

Impact of basic medical writing workshop on case report writing by post-graduate anaesthesia trainees: A pilot study

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ABSTRACT

Background and Aims: Research is an integral component of medical education and practice. However, the art of medical writing remains neglected. Case report writing marks foray into the world of publications and presentations. We assessed and compared the impact of basic medical writing workshop about case report writing and their perception levels of confidence in these skills, among post-graduate anaesthesia students. **Methods:** A needs assessment for medical writing skills was performed among all anaesthesia residents. A total of 20 students were enrolled in this study. The pre-workshop assignment consisted of writing one case report per participant within 30 days, followed by students' confidence assessment in these skills. A workshop on basic medical writing including analytical writing, scientific writing and plagiarism were conducted. Post-workshop a similar assignment was provided, followed by students' confidence assessment. **Results:** Moderate-to-high need for help was felt by 92.63% for analytical skills, 100% for scientific skills and writing without plagiarism, 95.78% for overall writing skills. For case report writing, the analytical and scientific writing significantly improved after the workshop ($P = 0.01$ and $P = 0.016$, respectively). There was a significant improvement in the students' confidence levels post-workshop in their analytical writing skills, avoiding plagiarism and overall writing capabilities ($P = 0.02$, $P = 0.016$ and $P = 0.002$, respectively). **Conclusion:** Writing skills of participants and their confidence in these skills improved post-workshop.

Key words: Case reports, education [subheading], medical writing, plagiarism, publications

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INTRODUCTION

The presence of publications in the curriculum vitae of a post-graduate student adds significant academic credit, not only enhancing their future career prospects but also inculcating a habit of evidence-based medical practice. The role of academic medical writing skills in preparing the manuscript generally involves writing the report of a research study or a case report, in a particular format as required by the journal in which the author wishes to publish. Lack of proficiency in these writing skills has been cited as one of the foremost reasons for a poor research study to publication ratio in various teaching institutes in India.^[1] Although the use of professional medical writers are encouraged by many reputed International journals, they are rarely utilised by post-graduate students. In this scenario, teaching academic writing

gains importance. Although research methodology has been inculcated in the medical curriculum, very few medical educational institutes offer academic writing courses.^[2]

Case reports are still relevant in clinical practice. For many post-graduate students, presenting case reports in various national and international conferences are the stepping stones into the world of research and

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publications.^[3] In the clinical departments of tertiary institutes, cases worthy of being reported as case reports, can be found galore. Although case reports are considered as the lowest class of evidence, writing a case report is easier as compared to an original article.^[3] In the absence of formal academic writing courses, the trainees generally prepare their manuscripts under the guidance of faculty, who may be seasoned authors with successful publications.

Hence, we designed a needs assessment questionnaire about case report writing for post-graduate anaesthesia students and designed a basic medical writing workshop based on same. We conducted the study to assess the possible improvement in the medical writing skills of the post-graduate trainees after the workshop.

METHODS

The ethics approval for the study was obtained from the Institutional Ethics Committee. This study was conducted during the period from October 2016 to June 2017. A focussed group discussion with seven recently graduated students from anaesthesia department of our institute was conducted. Common themes related to a deficiency in writing medical manuscripts were identified and a needs assessment questionnaire for basic medical writing was developed and validated. This questionnaire was distributed among all post-graduate anaesthesia residents of our department and responses sought. The background section of this questionnaire pertained to questions on the primary language of schooling till standard X, number of publications to their credit and their frequency of reading medical journals. In the next section, ten statements related to medical writing were graded by the participants on a five-point Likert scale where one stood for no need and five stood for very high need, with skills mentioned in these statements.^[4]

Post-graduate anaesthesia students were randomly approached to participate in the study. The first twenty students, who consented to participate, were enrolled in the project. The primary objective was to assess and compare the impact of basic medical writing workshop on analytical and scientific writing skills about case report writing, amongst post-graduate anaesthesia students. The students' perception levels of confidence in these writing skills, was also assessed and compared [Figure 1].

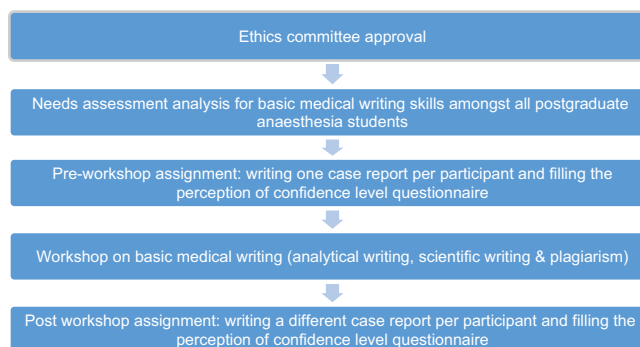


Figure 1: Flowchart of methodology

The pre-workshop assignment consisted of writing one case report per participant. Patient data for case report writing was collected from published case reports within the past 5 years, obtained from free full-texts, available online from different anaesthesia journals. The topics selected were such as to maintain uniformity in the difficulty level of writing the case reports. These patient data were provided to the study participants in the form of a perioperative anaesthesia sheet of our institute, to simulate the real experience. Along with this, full texts of three literature resources most commonly cited in the respective published case report was provided to them. A set of 'author instructions' similar to those found in the 'instructions to author' section of biomedical journals, were provided to them. All this data were e-mailed to the individual participants. They were required to submit the case report, in the format provided in the 'author instructions', within 30 days, by E-mail to the principal investigator. The principal investigator checked that the identity of the participant was not revealed in the case report, as specified in the 'author instructions'. The file was coded with a student identification number before forwarding the file to the evaluator by e-mail.

After this pre-workshop writing assignment, the students' confidence levels in their academic writing skill, was assessed by a validated perception questionnaire. It consisted of ten statements regarding case report writing which the participants graded on a five-point Likert scale where one stood for extremely confident and five stood for not at all confident [Figure 2].

A workshop on basic medical writing, which included analytical writing, scientific writing and plagiarism were conducted by trained faculty through interactive sessions. The participants were explained that analytical writing concerned the use of language,

content and construct analysis of the written article. It indicated the structure of the written essay which showed the relationship of the various themes to each other such that all the parts of the writing worked to support the central idea. Scientific writing involved writing in the 'IMRAD' format, and according to the guidelines advised by the journals in which publication was desired.^[5,6] Common errors in writing the manuscript and how to avoid them, were pointed out. The various types of plagiarism and the importance of avoiding them were explained. At the end of the workshop, the participants were asked to complete a validated feedback questionnaire. This questionnaire consisted of nine statements on workshop content, design, instructor team and pacing, to be graded on a five-point Likert scale where one stood for strongly disagree and five stood for strongly agree [Figure 3].

Post-workshop an assignment similar to the pre-workshop assignment was conducted but with different case scenarios, provided individually to them, to be completed in 30 days. It was also followed by students' confidence level assessment by the same perception questionnaire [Figure 1].

The evaluation of the case report writing was done by a single faculty (who has experience of being a reviewer for at least two peer-reviewed anaesthesia journals), using a checklist with a three-point anchored ordinal scale for performance in analytical and scientific writing and global rating score for overall performance [Figure 4].

Event: Pre module / Post module

Student Identification Number: _____ Date: _____
 (For each of the following items, please indicate how confident you feel during the process of writing an academic paper (e.g., research papers, critiques, and thesis/dissertation)
 1: Extremely confident 2: Quite confident 3: Moderately confident 4: Slightly confident 5: Not at all confident
 Please circle the appropriate number.

Particulars	Confidence level
Preparing an outline before you begin writing	1 2 3 4 5
Choosing correct words (anaesthesia related terminology)	1 2 3 4 5
Using proper grammar, rich vocabulary & expressions	1 2 3 4 5
Using correct punctuation and spelling	1 2 3 4 5
Using proper editorial styles (eg APA style)	1 2 3 4 5
Preparing graphs, tables and images	1 2 3 4 5
Writing under proper scientific headings (IMRAD)	1 2 3 4 5
Writing references	1 2 3 4 5
Writing a unique article without copying	1 2 3 4 5
Overall academic writing capabilities	1 2 3 4 5

Figure 2: Confidence assessment questionnaire

This checklist for analytical writing was modified from a rubric for analytical writing.^[7] For assessment of scientific writing, three-point anchored ordinal scale was added to the CARE guidelines, downloaded from the website 'www.care-statement.org'.^[8] The global rating score was graded as excellent, clear pass, borderline and clear fail. At the end of the evaluation of pre- and post-workshop assignment each, the evaluator was requested to give her general opinion about the written case reports. A plagiarism score was calculated online from the website 'smallseotools.com/plagiarism-checker/'.

All the data were entered into an excel sheet. The analysis of the needs assessment questionnaire was done in percentages. The pre- and post-workshop scores were compared using paired *t*-test.

RESULTS

Ninety-five students responded to the needs analysis questionnaire. Out of the 95 students, 32 students received education in vernacular languages up to standard X, only five students had a single publication to their credit and 44 students had never read medical journals, whereas 48 students read medical journals <3 times a month. Moderate-to-high need for help was felt by 92.63% of students for analytical writing skills, 100% of students for scientific writing skills and writing without plagiarism, 95.78% of students for overall writing skills.

Please circle your response to the items.

[1=Strongly disagree, 2=Disagree, 3=Neither agree nor disagree, 4=Agree, 5=Strongly agree]

A) Workshop content:						
1	I was well informed about the objectives of this workshop	1	2	3	4	5
2	This workshop lived up to my expectations	1	2	3	4	5
3	The content is relevant to me	1	2	3	4	5
B) Workshop design:						
1	The workshop activities stimulated my learning	1	2	3	4	5
2	The difficulty level of this workshop was appropriate	1	2	3	4	5
3	The pace of this workshop was appropriate	1	2	3	4	5
C) Workshop instructor team:						
1	The instructor team was well prepared.	1	2	3	4	5
2	The instructor team was helpful	1	2	3	4	5
D) Self-paced delivery:						
1	The workshop was a good way for me to learn basic medical writing	1	2	3	4	5
2	What was BEST about this workshop?					
3	What would make this workshop EVEN BETTER?					

Figure 3: Workshop feedback questionnaire

Figure 4: Evaluation sheet for Case Report writing

Student Identification Number:

Please circle the appropriate score:

Particulars	Clearly below expectations	Acceptable performance	Performs above expectations
Analytical Writing			
The idea/events are presented in an effective order.	1	2	3
The description is appropriate for its intended audience.	1	2	3
All the parts of writing work to support the whole idea.	1	2	3
Details are sufficient and appropriate.	1	2	3
Word choice enhances the writing.	1	2	3
The paragraphs and sentences are clearly and logically connected.	1	2	3
The language is not vague or confusing.	1	2	3
There are no errors in spellings, grammar, capitalisation of words or punctuation.	1	2	3
Scientific writing			
Title : precise and area of focus mentioned	1	2	3
2-5 keywords that identify areas covered in this case report	1	2	3
Abstract:	1	2	3
A) Introduction—What is unique about this case? What does it add to the medical literature?			
B) The main symptoms of the patient and the important clinical findings are mentioned	1	2	3
C) The main diagnoses, therapeutics interventions, and outcomes mentioned.	1	2	3
D) Conclusion—What are the main “take-away” lessons from this	1	2	3
Introduction: One or two paragraphs summarizing why this case is unique with references	1	2	3
Patient information:	1	2	3
A) De-identified demographic information and other patient specific information			
B) Main concerns and symptoms of the patient	1	2	3
C) Other details such as medical, family, and psychosocial history, relevant past interventions and their outcomes.	1	2	3
Important information from the patient’s history organized as a timeline	1	2	3
Diagnostic methods (such as PE, laboratory testing, imaging, surveys) with reasoning.	1	2	3
Description of intervention (such as dosage, duration, management etc.) and changes in intervention (with rationale)	1	2	3
Follow - up and outcome: Important follow-up, diagnostic and other test results, adverse and unanticipated events	1	2	3
Discussion:	1	2	3
A) Discussion of the strengths and limitations in your approach to this case.			
B) Discussion of the relevant medical literature and comparison with this case.	1	2	3
C) The rationale for conclusions (including assessment of possible causes)	1	2	3
D) The primary “take-away” lessons of this case report.	1	2	3
References: Punctuations and correct style.	1	2	3
Total word count: Abstract:			
Main text:			
Plagiarism percentage:			
Global rating score: Excellent / Clear Pass / Borderline / Clear Fail			

Out of the 20 students recruited for the study, eight participants did not adhere to the protocol and were not considered for statistical analysis. Out of eight participants who dropped out, one could not independently do the first assignment, two could not attend the workshop and the remaining participants did not complete the second assignment on time.

For case report writing, there was a significant improvement in the analytical writing skills and scientific writing skills after the workshop. [Table 1] The plagiarism percentage decreased post-workshop but was not statistically significant. The global rating score improved post-workshop without statistical significance.

On analysis of the manuscripts submitted, the evaluator was of the opinion that almost all the manuscripts, especially from the pre-workshop assignment, were of an unsatisfactory quality with most of the participants having poor analytical skills. Although the students had summarised the details of the case in an adequate manner, the discussion lacked a satisfactory analysis of the outcome, supported by the relevant literature resources provided. The participants used a very colloquial English language for writing the manuscripts. Some of the manuscripts had the problem of cohesion, despite a good vocabulary repertoire.

There was a significant improvement in the students' confidence levels post-workshop in their analytical writing skills, avoiding plagiarism and overall writing capabilities [Table 2]. During workshop feedback, all the participants suggested conducting such programmes regularly.

DISCUSSION

Scholarly writing has gained increased importance over the decades as means of sharing scientific information and gaining recognition globally. They help in the formulation of guidelines and standards of protocol encouraging evidence-based practice. It has become imperative to inculcate a positive attitude towards research and publications right from the time a student enters the field of medicine.

The practice of anaesthesiology in a tertiary care institute can be frantic and challenging. The post-graduate students, on entry, are directly called upon for clinical care of the patients. As part of their fulfillment towards their specialty curriculum, they are required to undertake original research study and submit it as dissertation near the end of their term. Medical writing comes into play at various stages over the course of their study: writing proposal for ethics committee and for the grant, presentations during various conferences, thesis writing and publications. Only a handful of them have had any exposure to research studies and publications in their undergraduate days. As seen during our study, only five students out of 95 had a single publication to their credit. In addition, students do not regularly peruse biomedical journals. Since English is the main language of communication in medical writing, the students not having English as the primary language of schooling may feel at a disadvantage during writing

Table 1: Case Report Writing Statistics

Particulars		Mean	Standard Deviation	P
1	Analytical writing	Pre 11.3	3.1	0.012
		Post 13.2	2.8	
2	Scientific writing	Pre 28.3	5.7	0.017
		Post 36.3	6.1	
3	Plagiarism	Pre 27.2	33.0	0.10
		Post 10.4	8.4	
4	Global Rating scale	Pre 3.3	0.7	0.19
		Post 3.0	0.5	

Table 2: Confidence Level Statistics

Particulars		Mean	Standard Deviation	P
1	Analytical writing	Pre 12.0	2.9	0.02
		Post 8.3	3.2	
2	Scientific writing	Pre 7.0	1.6	0.063
		Post 5.0	2.4	
3	Plagiarism	Pre 3.8	1.4	0.016
		Post 2.4	1.0	
4	Overall writing skills	Pre 4.0	0.9	0.002
		Post 2.3	1.0	

manuscripts.^[9,10] As revealed by the needs assessment questionnaire in our study, need for help with medical writing skills was felt by almost all the students. Needs analysis helped identify the target needs of the students about the medical writing which helped in designing the workshop.

Case reports are a brief, focussed and informative form of medical writing. They are valuable sources of new and unusual information for clinicians. Writing them is relatively uncomplicated as compared to conducting and reporting original research study. They require fewer resources and are less time-consuming.^[3] Presentation of case reports at various conferences are a common choice for foray in this field for many post-graduate students. Although Miller's pyramid of clinical competence applies to the clinical field, it is similarly applicable to the field of medical writing. Knowledge about academic writing is being increasingly obtained by peer and senior experience, attendance at various conferences and from journal websites. This constitutes the 'knows' and 'knows how' domain of the pyramid. With this study, we are assessing the 'shows how' component of the pyramid so that the student can successfully proceed to the 'does' component at the top of the pyramid. An old saying goes as 'I hear and I forget, I see and I know, I do and I understand.'

The purpose of this study is to assess if the student has achieved the 'shows how' stage of competence so that

the students actually write the case report, applying in practice all that they have learned. We hoped to target the highest level of educational learning objective according to Bloom's taxonomy.

Case report writing involves two major components: analytical writing and scientific writing. The use of CARE guidelines lends itself to the evaluation of scientific writing but evaluation of analytical writing can present a challenge. Rating scales or rubrics can only be a relatively reliable and valid assessment tool for same. Despite the use of a checklist for language analysis, the manuscript may still fall short of being a compelling narrative. Therefore, we also added a Global Rating Scale for assessment of overall writing skills.

Although the analytical writing skills of the participants improved significantly post-workshop, the global rating score did not show a significant improvement. Common analytical writing errors pertain to grammatical errors, spelling errors, punctuation errors and keeping the flow of sentences. The first three errors can be easily corrected with the use of spell check, grammar check, punctuation check functions easily available in MS word and on the Internet, which may have contributed to the significant improvement in the analytical writing skills of the post-workshop assignment. It is keeping a steady flow of sentences, maintaining the sentence structure, logic in writing, cohesion, fluency in written English, especially for vernacular medium students which are difficult to acquire after a single workshop. This points to the complex nature of writing as a skill. It indicates that the cognitive skills required at excelling in academic writing will need continued training and support.

Kommalage conducted an analytical essay writing activity in physiology for 1st year undergraduate students.^[10] On subjective analysis of the essays, the author found that there was a vast scope for improvement of analytical writing skills of the participants. He discussed the possibility of improvement in higher-order cognitive tasks such as analysis, synthesis and evaluation required for medical writing, only with active learning process done repeatedly. He also identified that prior knowledge of computer use, English language knowledge and writing ability had a minor influence on the activity.

In our study, the scientific writing skills improved significantly after the workshop, in spite of poor exposure to research and publications, as well as lack

of regular reading of biomedical journals. Clemmons *et al.* implemented a formalised writing programme along with one-on-one mentorship throughout the post-graduate training of pharmacy residents and found that the participants had multiple opportunities to refine their scientific writing skills leading to increased publication rate of the residents. Their institute inducted such programmes as part of the curriculum.^[11]

Many participants had difficulties in expressing ideas in their own vocabulary as seen by the pre-workshop plagiarism percentage. The plagiarism percentage did not show a significant decrease post workshop either. Common causes for plagiarism cited in the literature are varied such as expediency, lack of training and confidence in academic writing, reliance on textual borrowing, lack of proficiency in scholarly English, lack of inclination towards research, negligent attitude, etc.^[12] One of the solutions for plagiarism prevention lies in providing better training facilities in scholarly writing and citing styles.

There was a significant improvement in the students' confidence levels post workshop in all aspects of their academic writing capabilities. The accomplishment of a completed task helps instill a sense of confidence in their writing skills. It helps to reduce anxiety associated with such writing tasks.

A study found that most clinicians had little to no formal training in the art of academic writing and they developed their skills on the job. Their review found that little is known about how to effectively train authors and they suggested that future research in journalology should concentrate on effective training of authors, editors and peer reviewers.^[12]

The drop-out rate was also high in the study. The reasons cited by the participants were a heavy workload, time constraints and limited access to laptop and internet.

One important limitation of our study was that the study was intradepartmental. Since it was a pilot study, an interdepartmental study was not planned, keeping in mind the feasibility of multiple evaluators for different case reports, coordination for workshop, etc. Co-relation to prior computer literacy and English language skills would have further enhanced the study objectives.

In India, teaching the clinical subject at hand is considered paramount. Teaching academic writing skills are listed at a lower level on the priority list while designing the annual academic curriculum. However, the nature of medical writing skills is such that it needs to be a continuous process. Conducting only one workshop does not suffice the need felt for teaching and utilising these skills. Basic medical writing modules should become a part of both undergraduate and post-graduate curriculum and should constitute the base of the pyramid on which regular and more advanced writing skills, be built up. This activity can stimulate the students for independent learning in academic literacy skills, a much-neglected aspect of the medical curriculum.

CONCLUSION

The workshop on basic medical writing among the post-graduate anaesthesia students, resulted in significant improvement in analytical and scientific writing skills as well as their confidence in these skills, with regard to case report writing.

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Conflicts of interest

There are no conflicts of interest.

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