

# 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.

**Keywords:** Authorship, Types, Acknowledgment, Contributors

## 1. Introduction

Authorship is rewarding and it builds a good academic career for creative and motivated researcher<sup>1,2</sup>. 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 responsibility<sup>3</sup>. Problems with authorship are common and can threaten the integrity of the research<sup>4</sup>. 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 integrity<sup>5,6</sup>.

## 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 patients<sup>7</sup>. Over the past decades, the average number of authors in research had dramatically increased complicating the authorship process<sup>8-12</sup>.

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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<sup>12,13</sup>.

## 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<sup>14</sup>. 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<sup>12</sup>.

## 7. Acknowledgments

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## 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. Types and description of authorships<sup>3,6,12-14,16-41</sup>.**

Type of author	Description
Appropriate	
First (presenting, lead, principal, main) author	Researcher who conducted the bulk of the research work, provided intellectual input, and monitored the entire research process
Corresponding (submitting) author	Can be any one of the authors independent of their order, not necessarily the first or the senior. He is responsible for manuscript correction, proofreading, submission, replying to editors and reviewers' comments, resubmission of revised manuscripts, and replying to any queries of the publisher. He is accountable for the manuscript on behalf of all other authors and is responsible for all aspects at all stages of research dissemination before and after publication. He should be familiar with different editorial management systems and journal communication skills
Last author	At present, he is the most senior author who supervised and coordinated the whole research process and revised the manuscript before submission
Coauthor	Any author other than the first

(Contd...)

**Table 1. (Continued)**

Type of author	Description
Middle (contributing) author(s)	Any author other than the first and the last. The order of middle authors reflects their relative contributions to the study
Student author	There is an increasing trend to involve medical students in research and authorship
Single author	A single researcher is the sole author
Acceptable	
Group author/ collaborative author	A group of researchers has collaborated on multicenter research or an expert panel. It can be impossible to list all authors due to limited byline. This promotes interchange of knowledge and continuous learning from the group and gives credibility to the research
Deceased or incapacitated authors	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
Co-contributors	Co-first author, joint-first authors, joint-corresponding author, and joint-last author are not uncommon nowadays. Written as equal contribution footnotes on a manuscript. Usually, the peer-review system accommodates only one corresponding author
Inappropriate	
Honorary author	Authorship is granted to those who played no significant role in the research, due to a variety of reasons
Gift (Courtesy) author	Authorship offered to another author (honorary or not) due to reasons beyond the research itself, as promotion or personal relationships. Including the head of department is a common example
Ghost author (medical or technical writer)	A researcher meeting the authorship criteria but not included as an author, for example, statistician, medical, or technical writer. This is common in partnership between industry and research institutes. It is used to hide researchers with conflicts of interest from editors
Guest author	Included to increase the probability of manuscript acceptance. A common example is rolled author in which the honor is granted based on previous publications and collaborations in a research group.
Authorship for Sale	A non-author who buys authorship from true authors just to pay costs of research or publication
Anonymous Author	Some editors publish anonymous manuscripts if adding the author's name may threaten his work or personal safety
Coercive (forced, pressured) author	Use of force or threat to be added as a coauthor without intellectual input in the research, usually done by head of department, supervisors, or seniors. It is demanded not voluntarily awarded
Mutual support author	Agreement by researchers to award each other's name in publication to achieve higher points and increase the productivity of each other
Duplication author	Publishing the same research in more than one journal with different titles and writing style to achieve more publications
Forged (unaware) author	Authors not involved in the research who are awarded authorship without their knowledge or consent to increase the chances of acceptance in reputed journals
Orphan (denied) author	Author contributed to work, but unfairly excluded from both the authors' list and acknowledgment by other authors

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<sup>42,43</sup>.

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, deviance 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<sup>43-45</sup>. 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.

## 13. Availability of data and materials

Not applicable.

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## 18. References

1. Zarghami M. Authorship and contributorship. *Iran J Psychiatry Behav Sci* 2011;5:1-4.
2. Bennett DM, Taylor DM. Unethical practices in authorship of scientific papers. *Emerg Med (Fremantle)* 2003;15:263-70.
3. Sharma H, Verma S. Authorship in biomedical research: A sweet fruit of inspiration or a bitter fruit of trade. *Trop Parasitol* 2018;8:62-9.
4. Marušić A, Marušić '1 M, Bošnjak L, Jerončić A, Jerončić '1 J. Systematic review of research on the meaning, ethics and practices of authorship across scholarly disciplines. *PLoS One* 2011;6:e23477.
5. Noble M. The ethics of authorship: Policies for authorship of articles submitted to scientific journals. *Science* 2001. Available from: <https://www.science.org/content/article/ethics-authorship-policies-authorship-articles-submitted-scientific-journals>. [Last accessed on 2022 Feb 11].
6. ICMJE (International Committee of Medical Journal Editors). ICMJE | Recommendations | Defining the Role of Authors and Contributors. Available from: <http://>

- www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html. [Last accessed on 2022 Feb 11].
- Tilak G, Prasad V, Jena AB. Authorship inflation in medical publications. *Inquiry* 2015;52:0046958015598311.
  - Tarkang EE, Kweku M, Zotor FB. Publication practices and responsible authorship: A review article. *J Public Health Afr* 2017;8:723.
  - Pintér A. Changing trends in authorship patterns in the JPS: Publish or perish. *Pediatr Surg* 2013;48:412-7.
  - McDonald RJ, Neff KL, Rethlefsen ML, Kallmes DF. Effects of author contribution disclosures and numeric limitations on authorship trends. *Mayo Clin Proc* 2010;85:920-7.
  - Dang W, McInnes MD, Kielar AZ, Hong J. Comprehensive analysis of authorship in radiology journals. *PLoS One* 2015;10:e0139005. Available from: <https://pubmed.ncbi.nlm.nih.gov/26407072/>. [Last accessed on 2022 Feb 12].
  - Ali MJ. No room for ambiguity: The concepts of appropriate and inappropriate authorship in scientific publications. *Indian J Ophthalmol* 2021;69:36-41.
  - Avula J, Avula H. Authors, authorship order, the moving finger writes. *Indian Soc Periodontol* 2015;19:258.
  - CSE (Council of Science Editors). CSE Recommendations for Group-Author Articles in Scientific Journals and Bibliometric Databases – Council of Science Editors; 2006. Available from: <https://www.councilscienceeditors.org/resource-library/editorial-policies/cse-policies/approved-by-the-cse-board-of-directors/cse-recommendations-for-group-author-articles-in-scientific-journals-and-bibliometric-databases/>. [Last accessed on 2022 Feb 12].
  - Rennie D, Yank V, Emanuel L. When Authorship Fails: A Proposal to Make Contributors Accountable. *JAMA* 1997;278:579-85.
  - Strange K. Authorship: Why not just toss a coin? *Am J Physiol Cell Physiol* 2008;295:C567-75.
  - Courvoisier T, Hess CW, Brückner C, Kaiser T, Mauron A, Wahli W, *et al.* Authorship in scientific publications: Analysis and recommendations. *Swiss Med Wkly* 2015;145:w14108.
  - Nylen M, Andersen D, Dahlquist G, Sarvas M, Aakvaag A. Handling of scientific dishonesty in the Nordic countries. *Lancet* 1999;354:57-61.
  - Götzsche PC, Hróbjartsson A, Johansen HK, Haahr MT, Altman DG, Chan AW. Ghost authorship in industry-initiated randomised trials. *PLOS Med* 2007;4:e19.
  - Harvey L. Gift, honorary or guest authorship. *Spinal Cord* 2018;56:91.
  - American Medical Association. AMA Manual of Style. Guide for Authors and Editors. 11<sup>th</sup> ed. Available from: <https://www.amamanualofstyle.com/>. [Last accessed on 2022 Feb 12].
  - Mohta A. Authorship issues continued.... *Indian J Plast Surg* 2010;43:232-3.
  - Juyal D, Thawani V, Thaledi S, Prakash A. The fruits of authorship. *Educ Heal* 2014;27:217.
  - Claxton LD. Scientific authorship. Part 2. History, recurring issues, practices, and guidelines. *Mutat Res* 2005;589:31-45.
  - Feeser VR, Simon JR. The ethical assignment of authorship in scientific publications: Issues and guidelines. *Acad Emerg Med* 2008;15:963-9.
  - Bavdekar SB. Authorship issues. *Lung India* 2012;29:76-80.
  - Wislar JS, Flanagan A, Fontanarosa PB, DeAngelis CD. Honorary and ghost authorship in high impact biomedical journals: A cross sectional survey. *BMJ* 2011;343:d6128.
  - Kornhaber RA, McLean LM, Baber RJ. Ongoing ethical issues concerning authorship in biomedical journals: An integrative review. *Int J Nanomedicine* 2015;10:4837-46.
  - Flanagan A, Carey LA, Fontanarosa PB, Phillips SG, Pace BP, Lundberg GD, *et al.* Prevalence of articles with honorary authors and ghost authors in peer-reviewed medical journals. *JAMA* 1998;280:222-4.
  - Al-Herz W, Haider H, Al-Bahhar M, Sadeq A. Honorary authorship in biomedical journals: How common is it and why does it exist? *J Med Ethics* 2014;40:346-8.
  - Kovacs J. Honorary authorship and symbolic violence. *Med Health Care Philos* 2017;20:51-9.
  - Mowatt G, Shirran L, Grimshaw JM, Rennie D, Flanagan A, Yank V, *et al.* Prevalence of honorary and ghost authorship in Cochrane reviews. *JAMA* 2002;287:2769-71.
  - Errami M, Garner H. tale of two citations. *Nature* 2008;451:397-9.
  - Adibi P, Kianpour M, Shirani S. Investigating the root causes of duplicate publication in research articles. *J Educ Health Promot* 2015;4:14.
  - McNutt MK, Bradford M, Drazen JM, Hanson B, Howard B, Jamieson KH, *et al.* Transparency in authors' contributions and responsibilities to promote integrity in scientific publication. *Proc Natl Acad Sci U S A* 2018;115:2557-60.
  - Jones AH. Can authorship policies help prevent scientific misconduct? What role for scientific societies? *Sci Eng Ethics* 2003;9:243-56.
  - Alfonso F. Authorship: From credit to accountability: Reflections from the Editors' Network. *Neth Heart J* 2019;27:289-96.
  - Fong EA, Wilhite AW. Authorship and citation manipulation in academic research. *PLoS One* 2017;12:e0187394.
  - Resnik DB, Tyler AM, Black JR, Kissling G. Authorship policies of scientific journals. *Med Ethics* 2016;42:199-202.
  - 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

- journals during a 10-Yr period. PLoS One 2013;8:e71430.
41. Purohit B, Singh A. Coercive authorship – Moving away from avarice. *Austin J Public Heal Epidemiol* 2016;3:1046.
  42. Peter E. Authorship: A legal perspective. *J Indian Orthod Soc* 2015;49:173-6.
  43. Bahl R, Bahl S. Publication pressure versus ethics, in research and publication. *Indian J Community Med* 2021;46:584.
  44. de Vries R, Anderson MS, Martinson BC. Normal misbehavior: Scientists talk about the ethics of research. *J Empir Res Hum Res Ethics* 2006;1:43-50.
  45. Anderson MS, Horn AS, Risbey KR, Ronning EA, De Vries R, Martinson BC. What do mentoring and training in the responsible conduct of research have to do with scientists' misbehavior? Findings from a national survey of NIH-funded scientists. *Acad Med* 2007;82:853-60.