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Review

Ethical publishing: the innocent author's guide to avoiding misconduct

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Abstract
Publication misconduct includes a range of unethical behaviours, such as plagiarism, breach of confidence and inappropriate authorship. The most egregious cases are easy to recognize and widely condemned, but the gradient between normal and unethical behaviour is often a gradual one. Clinicians and researchers should be aware of the full spectrum of publication misconduct and understand that some widely accepted practices may be unethical. This paper describes the various types of publication misconduct and offers guidance to authors, reviewers and journal editors about ways to detect and prevent them.

Keywords: Duplicate publications, peer review, plagiarism, publication retractions, scientific misconduct

Introduction

Publishing about medicine carries considerable ethical responsibilities for authors, reviewers, editors and publishers. Yet, as with medical ethics, the options form a gentle gradient or spectrum moving gradually away from good behaviour. At the extreme lie actions that are clearly unethical, but exactly where behaviour becomes unethical is often a matter for debate. This article explores these spectra to highlight how easy it is for authors, sometimes unwittingly, to commit misdemeanours. It also describes the remedies and preventive measures that may be employed by journals and suggests ways in which authors can avoid unethical behaviour. Cases presented to the Committee on Publication Ethics (COPE) and the *BMJ* Ethics Committee are provided as examples.

Unethical research

All research that exposes human participants to additional interventions, or possible harms, or in which interventions are randomly assigned, must be designed to minimize risks and must be approved by a research ethics committee (REC) or institutional review board (IRB). However, collection of data for routine audit, designed to monitor and improve performance, does not necessarily require approval. Problems arise when an audit uncovers information that might be of interest to other units and the authors seek to publish their findings,[1] as most journals will not publish research unless it has received ethical approval. It is therefore advisable to consult your REC or IRB at the earliest opportunity if you suspect that a routine audit is evolving into a research project and you have any intentions of submitting the findings for external publication.

Case study[2]
A journal received a short case series describing elderly patients who had been treated with an unlicensed herbal remedy. Reviewers were concerned that there was no mention of ethical approval or whether the patients understood the experimental nature of the treatment. The ability of patients to give freely informed consent was also questioned, since all were residents of a nursing home of which the author was a director and the sole medical practitioner. The paper was rejected and the author informed of the editor's concerns.

Inadequate consent

Collecting patient information for the purposes of research normally requires explicit consent from the participants. RECs scrutinize consent forms for clinical trials to ensure that the potential benefits and risks of participating are clearly explained and that patients' rights are protected. But what if two licensed treatments are available for a condition and a clinician starts to assemble a series of cases? It has been pointed out that it is logically inconsistent to require consent if patients are formally randomized but not if they are treated according to the doctor's whim on the basis of flimsy evidence.[3] However, there may be some justification for considering retrospective data analysis differently from

Box 1 *BMJ* guidance on situations in which it may be acceptable to publish without patient consent[5]

The *BMJ* permits publication without the consent of the patient (or family) only if all of the following conditions are met:

- The patient is dead and his or her family is untraceable.
- The article contains a worthwhile clinical lesson or public health point that could not be as effectively made in any other way.
- A reasonable person in the position of the patient's relatives would not be expected to object to the publication of the case.

prospective data collection, even if the ethical border is blurred. Once again, if you are starting to gather data that may be used in a publication, consider whether you should obtain the patients' consent and whether your activities should be reviewed by your REC or IRB.

Reporting an individual case history requires explicit consent from the patient in nearly all cases (the *BMJ* provides guidance on situations in which it may be acceptable to publish without such consent – see Box 1).[4,5] Problems arise when clinicians want to publish cases of patients with whom they have long since lost touch.

Data fabrication

Making up data is never admissible. Careful statistical review sometimes reveals fabricated data because individuals tend to have preferences for certain numbers, so the frequency of digits is not as random as would be predicted in a naturally occurring sequence. Statistical methods exist to deal with missing data, but authors must describe any such methods used and apply them consistently. They must face up to the limitations of their study and also ensure their conclusions do not go beyond what the data can support.

Case study[6]
Data fabrication was suspected in a paper submitted to the *BMJ* after a reviewer noted that cognitive function scores did not match the participants' description (mean scores suggested substantial impairment yet participants were described as healthy). The author also claimed these elderly patients could recall 50 digits in memory tests when most people can remember only about 8. The reviewer concluded that the data had 'all the hallmarks of being entirely invented'.

Data falsification

Adjusting data to suit your hypothesis is as unacceptable as making it up, but it can be tempting to omit inexplicable outliers or exclude results that do not fit. When presenting results of randomized trials, authors should follow guidelines such as the CONSORT statement and indicate clearly how many participants were screened, randomized, assessed and included in the analysis.[7] Many journals require a so-called CONSORT diagram, which displays this information clearly.

Image manipulation

The evolution of digital imaging and sophisticated software (such as Photoshop) offer tempting possibilities to enhance images. This may range from altering the contrast to make the image clearer (which is acceptable if it is applied to the entire picture), to juxtaposing items for ease of comparison (such as gel columns – once again, this is acceptable so long as the alteration is clearly marked), to outright deception (i.e. manipulating an image to alter its interpretation). Some journals (especially those publishing basic research in the life sciences) now routinely check figures using the same software that might have been used to alter them.[8] This can detect 'cloned' images or areas of altered contrast.

Misrepresentation

Incomplete or selective reporting of trial outcomes can skew the interpretation of findings. Deliberate omission of unfavourable results should therefore be considered misconduct on a par with data falsification. However, a recent study found that, when compared with the protocol, on average 50% of efficacy outcomes and 65% of harm outcomes per trial were incompletely reported and 62% of trial reports had at least one primary outcome that was either changed, introduced or omitted.[9] Registration of trials at their inception, with details of all planned outcomes, or publication of protocols, may reduce this problem.[10] Some journals now routinely request a copy of the original protocol to review alongside reports of clinical trials.

Case study
COPE considered a case in which major discrepancies between the protocol and report were revealed. When the editor raised this with the authors, they initially responded by saying they had submitted the wrong protocol, and they sent another. However, this still did not match the report. After some discussion, the authors admitted that the paper reported selected outcomes from four different studies. The paper was rejected.

Inaccurate reporting

Researchers, editors and typesetters are all human, so occasional errors are inevitable. However, authors should take responsibility to check proofs carefully. Errors occurring before submission will not necessarily be detected during peer review, so careful checking of manuscripts is also in order. All investigators should ensure adequate quality control mechanisms to minimize inaccuracy. This may include double data entry (i.e. two people independently entering all data then comparing versions to check for errors) or simply getting a colleague to check tables and/or proofs.

Whoever is responsible for an error, journals have a duty to publish a correction so that readers are not misled. If an error is so serious that it casts doubt on the study findings, the publication should be retracted. This does not necessarily imply that the authors are guilty of misconduct.

Case study
A paper was retracted from *Science* after it was found that the researchers had been supplied with the wrong reagent from

a chemical company.[11,12] The paper had received considerable attention as it suggested that use of the recreational drug 'ecstasy' was far more dangerous than had previously been realized. The unexpected results were not picked up by peer review, but the error was discovered when others tried to replicate the findings.

Inaccurate quotations

Citations are an important part of scientific communication, so they should be accurate. Errors in references may prevent readers from locating a paper. Misrepresenting another author's views or findings will mislead readers.

A systematic review found that the median proportion of inaccurate citations across a wide range of medical journals was 39% and the median proportion of inaccurate quotations was 20%.[13] Journals can increase citation accuracy by including links to references (in electronic versions) or manually checking references. Authors should check their references carefully – if you are lucky you might persuade a librarian or student to check them for you. Using bibliographic software (such as Reference Manager or EndNote) to compile your references may reduce errors (because references can be downloaded automatically from databases and reformatted automatically, thus avoiding any retyping).

Duplicate submission

Journals expect submissions to report original work that has not previously been published and is not being considered by another journal. Many journals require an explicit statement to this effect in the covering letter, so authors cannot plead ignorance. Peer review works, largely, on unfunded altruism, so journals do not want to waste reviewers' time. Editors also suspect that, if authors are permitted to submit their work to more than one journal at once, the less scrupulous would happily agree to let it be published several times. Authors have argued that this system is inefficient and may delay publication, but it is a widely respected convention.[14] If editors detect duplicate submission (which sometimes happens when papers sent to different journals are sent to the same reviewer) they may blacklist authors and refuse to consider their submissions. If you discover a paper has inadvertently been submitted to more than one journal you should own up to your error/failure of communication and withdraw the most recently submitted paper.

***Menopause International's* requirements**
The journal's instructions to authors (on the website http://www.thebms.org.uk/journals.php) state: 'Original previously unpublished contributions will be considered for publication on the understanding that they are contributed solely to *Menopause International*. If any form of publication elsewhere (including electronic media) of any of the material in the manuscript submitted, other than an abstract of not more than 300 words, has occurred or is planned, the author must identify such in the cover letter and must include a copy of the other publication.'

Redundant publication

Publishing results of research more than once can distort the medical literature and skew meta-analyses if findings are double-counted.[15] Re-publication is acceptable in some circumstances (e.g. a translation) but must be done with the permission of the original journal and clearly identified. Clear study identification (e.g. by including a trial registration number) can aid the detection of redundancy.[16]

When a study generates several papers, it is particularly important to indicate that they come from the same study and to identify any parts that have been published elsewhere. A small degree of overlap (e.g. description of the methods) may be acceptable to put findings into context. Some journals have guidelines on the acceptable degree of overlap (e.g. up to 10%) and many editors request copies of related papers to prevent so-called 'salami' publication.

Plagiarism

The Internet and word-processing software make it simple to cut and paste words or data into a document. This becomes plagiarism if you do not acknowledge the originator, and instead pass the work off as your own. As with other ethical problems, grey areas exist. Some argue that it is poor practice to cut and paste even your own words into another document (self-plagiarism) and recommend that text should be freshly crafted for each situation. Others have pointed out that certain phrases may be the most precise way to describe a technique and it may therefore be acceptable to cut and paste, especially from the Methods section. Experts in their field may receive several requests each year for book chapters, review articles or editorials on closely related topics and may be tempted to recycle their work. While repetitive self-plagiarism is probably less harmful than covert redundant publication of original research, it is, nevertheless, a disservice to reviewers, readers and editors and, at the very least, a discourtesy and perhaps a waste of resources (paper, pixels and journal time). If you plan to reuse previously published material you must discuss this with the editor. If you wish to quote extensively from anybody else's work you must make this clear (e.g. by using direct quotations enclosed in quotation marks) and, if necessary, get permission from the copyright holder.

Case study[17]
A reviewer recognized entire paragraphs from his own, published review article in a paper purportedly written by another author. The editor challenged the corresponding author about this but it transpired that he was a guest author who had been asked to comment on the paper by the first-named author (whom he had never met). The editor informed the first-named author's institution about the plagiarism and accepted the corresponding author's apology. The corresponding author also stated that he would never again co-author an article with somebody he did not know.

Breaches of copyright

While plagiarism involves passing off another person's work as your own, even acknowledged quotations or republication of figures or tables may breach copyright unless permission has been granted by the copyright holder. Since many journals require authors to transfer copyright to them on publication, you may require the publisher's permission to reproduce items from your own articles. If you plan to reproduce a figure or

table, or a large portion (e.g. over 200 words) of text from another publication, you should identify the copyright holder and seek appropriate permission. The copyright holder may stipulate the wording to be used for the acknowledgement and, especially in the case of commercial publications, may charge a fee.

Missing (ghost) authors/ acknowledgements

Studies from different parts of the world have shown that, although the criteria for authorship produced by the International Committee of Medical Journal Editors (ICMJE)[18] are the most widely cited in journal instructions, they are by no means universally known or endorsed by researchers.[19–22] Some journals now list 'contributors' rather than 'authors', and publish details of each individual's contribution to the research and publication. One reason for this is to make it easier for editors or reviewers to detect missing (or ghost) authors, that is, those who have made a substantial contribution to the work but are not named. A recent study found that statisticians who met the ICMJE criteria were omitted from author lists in 75% of industry-sponsored studies.[23] Some journals now ask the communicating author to declare that everybody who meets the relevant authorship criteria has been listed.

Omitting deserving authors denies readers the chance to know who did the work, denies colleagues proper credit and recognition (which may be important for their careers) or may underplay the role of a commercial organization in a publication. The last is perhaps the most serious, since the omission of the author or contributor may mask a competing interest, for example if a commercial company paid a professional writer to work on the paper. Clinicians and researchers working with industry sponsors should ensure that all deserving employees are properly acknowledged. The Good Publication Practice guidelines for pharmaceutical companies recommend that, whatever criteria are used to determine authorship, they must be applied equally to both employees and external authors.[24] Whether somebody qualifies for 'full' authorship, or contributorship, or an acknowledgement, will depend on their contribution. A strict interpretation of the ICMJE criteria is that professional writers do not usually qualify as authors on papers reporting original research, but they may qualify on review articles.[25]

Honorary (guest) authors

The ICMJE criteria explicitly state that 'Acquisition of funding, collection of data, or general supervision of the research group, alone, does not justify authorship',[18] yet, in many places, the head of department is routinely included as an author on all publications, regardless of his or her direct contribution to the work. In other cases a 'big name' is added to the author list as a 'guest', despite minimal involvement in the work, in the hope of adding respectability or increasing the chances of acceptance in a prestigious journal. Editors hope that listing individuals' contributions rather than just their names and affiliations may reduce this practice but it is not a panacea.

COPE has produced guidelines aimed at empowering junior researchers in ensuring fair authorship practices but if confrontation or removal of a senior person's name is likely to be a career-limiting move, it is understandable why many junior researchers acquiesce.[26]

'Gift' authors represent another type of improper authorship. These are typically colleagues who contributed little or nothing to the work but who are listed on the understanding that they will add your name to their next publication.

Guest or gift authors have sometimes revealed their true level of involvement when a study has proved to be fraudulent or seriously flawed – when the 'gift' suddenly becomes less attractive.

Case study
Professor Geoffrey Chamberlain resigned as Editor of the *British Journal of Obstetrics and Gynaecology* after co-authoring a paper that later turned out to be fraudulent. According to a report in the *BMJ*, Professor Chamberlain said that in hindsight he agreed that gift authorship was a bad idea but that he had 'rubber stamped this paper out of politeness and because he asked me to as head of the department'.[27]

Lack of transparency

Editors, reviewers and readers expect to be accurately informed not only about who did a piece of work, but also who funded it and what the funder's involvement in the study and publication was. Most journals therefore require authors to declare any competing interests. Some journals set criteria for declaration (e.g. financial transactions over a certain level or links in the last five years) but such cut-offs are arbitrary and it is probably more helpful to consider what readers would wish to know. If you are working with several co-authors from different institutions, it is helpful to obtain declarations of competing interests well before a paper is finalized, to ensure this process is not done in a rush just before submission. Including co-authors' statements of competing interests in an early draft may also remind colleagues about interests they ought to declare. Remember that general and indirect funding (e.g. to a department or to fund a research assistant) should be declared as well as payments received directly by the authors (e.g. speakers' fees or travel grants).

Abuse of confidence

Until published, items submitted to journals remain the property of the authors and should be treated in confidence. Reviewers should be instructed not to keep copies of reviewed papers and not to use them in any way in their own work until they have been published. Reviewers should not discuss submitted papers with their colleagues and should not delegate the review to another person without the editor's permission.

Case study[28]
Nature received a manuscript describing a gene sequence for interleukin-1 from authors at the biotech company Cistron. It was sent to a reviewer working for a rival company, Immunex, who recommended rejection and informed the editor that he had information that the sequence was incorrect (but did not declare his competing interest). Both Cistron and Immunex obtained patents on parts of the

Table 1 Useful websites

Abbreviation/acronym	Full name	Website
COPE	Committee on Publication Ethics	www.publicationethics.org.uk
CSE	Council of Science Editors	www.councilscienceeditors.org
ICMJE	International Committee of Medical Journal Editors	www.icmje.org
WAME	World Association of Medical Editors	www.wame.org

sequence. It was later alleged that the reviewer had stolen the sequence from the Cistron manuscript (because the Immunex patent submission contained errors included in the original *Nature* manuscript but corrected in the Cistron patent submission). After much legal wrangling, Immunex paid Cistron $21 million in an out-of-court settlement.

Conclusions

While virtually all clinicians and researchers can identify, and usually condemn, egregious examples of publication misconduct, minor misdemeanours do not attract attention and there may be disagreement about whether behaviours constitute misconduct. Journal editors need to be vigilant in detecting misconduct, but they should also play an active part in educating authors and reviewers about expected standards of behaviour. Helpful resources are available from COPE, CSE, ICMJE and WAME (see Table 1).

All health-care professionals should receive training in the ethics of research and publication. Those responsible for supervising students should keep themselves informed about publication ethics, set a good example in their own behaviour and provide appropriate guidance. All institutions undertaking research (both academic and commercial) should promote ethical behaviour and ensure that institutional policies (e.g. about authorship) are in line with best practice. Institutions should also establish appropriate mechanisms for investigating cases of alleged publication misconduct.

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