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Original Article

Ethics in Scientific Publications

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Abstract: Ethical scientific publication is of growing importance due to an array of reasons. The responsibilities of a researcher have grown manifold with robust laws to protect human rights from spurious research, and rising awareness of ethics in conceiving, conducting and reporting research. To report a good research, an author must be aware of ethical publication practices. In this paper, we review the ethical issues involved with scientific publication. Literature regarding ethical publication was reviewed in leading search engine PubMed with the following search terms and their combinations: ethics, publication, scientific publication. Twenty-six papers were selected based on their relevancy. There is a need to raise awareness about the ethical issues in publishing especially at a student level in academics so that as they become researchers they already are aware of publication ethics. The University Grants Commission has developed a course in this regard which should be well promoted and compulsory since graduate studies. This paper highlights the nuances of ethical publishing that need to be taken care of such as data fabrication, plagiarism, conflict of interest and such commonly mistaken aspects that need to be addressed seriously while reporting research.
Keywords: Publication ethics; ethics; publication; scientific publication.

Introduction: Research conducted has to be published or documented; otherwise, it is considered not done. Publication of paper is critical for the evolution of modern science, in which the work of one scientist builds upon that of others. Documentation of research work followed by publication helps in the dissemination of observations and findings[1]. Publication of a research article represents the final stage of a scientific project. In many cases, the funds supporting the project were derived from public monies. There is, therefore, the expectation that the work be conducted and reported honestly, objectively, and fairly[2]. Academic publishing depends, to a great extent, on trust. Editors trust peer reviewers to provide fair assessments, authors trust editors to select appropriate peer reviewers, and readers put their trust in the peer-review process[3]. Also to maintain the readers' trust and to uphold the journal's reputation, it is paramount for the entire

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research, peer review and publication process to follow ethical principles and decisions[4]. Yet, sometimes deviations from this ideal occur. Ethical breaches can be intentional or can arise simply out of ignorance. Nonetheless, in legal parlance, ignorance is not and cannot be an excuse[2]. Medical publication ethics occurrence is perpetuated by the concept of "publish or perish" that is rampant in many universities and particularly so in Western universities[5]. Among 103 new allegations of scientific misconduct reported to the Office of Research Integrity in 2000, 24 involved falsifications of data, 37 involved data fabrication, 19 involved plagiarisms, and 23 were in other categories or misconduct rewpectively[6]. Authors from more than fifty countries retracted papers. While the United States and China retracted the most papers for plagiarism and duplicate publication[7]. In a longitudinal survey of National Institute of Health funded postdoctoral fellows, 50% were aware of and had referred to guidelines on authorship and publication practices while 50% were either unaware of or had not referred to guidelines[8]. Most editors of science journals seem not very concerned about publication ethics and believe that misconduct occurs only rarely in their journals and were also unfamiliar with available guidelines[9].

The above scientific misconduct can be removed only by cultivating good publication practices among researchers, editors and peer reviewers. Ethical guidelines and codes that affect publication practice were given by various institutions like American Medical Writers Association (AMWA) Code of Ethics; Committee on Publication Ethics (COPE); CONSORT statement; EQUATOR network; European Medical Writers Association (EMWA); International Committee of Medical Journal Editors (ICMJE) Recommendations; International Society for Medical Publication Professionals (ISMPP) Code of Ethics; World Association of Medical Editors (WAME); Medical Publishing Insights & Practices (MPIP) etc[10].

Good publication practices do not develop by chance, and will become established only if they are actively promoted[11]. Authors have to be educated as to what constitutes scientific misconduct and also about publication ethics in general[12]. Hence, a review of some of the ethical issues related to scientific publications is done in this paper.

Materials and Methods: A complete search for all studies on ethics in scientific publications was carried out. National Medical Library (Pubmed) database was used for searching the literature by applying various filters like journal article, publication date from year 2000 to till present, free full text papers, English language and in the search field title was selected. The basic search terms included publication ethics, ethics and scientific publication or publication. It showed sixty-one results out of which only twenty-two were relevant. Studies were further identified through a manual search of obtained article references. Also various authentic websites were searched. After all types of search, twenty-six papers were found useful.

Results: Twenty-six papers have been identified related to the topic 'ethics in scientific publication', which has the following components:

(1) Study design and ethical approval:

- Good research should be well justified, well planned, appropriately designed, and ethically approved. To conduct research of a low standard may constitute misconduct.
- Laboratory and clinical research should be driven by protocol; pilot studies should have a written rationale. The research protocol should adhere strictly to the international standards such as those of the Council for International Medical Science Organizations[1].
- Human/ animal ethics committee approval as per national guidelines: Formal and documented ethical approval from an appropriately constituted research ethics committee is required for all studies involving human beings, medical records, and anonymised human tissues. Animal experiments require full compliance with local, national, ethical, and regulatory principles, and local licensing arrangements[6]. It should be presumed that no author can publish research on humans or animals that do not follow the ethical

standards of the country where the article is published[1].

- Informed consent/ assent is a must when you are conducting research with human participants. It may not always be possible. However, in such circumstances, an appropriately constituted research ethics committee should decide if this is ethically acceptable[6].
- Trials are to be registered with 'Clinical Trial Registry of India' (CTRI) [1].
- Copy rights and permissions for data presentation should always be submitted in writing. These include identifiable individuals, previously published figures or tables, personal communications and acknowledgement of individuals for their contributions. Identifying information, such as patients' names, initials or hospital numbers, should not be used, especially in illustrative material, unless the information is scientifically essential and the patients (or parents or guardians) has given written informed consent for publication[4]. Without institutional permission, you cannot share your data with someone for analysis who is working in a different institution[13].

(2) Data analysis:

- Data should be appropriately analysed, but inappropriate analysis does not necessarily amount to misconduct. Rather fabrication and falsification of data constitute misconduct[6].
- Fabrication means research results are not generated from the study and falsification means research results are generated by manipulating data. Falsification or fabrication of data represented over half of the new allegations reported to the Office of Research Integrity (ORI) in 2002[6].
- Fabrication and falsification is considered as extremely serious misconduct. It is a breech of trust of the common people and loss of time and the resources[13].
- The data analysis methodology should be clearly stated in the protocol. The variations such as post hoc analysis or data omission should be agreed upon and reported in the paper by all investigators[1].
- Retracting the articles with fabricated data and reporting this misconduct to the institutional regulatory body is the recommendation of COPE[14].

(3) Authorship:

- Authorship confers credit, implies responsibility and accountability of the published work.
- The ICMJE (International Committee of Medical Journal Editors) recommends that authorship be based on 4 criteria: 1. Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND 2. Drafting the work or revising it critically for important intellectual content; AND 3. Final approval of the version to be published; AND 4. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. It is mandatory to declare the contribution of each author[13].
- All those contributors who do not meet the criteria for authorship like providing technical services, translating text, identifying patients for study, supplying material, providing funds, doing statistical analysis and drafting manuscripts etc., should be listed in the acknowledgement section and what they did should be described[13].
- Ghost, guest, or gift authors are the examples of unethical practices. Gift or guest authorship refers to listing as a co-author someone who fails to satisfy the ICJME criteria of authorship. Often guest or gift authors are well-known and well-respected in the field of research. Motives vary, ranging from nepotism on the part of senior researchers, to reciprocating favours for previous co-authorships, to increase the likelihood of publication. Ghost authorship refers to the practice of not citing as co-authors those who satisfy the criteria of authorship[15].

- The authorship disputes could range from order of authorship, inclusion or exclusion of authors, number of authors etc. The best advice is to discuss authorship issues at the onset of a study, who will be credited as authors and who will be acknowledged and as well as during, particularly if new investigators join, or original ones leave, the research project[2]. Usually, the dispute is for the "First author" place because most of the articles are cited by the name of the first author, the person who has done the majority of the groundwork would be considered eligible for being the first author (researcher) and the person who planned and conceived the study would be the last author (supervisor). 'Authorder' is an easy to use tool to allocate the order of authors for a publication. It is available free on its website and provides all the steps for deciding it[16]. Approval from all authors is warranted in case of revision of order of authorship[17].

(4) Conflicts of interest:

- The potential for conflict of interest and bias exists when professional judgment concerning a primary interest (such as patients' welfare or the validity of research) may be influenced by a secondary interest (such as financial gain)[18]. Authors', reviewers' and editors' conflicts arise when their primary and secondary interests contradict each other. Such conflicts may arise in any discipline and negatively affect the validity of related scholarly works[19].
- Any financial, personal, social or other interests that directly or indirectly influence the conduct of the author, reviewer and editor with respect to the manuscript is called as conflict of interest[13]. Examples include research grants from funding agencies, honorarium for speaking at symposium, financial support for educational programs, employment, and multiple affiliations. In addition, non-financial benefits include recognition, career advancement, advocacy for a strongly held position, and support for friends and colleagues[17].
- Conflicts of interest, either individual or institutional, can be real or perceived. Competing interests are not unethical as long as they are revealed. So such interests, where relevant, must be declared to editors by researchers, authors, and reviewers[11].

(5) Ethics related to submission: [13]

- Simultaneous submission: It is submitting the same manuscript simultaneously to different journals.
- Duplicate publication: It is submitting a new manuscript with same hypothesis, methods, data, discussion and conclusion. It is publication of a paper that substantially overlaps with one which is already published, without clear, visible reference to the previous publication[17].
- Self-citation: It is citing own publication out of context.
- These duplications lead to copyright issues, wastes journals', peer reviewers,' and readers' valuable time and also contribute to deviated meta-analysis[20].

(6) Plagiarism: [13]

- Use of previously published manuscript by someone for his/ her manuscript or unreferenced use of other's published and unpublished ideas without consent, credit or acknowledgement is called as plagiarism. This applies whether the ideas or words are taken from abstracts, research grant applications, institutional review board applications, or unpublished or published manuscripts in any publication format (print or electronic). The Office of Research Integrity estimates 25% of the total allegations it has received concern plagiarism[2].
- Most common form of plagiarism is copying text word-for-word i.e. copying

- Plagiarism can be intentional or unintentional. Unintentional plagiarism is usually seen in articles written by students or junior researchers. Lack of awareness and ignorance will lead to unintentional plagiarism. Intentional plagiarism happens when an author deliberately copies documented or published work and presents it as his/her own. Both types of plagiarism are unethical and illegal.
- Plagiarism is considered as serious publication misconduct. It is the worst offence of all the various forms of publication misconduct. The recent increase in the amount of plagiarism is partly due to the pressure that university faculty is under to "publish or perish". The situation is further compounded by the proliferation of electronic publications which make 'cut and paste' an easy option[12]. Also lack of understanding of what constitutes plagiarism and the use of a linguistic support strategy known as patchwriting by non-native speakers writing in English leads to plagiarism[21].
- Types of plagiarism: Direct plagiarism: Complete or partial copying without acknowledging the original author. Self-plagiarism: Duplicates of previous works or sentences. Redundant publications ('salami' publications): Publishing similar manuscripts/ reports based on the same experiments. It is considered segmental publication or part publication of results or reanalysis derived from a single study. Mosaic plagiarism: Where the author steals the idea, opinion, words, and phrases from different sources and merges those without acknowledging the original author[17].
- Plagiarism leads to: Infringement of international copyright law; additional new data wastes the valuable time of expert peer reviewers; needlessly expands the already extensive body of published literature; may unduly overemphasize the importance of the findings by having them appear more than once; may interfere with subsequent meta-analysis by apparently boosting patient or experimental numbers[2].
- How to avoid: Avoid "copy-paste". Write the concept in own words-spend more time. Acknowledge original sources (Even unpublished works). Cite references accurately. Avoid writing several articles of the same type. Use anti-plagiarism software tools like 'URKUND' , 'Ithenticate' or 'Turnitin' etc. (as per University norms).
- To deal with plagiarism: The rule of thumb is that editors should carry the responsibility of trying to detect misconduct and then report it to the culprit's institution and to the authority who must have funded the author's research[12].

(7) Peer review:

- Peer reviewers are external experts chosen by editors to provide written opinions, with the aim of improving the study. It is most often in this review phase of the publication process that untoward ethical issues are discovered[2].
- The review process needs to be timely and fair for authors and for the reviewers[2]. Journals should have clearly defined and communicated policies on the type of peer review used, for example, single-blinded, double-blinded, open, or post publication[1].
- During the manuscript review process, respect for the authors' confidentiality is paramount. He should always bear in mind that the submitted manuscript is an intellectual property belonging to the author[4]. Submitted manuscript should not be retained or copied. Reviewers and editors should not make any use of the data, arguments, or interpretations, unless they have the authors' permission. Reviewers should provide speedy, accurate, courteous, unbiased, and justifiable reports. If reviewers suspect

misconduct, they should write in confidence to the editor[6]. The authors' rights may be violated if there is disclosure of their confidential details during the review of their manuscript[4].

- Reviewers also have rights to confidentiality, which must be respected by the editor. The reviewer should expect his own identity to be kept anonymous, particularly from the authors of the manuscript. Reviewer comments should not be published or publicised without the permission of the reviewer, author and editor[4].
- When making editorial decisions about peer-reviewed articles where an editor is an author or is acknowledged as a contributor, journals should have mechanisms that ensure that the affected editors or staff members exclude themselves and are not involved in the publication decision[11].

(8) Duties of editors: [1]

- Editors are the wardens of the scientific literature and are responsible for maintaining high research and publishing ethics standards.
- Editors' decisions to accept or reject a paper for publication should be based only on the paper's quality, importance, originality, and clarity, and the study's relevance to the remit of the journal.
- Studies that challenge previous work published in the journal should be given an especially sympathetic hearing.
- Studies reporting negative results should not be excluded. All original studies should be peer reviewed before publication, taking into full account possible bias due to related or conflicting interests.
- Editors must treat all submitted papers as confidential. When a published paper is subsequently found to contain major flaws, editors must accept responsibility for correcting the record prominently and promptly[6].

(9) Predatory publishing: [17]

- Predatory publishing is the publication of an article in the journal that lacks the usual feature of editorial oversight, transparent policies, and operating procedure of legitimate peer review journals. Predatory or pseudo - journals exploit the authors by charging the publication fee and deceiving them by providing the false claim about the journal's impact factor, indexing, and peer review.
- Predatory publishing is harmful for both the author and the community. Predatory publishing may tarnish the image of the author. It can misinform the readers and propagate wrong science because of poor quality control. Sometimes genuine information also gets missed because most of the predatory journals are not indexed in the database, so papers are not easily traceable.
- Predatory publishing can be avoided by educating researchers, supervisors, and administrators about fake journals. Authors should also learn how to identify trustworthy journals. If the journal website mentions of indexing, then it is important to cross check the inclusion of the journal in the mentioned databases. Another approach to check trustworthy journals is to self-asses the journal through websites like https://thinkchecksubmit.org/.
- Authors should avoid citing articles published in predatory or pseudo-journals[18].

(10) Advertising:

- Most medical journals carry advertising, which generates income for their publishers, but journals should not be dominated by advertisements, and advertising must not be allowed to influence editorial decisions[18].
- Advertisements that mislead must be refused, and editors must be willing to publish criticisms, according to the same criteria used for material in the rest of the journal.

(11) Scientific misconduct:

- Scientific misconduct is the violation of the standard codes of scholarly conduct and ethical behavior in the publication of scientific research.
- authorship, simultaneous publications, duplicate publications, salami slicing, and non-declaration of COI. Conducting research without informed consent or ethics approval and not maintaining data confidentiality is also a form of scientific misconduct.
  - Institutions and journals both have important duties relating to research and publication misconduct. Therefore, COPE (Committee on Publication Ethics) recommends that editors should refer cases to researchers' institutions and request that they conduct an investigation[22, 23].
  - Culture of publish or perish is one of the important causes of misconduct. The researcher needs to publish a large number of papers in limited time period to get more opportunities in career and research. In addition, lack of knowledge, laziness, and fear of failure and desire of getting recognition also lead to misconduct[1].
  - Consequences of research misconduct: COPE (Committee on Publication Ethics) describes the consequences: 1. Depend on the type of misconduct (Major/ Minor); 2. Author can get blacklisted by member journals; 3.The institution, to which the author belongs to, can take action[13]. When significant unavoidable errors or misconduct occur, published articles should be retracted, and future citation of retracted articles should be avoided[24].
  - Prevention of misconduct: Training is a crucial step in avoiding publication misconduct. First and most importantly, editors have a specific duty to not turn a blind eye to issues that present themselves at the journal[25]. Planning for publications before, during and after biomedical research studies are conducted, promotes the timely dissemination of accurate and comprehensive results. Effective publication planning accounts for the work of all contributors, encourages full transparency and contributes to overall scientific integrity[26].
  - Different forms of scientific misconduct are plagiarism or misappropriation of the ideas of others, improprieties of

Checklist for ethics in scientific publications was shown in Figure 1.

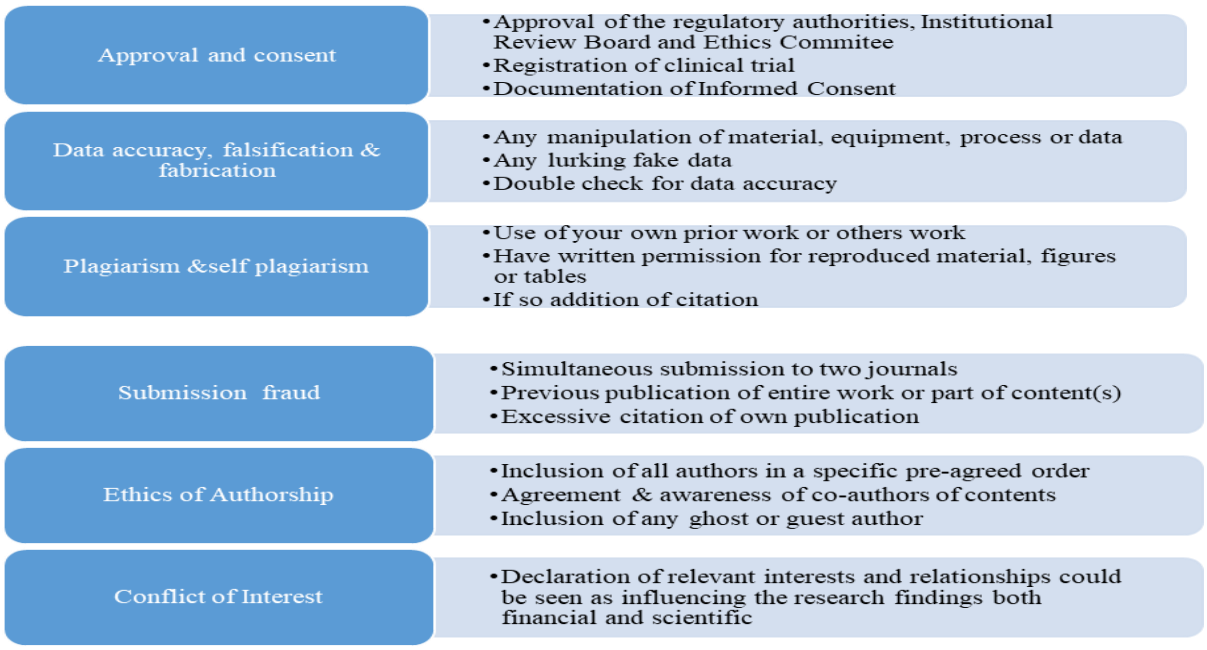
Discussion: Researchers have a duty to make publicly available the results of their research and are accountable for the completeness and accuracy of their reports. All parties should adhere to accepted guidelines for ethical reporting. Negative and inconclusive as well as positive results must be published or otherwise made publicly available. Sources of funding, institutional affiliations and conflicts of interests must be declared in the publication. Reports of research not in accordance with the principles of this declaration should not be accepted.

Unethical acts in research are also a result of moral failure. Research shows that proper education on authorship[27] and plagiarism[28] increase the awareness. However, there are certainly many underlying factors that may add to this systemic failure of unethical research publications. The practice of coercing academicians and research institutes to publish within certain time frames, their promotions being linked to the quantity of publications rather than quality which does somewhat add to substandard research papers which lack quality and ethical integrity. This is also one of the key reasons for predatory journals burgeoning so that students, academicians and researchers can publish due to certain fulfillment criteria. The ethics of research also suggests the idea that useful scientific findings will be circulated for the greater good through various dissemination methods including journals. There is a need to also look at ethics in publication from the angle that all scientific knowledge and publication need to be made freely accessible under some common science

repository not only to increase the quality of research writing but also for advancement of science itself.

Conclusion: The research studies need to be conducted ethically; the privacy and confidentiality of patients, authors and reviewers should be respected; proper rights and permissions should be obtained; and scientific misconduct due to data falsification and manipulation, duplicate submission and plagiarism should be avoided. Whilst such practices do still exist, these can be prevented by having robust institutional ethical processes in place, regular training, and editorial vigilance. All researchers should be aware of these misconducts and their legal consequences some of them can be career ending and very serious. Hence, there is a need of awareness on research ethics needs to be disseminated among all graduates and postgraduate students, as well as strongly include it in their curriculum in order to curb issues of unethical research publications.

Figure 1: Checklist for Ethics in Scientific publications[13]:



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