EDITORIAL

Authorship criteria in biomedical research: will guidelines help resolve the problem?

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INTRODUCTION

Researchers publish their work for a number of reasons. They may wish to inform policy, want to contribute to science, increase debate amongst colleagues, and feedback findings to participants. In biomedical research, this ultimately translates into better patient care. Also, presentations and publications are now increasingly vital for advancement of one's career.

Within the academic environment there is often some level of expectation regarding authorship or acknowledgement on the part of those contributing to a work. Harvard medical school describes authorship as an explicit way of assigning responsibility and giving credit for intellectual work. It also ensures transparency. Authorship offers significant professional and personal rewards, but these rewards are accompanied by substantial responsibility. Authorship is important to the reputation, professional advancement, and financial support of the individuals; as well as to the reputation of their organization. Thus authorship practices should be based on honest and actual contributions.

HISTORY

One of the related controversies is that of William Shakespeare. The argument is that someone other than Shakespeare of 'Stratford-upon-Avon' wrote the works attributed to him. Anti-Stratfordians is a collective term for proponents of this alternative-authorship theory, who say that Shakespeare was a front to shield the identity of the real author, who could not get public credit.

DEVELOPMENTS

Disputes arise about who should be listed as authors of a work and the order in which they should be listed. During the 1980s, editors started asking the contributors to meet specific criteria for authorship. These authorship criteria were first laid down for medical journals under the guidance of Huth EJ, the then editor of the Annals of Internal Medicine, at the 1984 meeting of the International Committee of Medical Journal Editors (ICMJE). The ICMJE guidelines were first published in 1985, which are now covered under the 'uniform requirements for manuscripts submitted to biomedical journals'. These guidelines are amended regularly, and various international journals use them as authorship criteria. Some journals, have formulated their own authorship criteria.

THE REAL SCENARIO

In real life the authorship practices in various organizations fall short of these standards. Two types of problems have been highlighted: 'honorary authorship' (named authors who have not met authorship criteria) and 'ghost authorship' (individuals not named as authors but who have contributed substantially to the work).

A review of peer-reviewed articles in medical journals found that 19% had evidence of honorary authors and 11% had evidence of ghost authors. Unequal power relations are known to significantly influence these practices. Juniors may unwillingly take their senior colleagues as authors as this may increase the credibility and authenticity of their work, and also its chances of publication, irrespective of whether these colleagues have made any substantial contributions to the work. They may fear offending their seniors, who hold substantial power over their academics, employment, research opportunities, and recommendations for jobs and promotion. Other common reasons for honorary authorship include repaying favours, encouraging collaboration and maintaining good working relationships.

Seniors though may like to contribute substantially to the research, may not be able do so because of other obligations. But they might still want others to recognize them as productive researchers. They may have developed this attitude because of their own past experience with their seniors. Sometimes the senior faculty have differences amongst themselves regarding the order of authorship.

Junior researchers may have engaged in doing ground work (e.g. data collection). Senior researchers may claim authorship (including order of authorship) because of their seniority and also by emphasizing on ideas and data interpretation.

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Ghost authorship may arise due to differences in the self-defined criteria for authorship. Students and junior research staff and those who are no longer employed when a paper is written, are most likely to be disadvantaged when authorship is assigned. [1]

These disagreements over authorship seriously hamper good will, effectiveness, and reputation of the individuals, the organizations, and their academic and scientific community. This ultimately vitiates the research atmosphere, and thus science fails to progress. These disagreements stem from vested interests, misunderstanding and faulty communication between colleagues. This, hopefully, could have been prevented by a clear, early understanding of internationally recommended authorship guidelines. [3]

**INTERNATIONAL GUIDELINES**

International Committee of Medical Journal Editors (ICMJE)

ICMJE (2009) has proposed uniform requirements for manuscripts submitted to biomedical journals. [6]

According to these guidelines, an "author" is generally considered to be someone who has made substantive intellectual contributions to a published study. According to ICMJE, biomedical authorship continues to have important academic, social, and financial implications. It says that an author must take responsibility for at least one component of the work, should be able to identify who is responsible for each other component, and should ideally be confident in their co-authors' ability and integrity. Some journals now request and publish information about the contributions of each person named as having participated in a submitted study. ICMJE also strongly advises editors to develop and implement a contributorship policy, as well as a policy on identifying who is responsible for the integrity of the work as a whole.

The ICJME has recommended the following criteria for authorship. Authorship credit should be based on:

1) substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data
2) drafting the article or revising it critically for important intellectual content
3) final approval of the version to be published.

Authors should meet conditions 1, 2, and 3.

When a large, multicenter group has conducted the work, the group should identify the individuals who accept direct responsibility for the manuscript. These individuals should fully meet the criteria for authorship/contributorship defined above.

Acquisition of funding, collection of data, or general supervision of the research group alone does not constitute authorship. [6]

All persons designated as authors should qualify for authorship. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content. One or more authors, referred to as "guarantors," should be identified as the persons who take responsibility for the integrity of the work as a whole, from inception to published article, and publish that information. The corresponding author/guarantor should be prepared to explain the presence and order of these individuals.

General principles of authorship (Dartmouth college, USA) [9]

1. Principles of authorship should apply to all scholarly work.
2. Authorship assigns responsibility and accountability for the content of scholarly work and intellectual products.
3. Authorship gives credit for intellectual work.
4. Authorship assumes independence from any agreements that could limit, or be perceived to limit, the analysis, interpretation and/or publication of data
5. Information and data should be reported truthfully and completely.

Other guidelines [9]

1. An author should have made substantial contributions to the scholarly work and intellectual process. Examples may include: creating the original idea, project planning, experimental work, data collection, analysis, interpretation.
2. An author should be able to articulate and defend their contribution to the scholarly work. They should know and be able to explain how their contribution relates to the overall project.
3. Single contributions, the acquisition of funding, the provision of technical services and/or materials, the collection of data, or the general supervision of a research group are generally not adequate to justify authorship. Being the head of the organization or funding agency or a statistical analyst does not qualify for authorship.
4. Honorary (named author who has not met authorship criteria), planted (author named without his/her knowledge or consent), ghost (individual not named as author but who has contributed substantially to the work), and relinquished (person meeting the criteria for authorship but ceding authorship to co-workers who may or may not have met the criteria) authorships are not acceptable.
5. Everyone who has made substantial intellectual contributions to the work should be an author. Everyone who has made other substantial contributions should be acknowledged.

6. All authors should participate in writing the manuscript by reviewing drafts and approving the final version.

7. One author should take primary responsibility for the work as a whole even if he or she does not have an in-depth understanding of every part of the work. This primary author should assure that all authors meet basic standards for authorship and should prepare a concise, written description of their contributions to the work, which has been approved by all authors. This record should remain with the sponsoring department.

ORDER OF AUTHORSHIP

There are different ways of determining order of authorship. Examples include i) descending order of contribution ii) placing the person who has conceptualized the work or took the lead in writing the manuscript or doing the research first iii) the most experienced contributor last iv) alphabetical or random order.

Therefore, it is difficult to interpret from order of authorship the respective contributions of individual authors. Readers therefore should not be carried away by the order of authorship.

Authors (especially the primary author) should specify in their manuscript how each author has contributed to the work and the reason for assigning a particular order.

Students should be the first author of their thesis or dissertation. "Students should be aware of their rights...to publish papers independently of their supervisors."[1]

IMPLEMENTATION OF AUTHORSHIP

Authorship issues should be discussed amongst study team members frankly early in the course of the work. [3]

1. Prior to submission, the primary author should review the authorship criteria of the journal.

2. At the start of the study and also periodically these criteria should be reviewed.

3. One author (primary/senior/submitting/responsible) should assure that each author:
   a. meets authorship criteria;
   b. has reviewed the whole scholarly work,
   c. has consented to authorship prior to the submission.

4. One author should coordinate the completion and submission of the work, assure adherence to the guidelines, and also give responses to inquiries.

5. Everybody meeting the criteria for authorship must be included.

6. While determining the order of authorship, one should adhere to the norm of their discipline and the publisher's guidelines.

The following are suggestions for determining order of authorship:

a. The major contributor or the person who has taken the lead in writing should be the first author;

b. The person who has general responsibility for the project is frequently listed last;

c. Authors who have made major contributions to analysis, interpretation, or writing may be listed immediately following the first author;

d. Other persons who fulfil the criteria for authorship may be listed in alphabetical order.

7. Authors should try to resolve authorship disputes themselves. If disputes cannot be settled they should be referred to a third party (department chair or dean) for resolution.

Organizations (including sponsors) should describe in their procedure manuals, their own authorship criteria (and also the order of authorship).

The guidelines should be periodically reviewed because both scientific investigation and authorship practices are changing.

ACKNOWLEDGEMENTS

All contributors who do not meet the criteria for authorship should be listed in an acknowledgments section. Examples include a person who provided purely technical help, writing assistance, or a department chairperson who provided only general support. Authors are supposed to declare whether they had assistance with study design, data collection, data analysis, or manuscript preparation. Financial and material support should also be acknowledged.[6]

Persons who have contributed materially to the paper but whose contributions do not justify authorship may be listed under such headings as "clinical investigators" or "participating investigators," and their contribution should be described, for e.g. "served as scientific advisors," "critically reviewed the study proposal," "collected data," or "provided and cared for study patients." Because readers may infer their endorsement of the data and conclusions, these persons must give written permission to be acknowledged.[6]

PLAGIARISM

This is defined as the 'imitation,' or 'publication' of another author's work, and the representation of them
as one's own original work, without citing or
acknowledging them. This is not a crime, but is considered
dishonesty, and not approved because it is unethical and
immoral. It can involve liability for copyright infringement.
The authors need to be aware of this. [10]

MY THOUGHTS
Assigning appropriate authorship is an important part
of Good Research Practice (GRP!!). [1] Already such terms
are in vogue like Good Clinical Practice (GCP), Good
Lab Practice (GLP), Good Manufacturing Practice (GMP),
etc. As per the guidelines of Harvard medical school,
authorship should be a component of the research ethics
course that is required for all research fellows. [3]

It is the responsibility of people in authority to see that
organization specific guidelines for authorship be framed
based on international guidelines, and these should be
strictly adhered to and implemented. These should not
be changed as per somebody's whims and fancies. ICMJE
guidelines are the most authentic, and are followed by
all leading international journals.

Assigning authorship in alphabetical order appears to
be the worst form of practice as this is not followed all
over the world, and also there is a high probability of
the least significant contributor being named as the main
author. In a recently concluded workshop an international
faculty while citing his work said that the first author of
that project has contributed least to the work. The only
reason her name is first in the list is that alphabetically
her name happens to be the first, and this is the
authorship criteria in their organization.

In my opinion the best authorship criteria should be
something like this:
1. The person who has conceptualized the work
   should be the main author.
2. All other people should be placed in the list in the
   order of seniority, with the senior and more
   experienced people towards the end.
3. We should give our junior investigators a chance,
   and we should feel happy and contended by
   moving towards the end of the list when
   appropriate. [4]

Many journals now ask authors to put et al' after six
names in the authorship list. I believe this is not a good
practice.

Guidelines are really not the answer to this problem. Even
if best guidelines are in place, unequal power relations
can still spoil the atmosphere. People may still claim
false authorship as the junior investigator might not be
bold enough to assert his right and we have to rely on
self-declaration which might still be manipulated. [1, 8]

I think the only way out of this controversy is to be honest
to ourselves and sensitize ourselves to ethics. A good

researcher does research for the sake of research, not
just for name or fame. However, every human being wants
recognition for the work he does, and wants to be
acknowledged for the help he has offered to others.

Being aware of the authorship criteria would be vital for
young researchers in their career.

Let us not pollute the environment of ¹genuine enquiry'  
and defeat the spirit of research. Let us work together
for advancement of Science. It is worth pondering over
the following shloka from Kathopanishad [11]

\[
\text{om saha navavatu}
\]
\[
\text{saha nau bhuanyaktu}
\]
\[
\text{saha varyaa karavavahai}
\]
\[
\text{tejasvinavadhi tamatsu midvidvi vahai}
\]
\[
\text{om shanti shanti shanti}
\]
Om! May He protect us both together;
May He nourish us both together;
May we work conjointly with great energy,
May our study be vigorous and effective;
May we not mutually dispute (or may we not hate any)
Om! Let there be peace in me!
Let there be peace in my environment!
Let there be peace in the forces that act on me.

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Rajsekhar: Authorship criteria in research


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