

The confounding factors leading to plagiarism in academic writing and some suggested remedies: A systematic review

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Abstract

There is a staggering upsurge in the incidence of plagiarism of scientific literature. Literature shows divergent views about the factors that make plagiarism reprehensible. This review explores the causes and remedies for the perennial academic problem of plagiarism. Data sources were searched for full text English language articles published from 2000 to 2015. Data selection was done using medical subject headline (MeSH) terms plagiarism, unethical writing, academic theft, retraction, medical field, and plagiarism detection software. Data extraction was undertaken by selecting titles from retrieved references and data synthesis identified key factors leading to plagiarism such as unawareness of research ethics, poor writing skills and pressure or publish mantra. Plagiarism can be managed by a balance among its prevention, detection by plagiarism detection software, and institutional sanctions against proven plagiarists. Educating researchers about ethical principles of academic writing and institutional support in training writers about academic integrity and ethical publications can curtail plagiarism.

Keywords: Plagiarism, Unethical writing, Academic theft, Plagiarism-detection software.

Introduction

Plagiarism refers to "someone using someone else's intellectual product [such as texts, ideas, figures, or results], thereby implying that it is their own".¹ Historically, way back in 1984, plagiarism was elucidated as "a continuum ranging from sloppy paraphrasing to verbatim transcription without crediting sources".² However, while there is agreement about paradigmatic cases of plagiarism, academics and writers have not agreed on a unified definition of plagiarism. Sox has stated plagiarism "involves stealing someone else's work and lying about it afterward".³ This divides plagiarism into two segments; a) appropriating someone else's work and b) passing it off without acknowledging the original source. Thus a person

downloading the copy-right-protected articles from the Internet, without permission, is committing an intellectual theft. If this act is complemented by passing it off as someone's own work, this underpins the core concept of plagiarism. However, in practice, it is often extremely difficult to distinguish plagiarism due to poor scholarship or insufficient knowledge and deliberate intent to gain unfair advantage.⁴ Plagiarism, also known as 'academic kidnap', can be in the form of plagiarism of ideas; 'word-for-word' or direct-text plagiarism; mosaic plagiarism where the plagiarist intertwines his/her views with those of the primary source and thus presents an erroneous complex write-up; and self-plagiarism where the plagiarist steals his/her own work.⁵ Results of a survey on college students showed that 40% of the participants admitted being involved in the Internet plagiarism in 2005; a 30% rise since 1999.⁶ Other studies have also echoed serious concerns about the staggering rise of this textual borrowing.⁷ For some mainstream journals, up to a third of the published papers have been reported to be plagiarised.⁸ Similar incidence of plagiarism has been reported in medical literature across the world. A report showed that 56% of medical students in the USA plagiarised at least once in their academic career.⁹ Another study reported that 27% of 5th and 6th year medical students and medical interns from the United Arab Emirates did not consider plagiarism as academic dishonesty.¹⁰ A Croatian study showed that 90% of medical students plagiarised their essay-based assignments.¹¹ Plagiarism not only invalidates the assessment process but also negatively influences feedback, thus contradicting the instructional strategy.¹² The assessment and evaluation processes would be undermined by plagiarism, whether or not detected by faculty or other stakeholders. Unidentified plagiarism is more detrimental as nobody will discover that the evaluation process has been undermined. Plagiarism is rampant across all disciplines, such as science, art, literature, music, agriculture, computer sciences and so on. Looking into the magnitude and misconception about plagiarism, this systematic review was planned to present an explicit dossier about its understanding, factors that compel the writers to plagiarise, complexity of metrics of plagiarism, and the remedies to tackle and prevent

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plagiarism.

Materials and Methods

This systematic review followed the guidelines provided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).¹³ A search was conducted for the full-text English-language Review and Original articles published between 2000 and 2015 in the data sources of Inter Services Intelligence (ISI) Web of Knowledge, Medline, Library, Information Science & Technology Abstracts (LISTA) (EBSCO, USA), Science Direct, and Database of Abstracts of Reviews of Effects by using the online search mode of EndNote X 5. Medical subject headline (MeSH) terms "plagiarism", "unethical writing", "academic theft", "article retraction" and "medical field", or "plagiarism detection software" were used in literature search. The data selection in this systematic review retrieved a total of 201 articles that were further shortlisted, during data extraction in terms of the relevancy of topic and the application and validity. Short reports, editorials, letters to editors, personal opinions and commentaries were excluded. Data synthesis step of systematic review provided a final list of 30 articles that were selected for this review. Two independent researchers conducted literature search and any resulting differences were discussed till a general consensus was reached (Figure).

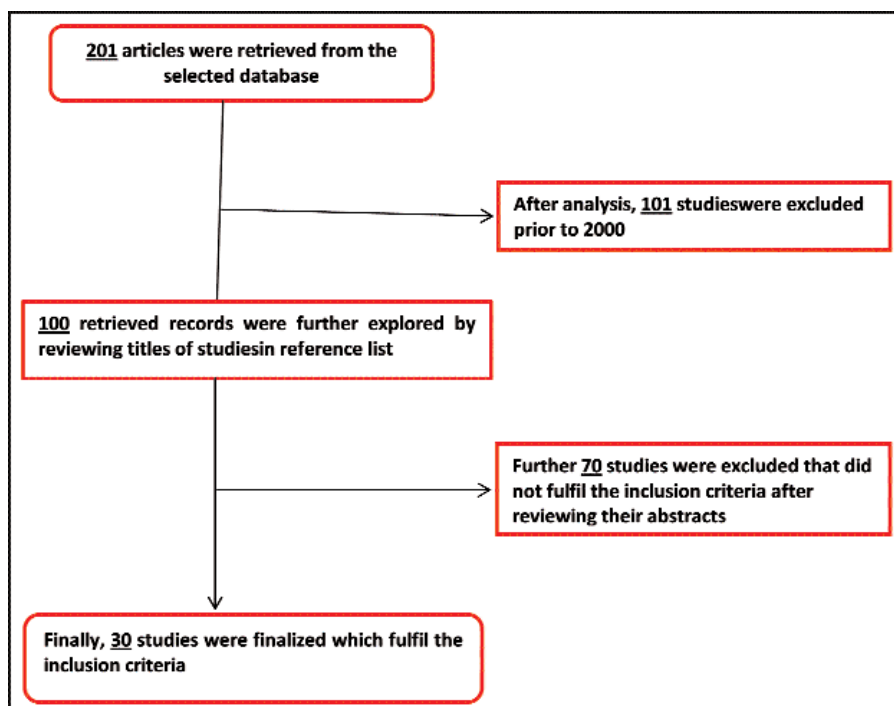


Figure: Flow diagram showing the search design for selection of publications about plagiarism of scientific literature in medicine.

Results and Discussion

1. Causes of plagiarism

Reasons for plagiarism are complex and multi-dimensional that can be broadly attributed to poor language proficiency, weak educational backgrounds, and unawareness of the grave consequences of detected plagiarism.¹⁴ Factors described in literature as the leading causes of plagiarism included: lack of ethical awareness and poor understanding of the principles of scientific writing;¹⁵ unawareness of the consequences and gravity of plagiarism;¹ weak language proficiency and writing skills. Writers may use the original text because they lack confidence to express their views and opinions in English, or because they doubt their ability to convey the real essence of original publication;¹⁶ insufficient skills of using and citing scientific information [quotations, summarising, and paraphrasing];¹⁷ lack of knowledge about the Western scholarly traditions by the non-Western writers;

a. 'pressure to publish' and 'publish or perish' mantra. The faculty, researchers, and eminent writers are under tremendous pressure to increase the number of publications; promotions, research grants, recruitments, and perks by pharmaceutical agencies are some of the motivating factors. This pressure to publish has led to unethical practices and the publications of waste full research;¹⁸ unawareness of the possible mechanics of plagiarism. There is general perception that the Internet-based information is in 'public domain' and is meant to be for public use;¹⁹ easy and convenient approaches to the Internet search engines with immediate access to substantial information, such as Google™ or Bing™, allows and inspires the writers to mash up materials for their write up;²⁰ great majority of institutions have no regulatory policy to implement a clear code of unethical conduct to students or faculty in case of proven plagiarism;²¹ an institution may adopt a lenient approach by simply reprimanding the accused person and thus avoiding a formal investigation, hoping that the problem will not recur.²² Managers and leaders of institutions may try to overlook plagiarism as they might

not be appropriately equipped to conduct an investigation, as well as due to lack of time and documentation. Such lenient approach by institutions encourages the wrong-doers in carrying on with this lapse of academic integrity.

2. Text overlap, originality, and metrics of common words

Plagiarism can be minimal or significant, accounting for entire chapters of books, complete published articles, or stanzas and some sentences. This brings up an important concern about the lower limit of plagiarism. Principally, it may consist of one special word that was used creatively, e.g. for naming a novel concept, thus bringing new dimensions to an area of research.²³ Using common words such as "and", "it", "when", "sometimes", "are" can never constitute plagiarism. Nor can the use of series of words, or stanzas, which are so common that they cannot meaningfully be attributed to a certain writer. The Committee on Publication Ethics (COPE) provides the example of "smokers with chronic obstructive pulmonary disease" being used in science as a standard phrase, with more than 58,000 hits on Google.²⁴ However, if a significant number of ordinary sentences are arranged after each other in exactly the same manner as written by another author, then this may again be considered plagiarism.²⁵ Thus, plagiarism can comprise as little as one word, while there are many standard phrases and terms that will not be labelled as plagiarism even if, in fact, copied from someone else's research write-up. Various institutions, publishers and research centres practise varying scales of plagiarism index to define plagiarism ranging from 10% to 30%.⁸ However, great precaution should be observed by the clients as different plagiarism detection programmes may provide conflicting reports due to the varying depths of analysis and databases explored. By and large, all institutional bylaws oblige the authorities to initiate formal inquiry as soon as the plagiarism is detected; yet the time taken to amass sufficient evidence of quality and quantity can be substantial.

3. Measures to prevent plagiarism

The instant availability of voluminous scientific literature on the World Wide Web appears to be a double-edged sword, allowing plagiarism to be more easily committed, while simultaneously allowing its easy detection by the use of plagiarism-detection software. Since a one-remedy-fits-all continuum is not possible to tackle plagiarism, some solutions to avoiding and treating plagiarism have been outlined (Table-1).

This review has identified the following remedial

Table-1: Some suggested remedies to combat plagiarism in scientific literature.⁴⁹

No.	Remedies
1	Education of students and faculty about the legal regulations on copyright, appropriate usage of literature sources and all other intellectual property formats
2	Academic institutions and higher education regulatory centers should initiate a unified holistic approach and policy statements towards plagiarism prevention
3	Measures for plagiarism prevention and policies about applying these measures should be consistent with legal requirements. Such restrictions should be implemented without jeopardizing the students' rights
4	Implementation of a range of penalties for proven plagiarism
5	Appropriate education of the students and institutional faculty for mastering the writing skills while avoiding plagiarism
6	Institutional support in training and efficient use of the plagiarism detection software
7	A clear learning agenda of monitoring the students' educational process, plagiarism detection procedures, as well as appropriate sanctions and penalties for the accused persons
8	Institutions should not rely upon sole complaints of plagiarism as the only source of monitoring research integrity. Formal continuing mechanisms of evaluating the research environment, such as research audit is essential to maintain standards of research.

measures to avoid plagiarism that have been proposed by various studies fulfilling the PRISMA criteria.

a. Commercially available plagiarism detection software

Wide ranges of commercial and free software are available for the detection of plagiarism. Perhaps the most popular commercially available tools are "iThenticate" [<http://ithenticate.com/>] and Turnitin originality checking [<http://turnitin.com/>] software, which recently partnered with Cross Ref [<http://www.crossref.org/>] to create Cross Check, a new service for verifying the originality of the scholarly content. In addition to providing the similarity index, the programme displays the overlapping text from the original sources along with the breakdown of similarity index from various sources. With Turnitin, overlaps between a submitted text and an archived document are colour-coded according to the degree of overlap, and an "originality report" with a percentage and numerical grade is generated.²⁶ However, it only shows copied sequences and their sources, which may or may not have been appropriately used by a writer.²⁷ Martin analysed graduate student articles by Turnitin software over the course of 5 semesters and reported that 50% submissions had some form of plagiarism.²⁸ The author suggested that, bearing in mind the convenient access to the prewritten material, Turnitin might act as a strong deterrent to plagiarism.²⁸

Other plagiarism detection programmes include eTBLAST, EVE2, CopyCheck, and WordCheck. Major concern is that the reports generated by these software need to be reviewed by a content specialist as there might be unnecessary inflation of the plagiarism index by common phrases and standard formulas and equations. To circumvent this drawback, a group of researchers developed a plagiarism-detection software that utilises human evaluation in combination with computational tools including eTBLAST.²⁹ Following manual verification, highly similar citation pairs are classified into various categories ranging from duplicates with different authors to sanctioned duplicates. Of the 9120 articles screened, the researchers detected 212 pairs of articles with potential plagiarism. eTBLAST is available to authors, editors, reviewers, publishers and sociologists to examine, intercept, annotate and control unethical publication practices.

b. Educational approach for students and faculty

The approach adopted by McCuen is based on the premise that a great majority of cases of plagiarism are unintentional and accidental, and that the problem should be solved by an educational perspective, rather than punitive.³⁰ Plagiarism can be avoided by educating the undergraduate and postgraduate students in certain domains.^{31,32} These include explaining and defining plagiarism to all the students, preferably by using examples explaining what constitutes acceptable and unacceptable degrees of plagiarism; to clearly declare the policy that students' submissions and assignments shall be subjected to screening by authentic plagiarism-detection software; to make the students understand that assessment grades shall be awarded after considering plagiarism reports generated by the plagiarism-detection software; and students should also be trained in developing the cognitive and writing skills, and to expand or elaborate the extant knowledge in a defined research discipline.

Working in the same direction, the generic essence of research need to be cultivated in faculty members in terms of development and implementation of policies and procedures related to plagiarism.³³ At this juncture, it is imperative to distinguish falsification and fabrication, both being intertwining terms considered under plagiarism. Falsification is the act of presenting and/or publishing misleading facts from a research or experiment in order to manipulate the results towards desired objectives.³⁴ Fabrication refers to making up the data for the sole purpose of publication and reporting.³⁵ Writers should cite references, completely and accurately,

Table-2: Educational remedies to prevent plagiarism of scientific literature.³⁸

No.	Remedies	Definitions
1	Paraphrase	Rephrasing the words of an original source, putting his/her thoughts in your own words. Paraphrased text should be cited.
2	Summarize	Involves putting the main idea of one or several publications into your own words, highlighting only the main theme. Summarized text should be cited.
3	Quotation	Quotations are the exact words from a source, word for word. Quotations must be cited. But excessive quotations will again lead to plagiarism!
4	Citation	Accurately and completely cite original source

so that they can be reproduced by other researchers. Incomplete or wrong citation also amounts to plagiarism.³⁶

Remedial strategies have been described in literature that provide practical tips to avoid plagiarism in academic writing^{37,38} (Table-2).

c. Roles of editors, reviewers and writers

Editors, reviewers and authors should rigorously check sources and consider the use of plagiarism detection software.³⁹ The role of editors is more crucial as in case of publication of plagiarised article, the publisher and the journal will have to take responsibility of careless peer review. Some journals check the similarity index of all manuscripts at the time of submission, but the majority of publishers check only accepted articles for plagiarism prior to production. Depending on the journal's policy, the questionable articles are either rejected or authors are advised to tackle plagiarism by paraphrasing and by appropriately attributing the sources. If detected post-publication, articles are retracted and in case of serious offence, authors are blacklisted and their institutions are accordingly informed.

d. Retractions due to plagiarism, fabrication, falsification, redundant and duplicate publications

Retraction implies "a mechanism for correcting the published literature and alerting readers to publications with seriously flawed or erroneous data".⁴⁰ "Articles may be retracted when their findings are no longer considered trustworthy due to scientific misconduct or error, they plagiarise previously published work, or they are found to violate ethical guidelines".⁴¹ Steen examined the causes of retractions of 742 English-language articles from the PubMed during the period 2000-2010, and found that 26.6% articles were retracted due to plagiarism.⁴² Data fabrication was the most frequent type of text plagiarism.

This study reported that the number of articles retracted per year have significantly increased over the past decade ($r=0.96$; $p<0.001$) with an exponential increase in retractions due to academic fraud ($r=0.89$; $p<0.001$).

COPE has suggested that editors of journals should consider retracting a publication if study findings are unreliable, either as a result of misconduct [e.g. data fabrication] or honest error (e.g. miscalculation or experimental error); the findings have previously been published elsewhere without attributing the primary source or permission [redundant publication]; clear evidence of plagiarism; or if it reports unethical research.⁴³

Retraction notices should highlight the reasons and backgrounds for retraction, and should also specify whether the author or the publisher retracted the article. The publisher should clearly notify the retraction on electronic as well as print versions of publications and retraction notices should appear on all electronic searches for the retracted publication. However, if only a small section of a publication shows erroneous data due to an unintentional error, then the problem is best solved by an erratum by the publisher. The term usually specifies a production error by the publisher. The term 'corrigendum' is undertaken as a corrective measure due to an author error. Redundant or duplicate publications are identified when there is evidence of two or more studies, data sets, or publications.⁴⁴ Such publications may overlap the same or similar data, hypotheses, study design, results, discussion, and/or conclusions. At the same time, duplicate publications may have similar or identical authors in varying roles and orders.

A retraction of published article owing to plagiarism, data falsification, data fabrication, and redundant or duplicate publication serves to eradicate literature from erroneous data. At the same time, authors are alerted to be aware of the retracted articles that may leave a reminder to the writers for avoiding research misconduct.

4. Sanctions to proven plagiarism; The Dundee Polyprofessionalism Inventory I: Academic Integrity

Events of potential plagiarism should be reviewed by a Faculty Plagiarism Committee. The proceedings of inquiry shall review the evidence, listen to both parties, and then to apply sanctions conforming to the institutional regulations. The US National Academy of Sciences has directed the scientists to 'act' to the event of a suspicious research misconduct.⁴⁵ However, a global policy to tackle the reported cases of plagiarism is lacking. In this perspective, the most recent development has been the

introduction of Dundee Polyprofessionalism Inventory I: Academic Integrity by S. Roff in 2011⁴⁶ that invites the participants to score the Recommended Sanctions to 30 possible lapses to academic integrity on a scale of 1-10, ranging from Ignore through Reprimand to Expulsion/Report to Regulatory Body sanctions. The evidence-based research has inferred that there were congruency and dissimilarities of perceptions to sanctions of lapses of academic integrity.⁴⁷ These variations of the perceptions of respondents were based on cultural, social and religious variations. Cross-cultural perceptions about the academic dishonesty can help to develop a unified charter of professionalism inventory that might be applied as an e-learning educational forum for needs analysis, including that for international medical graduates moving across different cultures and educational backgrounds.⁴⁸ Key lapses in the Dundee Polyprofessionalism Inventory I: Academic Integrity includes drinking alcohol, forging collaborative work as one's individual work, sexual assault, signing attendance for the absent colleagues, substance misuse, cheating in exam, plagiarism of published literature, and damaging public properties.

Awareness of the sanctions to academic dishonesty, including plagiarism, would certainly deter the wrongdoers. At the same time, the available policies and bylaws imposing sanctions to those pleading guilty will provide the much needed legislative support to institutions.

Conclusion

Plagiarism is more than just a failure to assign quotation marks or to acknowledge a paraphrased text. Duplicate publications, self-plagiarism, falsification, and fabrication also contribute to plagiarism. Institutions and research centres need to invest time, expertise and revenue to train and sharpen the writing skills of the faculty and students. There is a very thin line to distinguish plagiarism from the inability to deal with literature beyond the writer's linguistic and technical skills. Writers, particularly the novices, need to reorganise the concept and discourse of plagiarism. The educational strategy for avoiding plagiarism by paraphrasing, summarising, quotations, and proper citations carries great promise and these writing skills should be inculcated in the researchers' portfolios. Institutional usage of plagiarism detection software, legislative support to applying sanctions to the accused plagiarist, and retractions of the plagiarised articles from literature can be instrumental in arresting the growth of this form of research misconduct.

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