

A holistic approach to remove the bottlenecks and to improve the quality of medical research in India

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ABSTRACT

The current trend of conducting research and publishing the same to fulfill the academic or professional requirements can jeopardise what research actually means in health sciences. Rather than highlighting how many publications one can have, or showcase the expertise as a researcher, research can inform knowledge gaps and address the same in a replicable and scientific manner. More importantly, for low- and middle- income countries like India, research can be a powerful tool to assess healthcare problems at the primary care and develop innovative solutions to strengthen health systems at the grass root level. It can be argued that, enriching research portfolio for an individual is a misleading approach whereas research has much more to offer to the society at large. In the context of in primary care, academic and implementation research is important for several distinct reasons. The practice-based research can inform better practice through communicating the concerns or findings from research with key stakeholders of primary care. If the primary care practitioners are equipped with fundamental research skills, it may help them to become better critics and evidence-based practitioners. Publishing research findings in a good scientific journal is not an easy job. A lot of time and resources are often required from the submission process to publication. There are many obstacles for publishing a research, some are inherent some are man-made. In this article we describe our experiences about the bottlenecks that we have faced while conducting medical research and we have also prescribed some possible solutions which can help to the researchers in future while conducting medical research.

Keywords: Article processing charge, authorship, case study, citation, medical research, indexing, impact factor, language editing, meta-analysis, predatory journal, on-line journal, original article, plagiarism, print journal, *P*-value, qualitative study, quantitative study, review article, review of literature, systemic review, meta-analysis

Publish or Vanish: Dilemma of an Academic Career

In medical colleges in India, a medical graduate who is pursuing post-graduate (PG) courses including MD/MS/DM/MCh is supposed to write a thesis as a part of the course requirements.

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In the current scenario of medical education in India, this offers the first exposure of medical research to the PG scholars. After completion of thesis, they often publish their research findings in a journal related to his/her specialty. In the due course of career, s/he may seek a job as Senior Resident. During job interviews, particularly for the senior residencies, 10% marks are allotted for research papers to evaluate the research expertise of the candidates. Later again, the same individual applies for the job of an Assistant Professor in any medical college, s/he is again asked for presenting research papers which were published

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earlier [Table 1]. It is clearly mentioned in the Medical Council of India (MCI) notice [Table 1] that for promotions in medical career, at least 2 original articles are required to be published as first or corresponding author, in addition to the teaching experiences in prior workplaces.^[1]

The current trend of conducting research and publishing the same to fulfil the academic or professional requirements can jeopardize what research actually means in health sciences. Rather than highlighting how many publications one can have, or showcase the expertise as a researcher, research can inform knowledge gaps and address the same in a replicable and scientific manner. More importantly, for low- and middle-income countries like India, research can be a powerful tool to assess healthcare problems at the primary care and develop innovative solutions to strengthen health systems at the grass root level. It can be argued that, enriching research portfolio for an individual is a misleading approach whereas research has much more to offer to the society at large. In the context of in primary care, academic and implementation research is important for several distinct reasons. Firstly, research is essential for the practitioners to learn new things, both from primary sources (e.g. new or unusual cases appearing in the primary care settings), or secondary sources (analyzing and appreciating scientific evidence published in reputed journals). To strengthen knowledge-based primary care practice, primary care practitioners have to stay updated with advances in medicine. Secondly, the success of primary care is contingent upon many contextual and systemic factors. In a given population, a primary care provider may need to evaluate how to deliver optimal services to the target population. In such a scenario, quick and effective approaches like formative research can help the primary care providers to better understand the barriers or facilitators of primary care and communicate the findings with other colleagues working in same or similar contexts. Thirdly, consolidated findings from primary care research can inform regional, state-level, and nation policymaking processes. This can help the development of a resilient primary care system through informed decision-making process. In this way, the practice-based research can inform better practice through communicating the concerns or findings from research with key

stakeholders of primary care. If the primary care practitioners are equipped with fundamental research skills, it may help them to become better critics and evidence-based practitioners. Many practicing doctors may not be interested in research. Still, they have to complete the mandatory MCI criteria of promotion, i.e. requirement of publishing two original articles.^[1] Publishing in a good scientific journal is not an easy job. A lot of time and resources are often required from submission process to publication. There are many obstacles for publishing a research, some are inherent some are man-made.

In this article, we describe our experiences about the bottlenecks that we have faced while conducting medical research.

Research, whether it is a discovery or invention, is an expression of innovative thinking of human mind followed by observed chronicles or experiments. If any research is bounded by pre-determined/prefixed/restricted conditions like criteria for papers, indexing, impact factors, the quality of research may then get compromised.

Whenever we try something too hard and restrict the natural path of a flowing river, it is flooded over and simultaneously collateral damage occurs too. The same is applicable for free-flowing thought processes in human minds, in this case, the researchers.

In most of the resource-constrained countries with ineffective education systems, the foundation of restricted thinking is often laid during school age in the form of rote learning, home works, exams, discouragement of questioning etc., Students are rarely encouraged to question their teachers, whenever they try to learn new things, a structural violence often makes them disappointed. This process may continue beyond elementary education and become a norm in higher and specialized education as well, and medical science is no exception to that. Such processes may inhibit the curious minds in medicine, both in academia and practice, to raise questions and learn new things – which are the essential steps of research.

Research Publications: Key Questions

Now, we describe the various concerns that we need to consider about our research publications throughout academic and professional engagements.

Does the journal fall in the fake/predatory category?

Whenever we are putting conditions on research, we are creating a demand which may not be realistic all the times. The same is taking place in the cases of medical teachers as described in Table 1. To meet this demand, many of us taken the alternative path, which is quite natural. As a result, fake journals have emerged as a boom to the upcoming young faculty/researchers.

Surprisingly, almost 80% fake/predatory medical journals are publishing from India due to huge man-made demand. These kinds of journals publish anything without any peer review

Table 1: Regulations for appointment of Medical teachers in India

Posts	Aca. Qual.	Teaching & Research Exp.
Professor/Addl. Professor (8 year of Post PG Experience)	A post graduate qualification MD/MS in the concerned subject and as per the TEQ Regulation	Associate Professor in the subject for 3 years in a permitted/approved/recognized medical college/institution with 4 Research Publications in Indexed Journal on cumulative basis with minimum of 2 Research Publication during the tenure of Associate Professor as 1st Author or as corresponding author.
Associate Professor (5 year Post PG experience)	A post graduate qualification MD/MS in the concerned subject and as per TEQ Regulation	As Assistant Professor in the subject for 4 years in a permitted/approved/recognized medical college/institution with 2 Research Publication in Indexed Journals as 1st Author or as corresponding author.
Assistant Professor	A post graduate qualification MD/MS in the concerned subject and as per the TEQ Regulations.	3 years Junior Resident in a recognized medical college in the concerned subject and one year as Senior Resident in the concerned subject in a recognized medical college.

process. For that, we have to pay a good amount of money. Even now, the term “Ultra Rapid Processing” has become quite popular. By this method, an article can get published within 7 days, sometimes as fast as 2 days, by just paying double the amount of money.^[2]

Do you have money (Article processing charges) for publishing your research?

As per research data, most of the medical journals demand money in the name of Article Processing Charges. It ranges from 3000-100000 INR depending on the reputation of the journal. So, if some institution/individual does not have funds, then the article publication is not possible at all, despite having a good research material.^[3]

There is also a mechanism of fees waiver (even for low-income countries like India in international journals), If some researcher requests for it, after providing a proper reason, they may waive the fees partially or completely. But it is not a very common picture. Even it is done; it seems like a corporate social responsibility, as the journals main aim seems to make profit/business. For survival of any medical journal, money is required. So we have to think about the middle path where interests of both parties are maintained.^[3]

Is your article well-indexed?

Now if we talk about indexing, there are lots of indexing agencies the question here arises is, which one, to consider? Some scholar may argue that PubMed^[4] is the best. In that discourse, the next question is, are all non-PubMed journals really bad?

Lack of consensus among Medical College Bodies/MCI also creates a critical problem. In India, some Medical Colleges recommend Pub-Med indexing, others are Scopus, and yet some of them are preferring Index medicus (for the South East Asia region) or Index Copernicus (minimum/benchmark).^[4] This situation is quite frustrating, misleading and alarming for the younger scientific community. Although University Grants Commission (UGC) has come out with a list of medical journals^[5] as a knee jerk response, still it does not look promising. They keep on adding or deleting many Journals on regular basis. Hence, this lack of consistency leads to lack of accountability and credibility. If a medical researcher has published in a previously recognized journal and if now that journal has been deleted/derecognized, then what will be the status of his manuscript/research? Will it be acceptable for others for academic or citation purpose?

Another important thing is, if a research published in Copernicus indexed journal having high impact on human lives and another research in Pub-Med indexed journal having low impact, which one will be appreciated? These are the basic questions we need to answer.

What is the impact factor of your journal where your article has been published?

“The impact factor (IF) or journal impact factor (JIF) of an academic journal is a measure reflecting the yearly average number of citations to recent articles published in that journal. It is frequently used as a proxy for the relative importance of a journal; journals with higher impact factors are often deemed to be more important than those with lower ones.”

Nobel Laureates like Peter Doherty, Bruce Beutler, Joseph Goldstein and Paul Nurse are against Journal Impact Factors. They all cordially supported the “San Francisco Declaration” which conclude that “you can’t judge the quality of research by just looking at the Journal Impact Factor.”^[6] Interestingly, Dr Peter Ratcliffe was jointly awarded the 2019 Nobel Prize in Medicine -- along with William Kaelin Jr., Sir Peter Ratcliffe and Gregg Semenza -- for their pioneering research into how human cells respond to changing oxygen levels. However, a 27-year-old letter doing rounds on the internet reveals that his award-winning study on cells and their adaptability to oxygen, was rejected for publication by a very reputed science journal in 1992. The journal in 1992 had concluded that Ratcliffe's study was unfit for publication as the direction of research was something which was beyond their understanding. This kind of examples are not uncommon.^[7]

The National Health and Medical Research Council – Australia’s major medical research funding body is also officially opposed to Impact Factors. They has also outlawed reporting them in grant applications. The list of A star, A, B and C ratings for journals has and recommends against institutions continuing to use it. As per their opinion, “Impact Factors represent the average number of citations for each paper in the journal over a two-year period. They are unreliable. They can be gamed in various ways, such as including a lot of reviews in a journal, and they can be heavily influenced by one or two “jackpot” papers.”^[6]

In summary, Journal Impact Factors are a crude short cut to the proper job of estimating quality – they come across as a type of pre-judgment, a prejudice.

There are many factors which are responsible for accepting manuscripts in high impact factor journals, among one of them is big data. If a researcher does a single innovation in a single timeframe with limited sample size, whether his research will be considered by a high impact factor journal?

It is partially true that impact factor is necessary for judging a medical research. This is because the use of impact factor system is more or less generalized. Additionally, stream-wise or subject-wise also, the impact factor differs. As for example, if a journal of public health journal which has relatively low impact factor, publishes an operational research and helps millions of people, in contrast to it, if a journal of neurosurgery with high impact factor publishes an article which helps, but relatively a

smaller number of people. In this case, how can we judge that which research has more impact?

The irony of the situation is millions of live saving public health research is being recognized as a low impact factor journal and neurosurgery journal where research is catered to a destined for a special section or fewer has been recognized as a journal of high impact factor.

How many citations do you have?

A citation is defined as “a reference to a published or unpublished source. More precisely, a citation is an abbreviated alphanumeric expression embedded in the body of an intellectual work that denotes an entry in the bibliographic references section of the work for the purpose of acknowledging the relevance of the works of others to the topic of discussion at the spot where the citation appears.”^[8]

A common question we used to ask to our scientist colleagues- How many citations will be considered for an article to be labeled it as impactful?

As an example, if an innovative researcher does a noble research and publishes an article on it (though with difficulty), and it is very unique, maybe in the future, very few researchers can understand it and do further research on it, so in that case, this innovative research could get less citation than a scientist who is doing conventional research on common topics like tuberculosis, under nutrition, maternal mortality or etc., As per rule/convention, citation is an important marker of quality of a research. It means more the citation, the more impactful is the research. As mentioned earlier, if contemporary research/uncommon topics get less citation than conventional research/common topics then how can the formula of citation holds true?

Is your study “statistically significant”?

The *P* value is used all over statistics in Medical Sciences like other branches, from t-tests to regression analysis. Everyone knows that you use *P* values to determine statistical significance in a hypothesis test.

Despite being so important, the *P* value is a slippery concept that people often interpret incorrectly. In any research we tend to neglect the values where *P* values come insignificant. We even reject the “statistical non-significant” findings which are very important. Unfortunately, *P* values often determine what studies get published and what projects get funding. This is not good at all for research perspective.^[9]

Do you have any previous supportive study? (Review of literature)

In any noble research, reviewer and editor insist upon review of literature. If the topic is very uncommon and we don't get any/much references of similar research, then how do we go

about it? Many fresh ideas keep on emerging but are thrown away regularly just because we don't have enough previous evidence.

As an example, a research hypothesis on “*Taste Modification*”^[10] was rejected in more than 20 journals, as most of the reviewer thought that the research was not validated by previous research (ROL). But after publishing it in a local journal, when it was circulated amongst the scientists, and few of the top most scientist in India also started thinking of doing the similar research as they thought it will be very impactful for prevention of Non-Communicable Diseases. This is the irony of modern research. We think everything under the normal curve. If deviance appears in positive or negative direction, we quickly reject it without considering it for the second time.

One may argue that we can do experimental studies. But due to feasibility issues, most of the times it is not possible to do such research at all. Till now, we don't have the answer about how to move further for such research ideas?

Do you have publication in the national journal or international journal?

Another important question is, some organization give weightage to the research published in the international journal over national journal. Then again, our question is – which research is more important? Research published in a national or an international journal?

From common sense, we can say that these are not comparable. Still, we can always look at the impact level. For example, if impact on lives of a national research (published in national journal) is more than an international research (published in international journal), then we can give weightage to the national journal. But in reality, opposite scenario is observed. Commonly, international research article are preferred over national research article irrespective of impact on our lives/ outputs.

Your article is published in which version of the journal – Print/Online/Both version?

As per MCI guidelines, for academic or for promotion purpose, only those journals are considered, which have both the online and offline versions. Imagine, if a good international journal publishes only online version, and important research has been published by a researcher in these, still, his/her research will not be considered worthy? On the contrary, a poor-quality journal fulfilling the above-mentioned criteria is considered as good. This kind of discrimination may have negative impact on the research as well as researchers across the globe.^[1,5]

Qualitative vs. quantitative research – Which one you have conducted?

It is often observed that quantitative study is more popular in Medical Sciences. This is due to multiple reasons. Firstly,

quantitative study provides data, and nowadays, data is very valuable for business perspective. As an example, if we know that in a city, 20000 people are suffering from chronic liver disease, the data will be useful for owners of Centre for Hepatobiliary Sciences as well as the researchers. Whereas, if we do qualitative research and we find that excess of alcohol drinking is associated with it, then the research will not be considered as important as it will not give business. It can even be devastating for liquor shop owners if the government decides to close all the liquor shops in the city. Moreover, the government will also lose on revenue. Therefore, qualitative or mixed-method studies may inform in-depth understanding of a social health problem.

Authorship – How many articles you have published as a first/corresponding author?

As per MCI norms, the credit of original articles goes to the first author and the corresponding author (previously 1st and 2nd author).^[1] For promotion purpose, only these 2 authors get credit, and the others do not. So, the moot question is why other researchers will show interest in a collaborative research, other than first and corresponding author? As a result, if the amount of data becomes large or the research is very difficult, then it is impossible to complete the research by two motivated researchers. This kind of policy/attitude is enough to demoralize any young researchers who are in a learning phase and cannot perform research as a first or corresponding author. This does not hold true in developed countries, where no such discrimination exists regarding authorship.

Another important factor is if a research articles emanates from a Project, and many Co PI's (Co-Principal Investigators) have contributed to the research work both in field and paperwork/desktop work, still we can give contribution to maximum of five more researchers excluding the PI (Principal Investigator) which further demotivates the other researchers who have contributed perhaps equally in the research work in contrast to International journals which acknowledges the work of even 12 authors or more.

Which type of article have you published? – Original Article/Review/Letter to Editor/Case Study?

As per guidelines of UGC (University Grants Commission)/MCI (Medical Council of India) for promotion purpose, only original research is acceptable. So here the concern is, if we do research other than original article, will our research be given adequate importance? So why people will engage themselves with such forms of research, when these researches are given less significance, although we cannot ignore the role of review article/case studies or opinion papers. Such researches also enrich our scientific literature. This kind of academic bias is not good for any scientific community. In scientific papers, it is already mentioned the importance of various kind of studies, including case studies, still we are harboring this kind of negative attitude.^[1] Other forms of scientific writing include systematic review, meta-analysis, and meta-synthesis of the empirical studies, which

offer one of the most powerful evidence for policymaking and practice. Considering such write-ups whenever appropriate can inform better science and practice in academia and primary care.

You have not used proper English

Some of the Medical journals prefer British English and some of them prefer USA English. Then, what about our Asian English? We need to remember that English is just a language and not the marker of our intelligence (research). Unfortunately, most of our publications get rejected due to our native English. Why is this still happening? After over 50 years of colonial independence? As a result, nowadays, 100 plus English/Language editing companies are mushrooming all over the world and running a profitable business. If our research is understandable in English or any language irrespective of British, USA or Indian English, we should acknowledge it and it can be translated/edited by the Journal/University itself, without spending an extra penny on third parties.

Your article is Plagiarized by >15%

The verb “plagiarize” is defined in the Shorter Oxford as follows: (Plagiarus - Latin - an abductor; plagiare - to steal) “Take and use as one's own (the thoughts, writings, inventions, etc., of another person); copy (literary work, ideas, etc.) improperly or without acknowledgement; pass off the thoughts, work etc., (of another person) as one's own”.

Plagiarism thus involves claiming credit for ideas or creations of others without proper acknowledgement. To plagiarize is to give the impression that you have written or thought something that you have in fact borrowed from someone else. There are different types of Plagiarism – *Plagiarism of ideas, Word-for-word plagiarism, Plagiarism of sources, Paraphrasing, Dropping Names, Plagiarism of authorship* etc.^[1] All such tactics reflect an unworthy disregard for the contributions of others. This is also happening in Medical Research.

Multiple software are currently available in the market for detection of plagiarism but we cannot be conclusive about the accuracy of these platforms. Additionally, plagiarism detection software may also include common terms like-cardiovascular diseases, cancer, hypertension within plagiarism report as a result, in most cases the similarity index/plagiarism percentage crosses over 15% and creating trouble for the young researchers. Another problem is, there is no consensus among medical universities in India about the acceptable cut off percentage of similarity index, in some medical university, some consider 10% as acceptable, and some consider 15%, which is very confusing and disturbing to us.^[12] Last but not the least, most of the standardized plagiarism-checking tools require paid subscriptions, which may make it difficult for academicians and primary care practitioners in resource-constrained nations to use the same for their scientific communications.

Discussion and Recommendations

Before discussing anything, we have to keep in our mind that MCI is the highest and oldest authority for medical teaching in India. Our purpose of this paper is not to criticize/question anybody. But we can express our problems we are facing as a medical teacher.

It is already clear from the MCI notice that these days, almost in all interviews for medical teachers, weightage are given for publications. So, the number of published articles becomes a passport for jobs or promotion. As a result, 'publish or perish' syndrome develops. Some mechanisms need to be developed so that publishing at any cost does not become a compulsion for job/promotion seekers.

In fact, the prevalent state of value system in our society where everyone searches for easy formula for 'success' or 'sustenance' has created breeding ground for unethical practices in medical research. We need to create a pressure-free research environment. The procedural barriers of authorship, indexing, nitty gritty of impact factors should be removed or criteria should be relaxed for suitable persons. Plagiarism should be discouraged and affordable options to evaluate plagiarism with optimal accuracy should be explored. Moreover, new ideas should be welcomed irrespective of previous Review of Literature. This requires education of the potential authorities. We need to advocate cultivation of honesty among the researchers and health administrators. There is also a need to formulate and declare a policy of acknowledging all kind of research, particularly those related to primary care and health of the mass population. We should give equal importance to qualitative as well as quantitative research depending on our research questions, not for meeting conventional requirements. We have to think beyond the *P* values. All research should get due credit, if it is impactful to human life with respect to time, place and person. For managing funds for APC, the universities should come out with adequate budget. Even universities can run journal with their own budget (some are doing but, half-heartedly). The APC should be regulated.

The intention of MCI is good, i.e. to maintain a uniform and basic standard of research, improving the quality of our research all over our country, but it ought to be more flexible. We have to remember that as a teacher/educator, we all may not be interested in research. Some of us may be interested to educate students, looking after patients, empowering communities more, so the criteria of promotion for teachers/educators should be flexible for the right candidates. Open access policy and flexible regulations is the key, to curb the unethical practice and promote quality research in the medical community.

Conclusion

To conclude, research in medical education and practice needs to be reoriented to make it useful for the researchers, primary care practitioners, other healthcare professionals, and more importantly, for the people who must benefit from

such intellectual explorations. Institutional policies should adopt an inquisitive mindset and encourage burning desires of researchers and practitioners to help the humanity by removing the bottlenecks of conducting and communicating research. A culture of research-based learning and practice may benefit the young healthcare scholars to learn and work in a better way and improve healthcare for millions of disadvantaged people.

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Conflicts of interest

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