journals have limited space and give a priority to original innovative research. Authors must state that the manuscript is original and neither published nor considered for publication elsewhere. All communications with editors and replies to reviewers should be confidential. Authors should disclose actual contributions of each of them, financial support, conflicts of interest, as well as the official approval of study institutions and regulatory agencies of any devices or drugs used. Authors must sign a licensing agreement to the journal publishing the research.12

7. Acknowledgments

Acknowledgments should include the names whose contributions did not qualify them for authorship, for example, general supervision of the research, providing advice, writing assistance, acquisition of funding, data analysis, doing the technical laboratory work, or providing patients/reagents/animals.15-17

8. Types of Authors

There is no standard classification for types of authors. There are several overlapping types; they are summarized in Table 1.

9. Remedies for Authorship Misconduct

Remedies should be taken for inappropriate authorship in research. The non-judicial remedy is to contact the...
Table 1. (Continued)

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<thead>
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<th>Type of author</th>
<th>Description</th>
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<tbody>
<tr>
<td>Middle (contributing) author(s)</td>
<td>Any author other than the first and the last. The order of middle authors reflects their relative contributions to the study</td>
</tr>
<tr>
<td>Student author</td>
<td>There is an increasing trend to involve medical students in research and authorship</td>
</tr>
<tr>
<td>Single author</td>
<td>A single researcher is the sole author</td>
</tr>
<tr>
<td>Acceptable</td>
<td>A group of researchers has collaborated on multicenter research or an expert panel. It can be impossible to list all authors due to limited</td>
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<tr>
<td></td>
<td>byline. This promotes interchange of knowledge and continuous learning from the group and gives credibility to the research</td>
</tr>
<tr>
<td>Deceased or incapacitated authors</td>
<td>Authors should obtain disclosure and copyright from a familial or legal proxy of their coauthor who has died or is incapacitated during the writing, submission, or peer-review process</td>
</tr>
<tr>
<td>Co-contributors</td>
<td>Co-first author, joint-first authors, joint-corresponding author, and joint-last author are not uncommon nowadays. Written as</td>
</tr>
<tr>
<td></td>
<td>equal contribution footnotes on a manuscript. Usually, the peer-review system accommodates only one corresponding author</td>
</tr>
<tr>
<td>Inappropriate</td>
<td>Authorship is granted to those who played no significant role in the research, due to a variety of reasons</td>
</tr>
<tr>
<td>Honorary author</td>
<td>Authorship offered to another author (honorary or not) due to reasons beyond the research itself, as promotion or personal</td>
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<td></td>
<td>relationships. Including the head of department is a common example</td>
</tr>
<tr>
<td>Gift (Courtesy) author</td>
<td>A researcher meeting the authorship criteria but not included as an author, for example, statistician, medical, or technical writer. This is</td>
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<td>common in partnership between industry and research institutes. It is used to hide researchers with conflicts of interest from editors</td>
</tr>
<tr>
<td>Ghost author (medical or technical writer)</td>
<td>Included to increase the probability of manuscript acceptance. A common example is rolled author in which the honor is</td>
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<td>granted based on previous publications and collaborations in a research group.</td>
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<tr>
<td>Guest author</td>
<td>A non-author who buys authorship from true authors just to pay costs of research or publication</td>
</tr>
<tr>
<td>Authorship for Sale</td>
<td>Some editors publish anonymous manuscripts if adding the author's name may threaten his work or personal safety</td>
</tr>
<tr>
<td>Anonymous Author</td>
<td>Used of force or threat to be added as a coauthor without intellectual input in the research, usually done by head of department,</td>
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<td></td>
<td>supervisors, or seniors. It is demanded not voluntarily awarded</td>
</tr>
<tr>
<td>Mutual support author</td>
<td>Agreement by researchers to award each other's name in publication to achieve higher points and increase the productivity of each other</td>
</tr>
<tr>
<td>Duplication author</td>
<td>Publishing the same research in more than one journal with different titles and writing style to achieve more publications</td>
</tr>
<tr>
<td>Forged (unaware) author</td>
<td>Authors not involved in the research who are awarded authorship without their knowledge or consent to increase the chances of</td>
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<td></td>
<td>acceptance in reputed journals</td>
</tr>
<tr>
<td>Orphan (denied) author</td>
<td>Author contributed to work, but unfairly excluded from both the authors' list and acknowledgment by other authors</td>
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journal editor explaining the violation of the journal policy. Editors have the right to retract/withdraw the paper after publication. Furthermore, they can notify the institution of the researchers to take legal actions or penalties, as appropriate. In extreme cases of misconduct, the local court of law can be approached for judicial remedies, justice, and even compensation. Copyright as a legal tool can benefit researchers and authors.\textsuperscript{42,43}

In contrast to research misconduct that includes fabrication, falsification, and plagiarism (including self-plagiarism), the term of scientific misbehavior was defined as irresponsible, questionable, or problematic behavior. Scientific misbehavior includes honest error or differences in opinion, deviation from ethical norms, inappropriate citation, carelessness to get a license or permission for using a copyright-protected study tool, hiding conflict of interests, misleading analysis, selective reporting, and fragmented publication of the research findings.\textsuperscript{43-45} This misbehavior can be prevented by training of potential researchers on the sound behavior with rigorous mentoring of their performance.

10. Conclusion
We recommend that only one corresponding author and one first author should be named in an article. However, more contribution details (e.g., equal contribution) should be included in the acknowledgment or contributors’ statements at the end of the paper. The sequence of authors should be defined based on their relative contributions to the manuscript before initial submission by to the journal. Potential authors should be aware about the new policies and guidelines of journals. Journal editors in collaboration with research institutions should have a clear policy of authorship with laws of punishment in case of authorship misconduct, abuse, and malpractice. Authorship issues should be included in research methodology curriculum of all researchers and considered as a prerequisite for graduation of junior researchers. Obligation should be made for reporting and preventing authorship misconduct with appropriate remedies and legal actions.

11. Ethics approval and consent to participate
Not applicable.

12. Consent for publication
Not applicable.

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18. References
Authorship in Medical Research

40. Li Z, Sun YM, Wu FX, Yang LQ, Lu ZJ, Yu WF. Equal contributions and credit: An emerging trend in the characterization of authorship in major anaesthesia