

Usefulness of a workshop on scientific writing and publication in improving the baseline knowledge deficit among postgraduates

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Background: A well-written manuscript published in a reputable journal is the deserved end-point of good research. It is important for postgraduates to be trained in scientific writing for their academic progression as well as the advancement of science.

Methods: A day-long workshop on scientific writing and publication was conducted at Raipur, India in February 2020. The medical postgraduate (UK equivalent: Core Medical Trainee) participants were engaged with lectures, discussions and a practical session requiring critical appraisal of a manuscript. The lectures also discussed publication ethics and the perils of falling prey to predatory journals. Pre and post-workshop surveys were given to the participants to assess the impact of the workshop on the baseline knowledge of scientific writing and publishing.

Results: Out of 69 participants, there were 67 (response rate 97%) and 41 (response rate 59%) respondents to the pre and post-workshop surveys respectively. The former identified a lack of baseline knowledge ranging from 6% for determining the components of the individual sections of the manuscript such as Introduction or Methods, 40% for the use of acronyms, and 55% for knowledge of different referencing styles, to 61% for knowledge of indexing agencies. The post-workshop survey revealed improvement in participants' knowledge of the contents of various sections of the manuscript and their knowledge about referencing styles and indexing agencies. In the post-workshop survey, 20% of respondents said that they would be open to engaging with predatory journals, which underscored the need to educate them continuously regarding the demerits of such practice. Participants expressed the need for longer workshops, preferably spread over two days, with discussion on research methodology and statistical analysis, and more 'hands-on' sessions.

Conclusion: This survey underscores the need for structured training in scientific writing. Its inclusion in the medical postgraduate curriculum appears desirable.

Keywords: paper writing, manuscript writing, publishing, journal selection, indexed journals, predatory journals

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Introduction

Good research contributes to the advancement of science and helps society at large only when it is published in a peer-reviewed journal. Published manuscripts preserve and chronicle the scientific advancements over time. They are an

important platform to share experience and stimulate debate. Not only the results, but the 'why' (objectives) and the 'how' (methods) of the research merit dissemination as well.¹ Well-defined objectives and methods, even in a study on a smaller scale, can stimulate larger studies. They add to the existing science or help prevailing practices to evolve for the better.

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For some medical professionals, publishing is a career requirement.² Nonetheless, it must be taken up by all as it helps the individual as well the specialty concerned to evolve. As science advances, it updates knowledge and hence has the potential to translate into better healthcare.³ As more and more people publish, the body of theory increases and increased competition leads to enhanced quality of research. Submission of manuscripts to a peer-reviewed journal brings back valuable feedback from editors and peer-reviewers, which helps iron out errors in research and improve the writing. Publishing in reputable journals brings recognition and prestige to the individuals, it helps them improve their academic standing and can enhance their chances of receiving funding for further research. Recognition gained in the specialty helps in establishing networks with other researchers working in the same field.¹

The ultimate goal of publishing is to convey the research in a scientific language that at the same time is also easily understood by the majority of the target readership.⁴ A good writer should be able to recognise which part of the manuscript a reader would go to for certain information. That is why it is necessary to adhere to the tenets of scientific writing. It is necessary to ensure that the specific sections of manuscripts contain only the information that is meant to be under the particular heading, and even unstructured manuscripts should follow a systematic flow of information. The process of scientific writing starts even before the research, continues during and after the experiments and includes knowledge about existing standards of reporting research in biomedical publications.⁵⁻⁷

Medical professionals worldwide are expected to start publishing independently immediately after their postgraduation – a phase where they were exposed to little or no training in scientific writing. The common hurdles to publishing include lack of skillsets and understanding of the process of scientific writing, and the lack of time, confidence and/or encouragement.⁶ Inadequacies at writing outweigh the inadequacies at research by far when it comes to the reasons for non-publishing of manuscripts.⁸ The hard work put into research should not be undone by the failure to publish because of poor writing. Therefore, there is a need to conduct structured training in scientific writing at the postgraduate (UK equivalent: Core Medical Trainee) level. Young researchers also need to be apprised about predatory journals at the beginning of their careers. Predatory journals actively solicit articles from authors and publish them for a fee. They have no editorial overview and do not subject manuscripts to peer-review.⁹

To disseminate knowledge and awareness regarding scientific writing and publications, the editors of the *Indian Journal of Rheumatology (IJR)* and the *Journal of the Royal College of Physicians of Edinburgh (JRCPE)* have been conducting workshops for postgraduate students for the last few years. Whereas the *IJR* has made provision for a separate grant for conducting scientific writing workshops at various medical schools across India with a focus on postgraduate students,

the *JRCPE* has a separate 'Education' section which contains articles related to the field of medical education, and has included research on ways to improve learning. Our objective for this study was to assess the existing knowledge deficit among postgraduates and the benefit of such workshops to them.

Methods

A day-long workshop on 'Scientific writing and publication' was conducted at Pandit Jawahar Lal Nehru Memorial Medical College, Raipur, Chhattisgarh, India on 22 February, 2020. The faculty for the workshop were editors of peer-reviewed journals i.e. *IJR* and the *JRCPE*. The call for participation to the medical postgraduate students in this workshop was made through official invitation letters sent via the heads of eight medical teaching institutions in and around Raipur. A majority (70%) of the participants were in the second year of their three-year training.

The participants were provided with printed questionnaires which they were asked to fill in and submit before the workshop commenced. The pre-workshop questionnaire had 17 items (see online supplementary Table S1) to assess participants' current standing in the research field, interest in research, understanding of scientific writing and publishing, and expectations from the workshop. The topics of the survey questionnaire were determined by the systematic evaluations the authors have carried out of previous workshops, also taking into account informal feedback received from participants over a period of time.

The workshop had nine lectures which were each followed by interactive sessions. There were lectures to discuss the preparation of the various components of a manuscript: the introduction, methods, results, discussion, abstract, title, keywords, and bibliography. Other lectures discussed the importance of research and the issues related to journal selection, authorship, plagiarism, and publication ethics. The participants were apprised of the importance of reporting cases to journals and how they were important stepping stones to those who were new to the field of publishing. There was an emphasis on educating the participants about predatory journals, and why and how they should prevent themselves from falling into the trap. These discussions were followed by a practical session where participants were divided into four groups with a mentor for each group. In this hands-on session, the participants had to critically appraise a dummy manuscript and share their observations.

Participants were asked to fill a 12-item printed post-workshop questionnaire (see online supplementary Table S2). Seven items in this questionnaire were repeated from the pre-workshop questionnaire to assess how the workshop had impacted the baseline knowledge of the participants about scientific writing and publishing. Other items assessed the usefulness of the workshop for the participants and what more they would have wanted in the workshop.

The anonymised data were analysed using SPSS software for Windows, version 26 (IBM, Armonk, NY, USA). Paired responses from the pre and post-workshop questionnaires were subjected to Chi-square test.

This was a survey of healthcare professionals and surveys of this nature are exempt from ethics committee review as per local guidelines.

Results

The workshop was attended by 69 postgraduates and the pre-workshop questionnaire had 67 respondents (response rate 97%), of whom 55 (82%) had not attended a similar workshop previously. Of all the respondents, 42/67 (63%) expected the workshop to provide them with orientation, while 24/67 (36%) expected to learn enough to start publishing right away. Fifty-nine (88%) participants replied to an open-ended question on 'what the participants expected to gain from the workshop'. An analysis of the responses revealed that the majority (63%) aspired to write good manuscripts and get them published in reputable journals. Examples of what the participants wished to gain from the workshop included 'Want to improve the scientific writing and learn about the proper ways to publish a paper' [*sic*] and 'Many a things which I haven't known for years' [*sic*].

The results highlighted participants' lack of baseline knowledge of scientific writing and publishing. The majority of the participants had no prior publications. 'Not knowing how to write a paper' was the commonly perceived hurdle towards publication. The majority (81%) of the respondents had never published a case report, and eight participants also did not intend to publish one in the future as the Medical Council of India does not recognise it as a publication for academic career progression. The participants' baseline knowledge and experience of research and scientific writing have been summarised in the Table 1.

There were 41 respondents (response rate 59%) to the post-workshop questionnaire. Thirty-seven (90%) found the workshop very useful and the majority (59%) of the respondents felt that there was a 50 percentage points or greater improvement in their awareness about scientific writing and publication after the workshop (details in supplementary Table 2). A majority, 39 (95%), felt that their chances of reporting a case to a journal had increased after the workshop. Thirty-three (81%) said that they would not publish in a predatory journal but eight (20%) respondents said that they would be open to it. Thirty-two (78%) participants replied to an open-ended question on what more they would have wanted from the workshop. Ten respondents

Question	Responses (n = 67) (%)
How many publications do you have?	
None	37 (55)
1	9 (13)
2-5	9 (13)
>5	12 (18)
Do you have any publications in indexed journals?	
No	41 (61)
Yes	23 (34)
Don't know	3 (5)
Have you ever reported a case to a journal?	
Yes	13 (19)
No	54 (81)
Would you want to report a case to a journal? If no, why?	
Yes, would want to report	44 (66)
No, because MCI doesn't recognize it	8 (12)
No, I do not know how to write a case report	15 (22)
Which is the biggest hurdle for publication for you?	
Not knowing research methodology	13 (19)
Now knowing how to write a paper	21 (31)
Not knowing how to approach a journal	12 (18)
Not knowing how to choose a journal	12 (18)
None	9 (13)
Have you attended a workshop on scientific writing and publication earlier?	
Yes	12 (18)
No	55 (82)
Have you been a part of any randomized control trial?	
Yes	8 (12)
No	59 (88)

Table 1 Responses to items in the pre-workshop questionnaire to assess baseline awareness and experience of research and scientific writing

MCI: Medical Council of India

said that they would have wanted discussion on research methodology and statistics, and more dummy manuscripts to practice on. Three respondents said that they would want such workshops to include more information on journals that don't have article processing charges. All the findings of the pre and post-workshop surveys can be seen in the online supplementary Tables S1 and S2.

A comparison of the responses to the pre and post-workshop questionnaires revealed a significant improvement in the participants' knowledge (Table 2). There was bridging of the

knowledge gap ranging from 2% for placement of information in a manuscript, to 16% for use of acronyms, to 40% for knowledge about referencing styles.

Discussion

Our study confirmed a significant baseline deficit in the participants' awareness of the process of scientific writing and publication. In an open-ended question in the pre-workshop questionnaire, many participants wanted the workshop to instil in them the confidence to take up

Item	Pre-workshop (n = 67) (%)	Post-workshop (n = 41) (%)
1. Which of the following is correct about the use of acronyms in manuscripts?		
They should never be used	10 (15)	4 (10)
They can be used wherever needed without expanding	10 (15)	5 (12)
Some standard acronyms may not be expanded	7 (10)	1 (2)
<i>All acronyms are to be expanded where they first appear in the text</i>	40 (60)	31 (76)
2. Objectives of the study are included in which part of the manuscript?		
<i>Introduction</i>	44 (66)	32 (78)
Methods	22 (33)	9 (22)
Results	1 (2)	0
Discussion	0	0
3. Inclusion and exclusion criteria are included in which part of manuscript?		
Introduction	3 (5)	0
<i>Methods</i>	63 (94)	41 (100)
Results	1 (2)	0
Discussion	0	0
4. Which of the following can be used in the results section?		
Text, Tables	4 (6)	1 (2)
Text, Tables, Graphs	25 (37)	9 (22)
<i>Text, Tables, Graphs, Flowcharts</i>	34 (51)*	30 (73)*
Tables, Graphs, Flowcharts	4 (6)	1 (2)
5. Comparison of the study data with data from other studies is done in?		
Introduction	2 (3)	1 (2)
Methods	6 (9)	4 (10)
Results	8 (12)	4 (10)
<i>Discussion</i>	51 (76)	32 (78)
6. Name 5 journal indexing agencies you know of		
Correctly named 5	9 (13)	9 (22)
Correctly named 4	4 (6)	16 (39)
Correctly named 3	1 (2)	5 (12)
Correctly named 2	5 (8)	1 (2)
Correctly named 1	7 (10)	0
<i>Couldn't name any</i>	41 (61)#	10 (24)#
7. Name any one referencing style		
Named Vancouver	27 (40)	29 (71)
Named Harvard	2 (3)	5 (12)
Named APA	1 (2)	1 (2)
<i>Couldn't name any</i>	37 (55)#	6 (15)#

Table 2 Comparison of paired responses to items in the pre and post-workshop questionnaires

Correct answers for items 1-5 and critical outcomes for items 6 and 7 are italicised

* $p < 0.05$ and # $p < 0.001$ (by χ^2 for proportions) for pre and post-workshop comparisons

APA, American Psychological Association

scientific writing which they lacked due to the absence of any guidance or training. Young faculty members are expected to publish independently, but most of them receive no specific training in research methodology and scientific writing at postgraduate level.¹⁰ A study conducted alongside one of the first workshops of this nature in India (which had some of the authors of the present study as faculty) had also found a lack of baseline knowledge about scientific writing among the participants.¹¹ Based on the results of that study, several actionable points were identified and implemented in the subsequent workshops.

The post-workshop assessment in our study confirmed that even a one-day workshop helped in bridging the knowledge gap to a significant extent. All assessment items concerning the components of a manuscript, knowledge about indexing and awareness about referencing confirmed the usefulness of the workshop. These findings reiterate the need for conducting such workshops regularly.

Original research articles are frequently the only publications that count towards recognition and career progression in medical academia.^{2,12} In our survey too, many participants did not find encouragement to publish case reports as these are not counted towards faculty appointment and promotions in medical schools in India.^{13,14} However, a case report can be a convenient vehicle to begin one's journey in the field of scientific writing. It is well recognised that not all the evidence for all disease conditions and treatments can come from clinical trials.¹⁵ Case reports form an important source of knowledge about rare diseases, their treatment, uncommon courses and complications of diseases, and rare adverse events.¹⁶ The workshop helped in emphasising to the participants the importance of publishing case reports.


A cause for concern was the lack of awareness about the demerits of engaging with predatory journals as the majority of participants were unaware of these journals and our survey showed that even after the workshop some confusion remained on this. Therefore, there is a need to educate young researchers that publications in predatory journals are unlikely to advance science or their careers.¹⁷ Articles published in such journals do not usually undergo peer-review, thus bypassing an important quality check.¹⁸ Rigorous review by peers (and sometimes even rejection) forms an important step in the process of learning scientific writing. Articles published in predatory journals cannot be publicised, and if publicised, bring disrepute within the scientific community. Even experienced researchers can sometimes find it tough

to spot predatory journals, but a general awareness about such practices is helpful in most cases.

Many participants felt that they would have preferred a longer workshop spread over two days to also cover aspects of research methodology, statistics and review articles, and to practice on more than one dummy manuscript. During the question and answer session at the end of the workshop, the authors were asked why similar teaching was not a part of the postgraduate curriculum. This option needs to be explored as it would help in delivering the constant training and updates required. One potential additional benefit would be that in all likelihood the value of such workshops to the 'initiated' postgraduates would be enhanced.

The results of our study can easily find resonance in other countries too.^{8,9} In fact, the Royal College of Physicians of Edinburgh has conducted one such workshop on 11 December 2003. Though the College regularly organises research methodology courses for medical trainees, currently, there appears to be relatively little focus on scientific writing.¹⁹

Our study has certain limitations. Firstly, due to time constraints, a more extensive survey questionnaire could not be undertaken, though our survey was representative and covered all relevant aspects of scientific writing and publications. In future workshops, we aim to plan a detailed questionnaire to identify the specific sections of a manuscript and steps of scientific writing which the participants feel greater difficulty in dealing with. Secondly, though ethical aspects of publication are extremely important,²⁰ and were covered briefly in this workshop, they were beyond the scope of a questionnaire which focussed on aspects of writing manuscripts. Future surveys of participant perspectives should consider ethical perspectives as well.

In conclusion, our study provides evidence that there is a lack of knowledge about scientific writing, and didactic lectures and practical sessions can help overcome the same. Besides the need for regularly conducting such workshops, there appears to be a need to include training in scientific writing and publication as part of the medical postgraduate curriculum. But it would be worth considering this for the medical students as well, as they should be exposed to the art and science of manuscript writing at an earlier stage. Such training could be made even more useful by specifically discussing the case reports, predatory journals and ethics of biomedical publications. 

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