

STUDENTS' CORNER

# Research by undergraduate medical students: Common pitfalls and ethical dilemmas

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## Abstract

*In recent times, multiple attempts have been made to involve medical students in research projects right from the early days of their medical education. Such efforts have started showing results and students are involving themselves in research workshops and activities to understand scientific literature better. However, they need to keep in mind some important ethical aspects which they may tend to overlook. Here, I highlight the loopholes exploited by young researchers and shortcuts used in the process. I also focus on different measures medical students could incorporate in their research to generate quality data, while following ethical practices.*

**Keywords:** undergraduate research, ethics, quality, authorship, publication

## Introduction

The original stimulus behind research was to generate and test interesting hypotheses and contribute to furthering medical science in the process. However, this is now being replaced by the desire to generate a publication-laden profile for oneself. Gradually, we do see the progressive trend of more and more undergraduate students taking up research activities [1]. But while the numbers of research projects undertaken are steadily increasing, do we young researchers understand the importance of adhering to ethical standards in research?

## Quantity over quality

*"It is not the quantity but the quality of knowledge which determines the mind's dignity."*

~ William Ellery Channing

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One of the major hurdles in the path of quality research is the haste and impatience among students. The prime ambition is to do *as much research as possible* rather than doing research which is *as good as possible*. The rat race for career advancement — obtaining research grants, awards, scholarships, and the significance of these in building a strong curriculum vitae (CV) for foreign graduate medical exams — has led to students publishing data without meeting any ethical standards. Researchers also tend to increase the number of publications by "salami slicing" of the research data, or splitting the data from a single study into multiple smaller "publishable" units or "slices" [2]. This is harmful from an academic point of view as important conclusions, which could have been derived had the data been presented as a whole, may be missed and stall scientific progress. Students also prefer to publish data in the form of smaller narrative reviews or short communications instead of the lengthy but standard original research articles, even though their data may be appropriate for the latter.

## Research methodology

First, it is important that students use the F.I.N.E.R. criteria (*Feasible, Interesting, Novel, Ethical and Relevant*) [3] to select a research topic that has important implications for society at large. To avoid duplication, a thorough literature search must precede framing of the research question, an important step we often tend to bypass. Colleges could help by organising sessions or workshops to teach undergraduates the use of PubMed and other search engines.

In order to increase the number of publications, students often take up multiple mediocre projects or compromise on the quality of research by opting for an inappropriate study design just to shorten the duration of the study. It is important to ensure that the aims and objectives of the study are compatible with the methodology, by having the study questionnaire/protocol validated by experts in the field. It is also important to keep in mind the responsibilities of a researcher for the environment by opting for environmental-friendly steps, such as using Google Forms or SurveyMonkey for gathering data, instead of printing questionnaires.

## Bypassing the Institutional Ethics Committee

Owing to the lengthy and complicated procedure for

obtaining permission for a study from the Institutional Ethics Committee (IEC), students may choose to bypass this important step, complete the research and publish it in low quality journals. These journals may not require the author to submit IEC approval documents during submission or editorial and peer review. However, it is imperative that students get their study protocol approved by the IEC as it not only ensures adherence to ethical principles; but makes the study design more robust by bringing out errors or miscalculations overlooked while drafting the protocol. To ensure that students do not skip the approval process, the entire procedure could be shortened and simplified by reducing paperwork, without compromising on the quality of ethical evaluation of studies. The Institutional Ethics Committee could also conduct sessions to orient students in drafting ethics committee proposals and informed consent documents to ease the process of submission, rather than risk a disappointing rejection at a later stage. All medical journals should also mandate authors to upload the IEC approval documents while submitting a manuscript for publication.

### Manuscript preparation

With undergraduate courses in medicine rarely offering hands-on training in academic writing for publication in scientific journals, authoring research papers is a challenge for beginners [2]. There are currently more than 300 different reporting guidelines for various study designs and health research disciplines — EQUATOR Network being the most comprehensive source of these guidelines [4]. However, the awareness amongst students about this is extremely poor. A study conducted by Ravi et al to assess adherence of published case reports to the CARE guidelines among PubMed-indexed Indian medical journals revealed that, of the 36 Indian medical journals they evaluated, most had only “average” adherence. Less than 5% case reports mentioned taking informed consent from the patient before publication, and only one journal displayed or mentioned the guidelines on its website [5]. Students must refer to these guidelines before beginning to write the manuscript. This would improve the quality of data reporting, which would be beneficial to the entire medical fraternity and simultaneously guide the novice medical student in writing standard articles. Students should also visit the “Instructions to Authors” section of the website of the journal they intend to publish in, for further modifying the manuscript according to the journal’s requirements.

Involvement of young researchers in misconduct such as plagiarism, fabrication and data falsification while reporting the results of their research is another worrisome trend [6]. Students must realise that a negative result is as significant as a positive one, and only when the reported data is genuine will it help in the advancement of the scientific community. The practice of “guest” authorship (authorship given to those who are not associated with the study) is also increasingly being adopted by students, so as to increase the manuscript’s quality and credibility, hoping that this would increase the chances of acceptance in a high quality journal [7]. The profile

of a researcher no longer depends solely on the number of publications, but is now judged based on the cumulative impact of one’s output and performance, measured by various indices such as the “h-index” [8]. Hence, students are also engaged in a quest to increase the number of citations of their articles for which they tend to resort to unethical means such as inappropriate and exclusive self-citation [9]. Quid pro quo arrangements such as granting ghost authorship to colleagues and preferentially citing their articles in one’s own paper in return have become increasingly common.

### Publication

*“If you’re going to try, go all the way. Otherwise, don’t even start.”*

~ Charles Bokowski

At the end of the study, the student is left with little energy and patience and generally wishes to quickly finish the process of publication. Here comes the dilemma of choosing a high quality, peer reviewed and indexed journal or going in for a medical students-run journal, or sometimes even a predatory journal. Impact factor and indexing of the journal could be the parameters that guide students on the choice of journal in which to publish their work. Students who face rejections from high quality journals with low acceptance rates tend to eventually submit their work to predatory journals. They should avoid this at all costs. Predatory journals are those which publish low quality, amateurish, and often unethical academic literature against monetary payment [10]. A systematic peer review is vital for young authors as it encourages them to increase the quality of published data. It is an indispensable aspect of academic writing to guard against unwarranted claims and erroneous interpretations after thorough scrutiny by subject experts [11]. However, predatory journals bypass this important procedure, thus assuring publication with a quick turnaround time, which attracts and incentivises students to approach them. In contrast, high quality academic journals take significantly longer to publish articles because they go through rigorous peer review. Journals with a high standard have a very low acceptance rate and students often feel discouraged by the critical remarks of the reviewers, which make them believe that their study has no chance of being published in a reputed journal, while competing with the research output of senior doctors.

It is more important to do things the right way than to do them quickly. The process of finding an appropriate platform to publish our studies could be long and tiring, and we may encounter numerous rejections along the way. However, we must realise that choosing the right platform to publish is not just beneficial for us, but is also important for the progress of medical science at large. Publishing is an indispensable aspect of research, and it is our ethical responsibility to complete what we started, in spite of the obstacles encountered.

## Conclusion

Today, students are forced to undertake research and publish because of the growing “publish or perish” culture. Hence, they resort to unethical research and publication practices right from their formative years. While some may argue that the motivation to do research does not matter, unethical means employed to hasten the process, bypassing critical checkpoints, is concerning. This defeats the purpose of inculcating the spirit of research and evidence-based medicine among students. Therefore, rather than having a publication-rich CV as a bench mark of good student performance, we must have some other indicator of the overall learning experience of students in medical school. Recently, several attempts have been made at different levels to increase participation of medical students in quality research activities. The incorporation of research electives in the newly introduced Competency-Based Medical Education curriculum and formation of student-led research councils such as “A.S.P.I.R.E: Association for Support and Propagation of Innovation, Research and Education” [12] at the institutional level are significant developments in this regard. Such measures will have a profound impact on the ability of students to comprehend and analyse scientific literature and will enable them to make their own substantial contribution to the field, right from the start of their career.

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