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How to write a… better paper

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This article highlights essential aspects concerning the format, the content and the writing of a paper intended for publication in a medical journal. Topics discussed include: the prerequisites; the types of papers; the structure and content of the manuscript; writing style; ethical issues; the cover letter; revision of the manuscript. Ten take-home messages serve as a conclusion. An appendix is added wich will allow the would-be author to test his/her ability to critically read a paper.

KEYWORDS: critical reading, manuscript, medical article, medical journal, scientific article, writing of a paper

Az orvosi folyóiratban megjelentetni kívánt kézirat olyan alapvető szempontjait tárgyalja ez a közlemény, mint a formátum, a tartalom és az írás módja. A közlemény bemutatja a kézirat megírásának előfeltételeit, a közlemény típusát, felépítését és tartalmát, írás stílusát és az etikai szempontokat, ismerteti a kísérőlevél szerkesztésének és a kézirat bírálatának szempontjait is. A szerző összefoglalásként tíz tanácsot ad az olvasónak. A mellékletben a jövőbeni szerző ellenőrizheti képességét egy közlemény kritikus olvasását illetően.

KULCSSZAVAK: kritikai olvasás, kézirat, orvosi cikk, orvosi folyóirat, tudományos cikk, tanulmány írása

The best reason for writing a paper and having it published is having a good story to tell. But one should know how. This article points out essentials and – by no means – will transform instantly the colleague lacking experience in this domain into a master in the art of writing. Only practice makes perfect.

Prerequisites

Knowledge

Be a lifelong learner. Read: in the subway, when immobilised in a traffic jam, in your bath, when tying your shoelaces, read as if your life was depending on it. Science literacy is a skill that physicians must acquire. One's cultural background and scientific knowledge are paramount determinants of the quality of one's writings. No personal computer and no portable gadget will remedy ignorance, even though those devices are invaluable accessories for gathering additional data. In this digital age, information literacy should reach a level that allows the individual to adequately scrutinise diverse document types through various media formats.

A critical mind

Critical thinking is a state of mind whereby information, whatever its source, its nature and its means of communication, is not taken at face value, and one wonders whether it makes sense and is credible

(i) as a whole and

(ii) in each of its components.

Skepticism is and always will be a prerequisite for the advancement of science and the progress of mankind. It has still gained in importance in these troubled times when irresponsible politicians in various countries are infringing on civil liberties. Be critically minded – at all times and in all circumstances; "truths" are often questionable, and always temporary.

The skill of critical (or "analytical") reading enables one to develop critical thinking, critical writing, and

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critical handling. Critical medical thinking is the main determinant of appropriate medical intervention: good clinical practice is rooted in evidence. The reader of medical literature must be capable of correctly – which entails, critically – appraising the reliability of both data and their interpretation. Critical reading allows to identify relevant papers – the latter form only a minority of those pertaining to a given topic; that ability is very important in the practice of evidence-based medicine (EBM) [1].

Command of the language

The first prerequisite for communicating across borders on a scientific matter is mastering the language – often English – in which the articles in the journal concerned are written. Achieving this is a matter of ambition, will, and hard work. Whether one likes it or not, English is the lingua franca, the pre-eminent cross-cultural language of our time. Robert Burchfield, the Chief Editor of the Oxford Dictionary stated – with that arrogance proper to English aristocrats – that "Any literate, educated person on the face of the globe is deprived if he does not know English" [2]. For your next birthday, ask your sweetheart to give you as a present an excellent dictionary.

Mandatory reading

Before going any further – you will resume devouring this article later – lie down on the sofa, and read Darrell Huff's opus magnum "How to lie with statistics", wonderfully illustrated by Irving Geiss [3]. The International Committee of Medical Journal Editors (ICMJE) has gathered comprehensive information concerning reporting on biomedical investigations [4]. These – and, obviously this article (☺) – are the documents every author-to-be of medical articles must have read.

The Topic

The idea behind the study should
(i) be original and likely, once developed, to bring new information to light, and
(ii) be of greater than merely local interest.

Types of papers and what they should be like

Patricia Baskin has pointed out how a study should be conducted and reported upon: "A premise of science is that research is meticulous and objective so [that] the results are valid and credible. Published articles should provide clearly written, transparent descriptions of how the research was conducted, results were obtained, and conclusions were reached based on appropriate uses of analytical tools" [5]. Investigators could adopt this statement as a profession of faith.

Letter to the Editor

Editors are pleased when there is a lively discussion in the "Letters" column. Letters to the Editor are a nice vehicle for the aspiring medical writer, and there is a fair chance of acceptance. They are titled and indexed, thus making them retrievable as articles in the journal.

The letter must be short, to the point, and properly structured. If it comments on a published article, the criticism should be constructive rather than destructive, and the critique justified. Start with citing the article which you comment upon; then develop a single argument. Mention your aquiescence, disagreement, questioning, or other motivation for writing. Provide evidence in support of the view you expressed – preferably from the literature; if not, from your own experience. A summary statement should tie the preceding parts together. A few references complete the letter [6].

A letter may also report on a "mini-study" that will not stand as a full-length manuscript (MS). A nice example of such a mini-study is that published by Leppée et al, in 2010 [7].

Case report

A case report may be another good way to initiate a carreer as an author of scientific papers. But the literature you should necessarily review beforehand will often reveal that the matter you intend to report on, is not nearly as uncommon as you had thought.

This type of paper is only of interest if it offers new, useful, practical and generalisable insight into prevention, diagnosis, treatment, rehabilitation. Only exceptionally should the number of authors exceed three. The abstract should be structured (Objectives/Case/Conclusions), and the text divided into sections (Introduction/Case report/Discussion/Conclusion). The emphasis will be on

(i) the concise but accurate description of the case (or cases), including salient points of the medical history, physical findings, results of tests, and treatment instituted, followed by
(ii) the presentation of the reasons why the observations are important, and
(iii) an evidence-based analysis of the findings.

The literature review will be limited to the papers of greatest relevance; references in general should not exceed 12 in number. The conclusion, like in other types of papers, should stress the take-home messages. The number of words of the entire MS should not be more than 2200, including maximum 160 words for the abstract. One or – at most – two photographs of the highest quality enhance the interest an unusual case will elicit.

Editorial

Editorials are fun to write. These short contributions express an opinion, based on the author's experience, scholarship and feelings, and do not call for a major research effort.

The connotation of "editorial" is that the writing is by one of the editors, or a designated authority, but actually certain editors welcome spontaneous external contributions.

Present the problem. Offer personal insight; this may be backed with a personal anecdote.

Offer evidence to support your opinion. Select your references: the editorial is not a review article. Offer counterevidence, in an unbiased way and then state why you disagree. Provide a summary. Include a few references [6].

Commentary

A paper of this type is similar in structure to an editorial or a letter to the Editor, or to a short narrative review.

If commenting on others' work:

- state their intentions and how they proceeded.
- Indicate whether they have succeeded and why.
- Add your experience and/or a brief review of the literature.
- Mention unanswered questions.

Consensus opinion

Consensus opinions rank extremely low when studies of various types are graded with regard to the quality of the information they provide. Actually, with the exception of "clinical experience" they are considered to be the least reliable method for gathering evidence.

Historical paper

More articles about medical history should be written. They highlight the inextricable link between medicine and socio-cultural context.

A historical paper is not a patchwork of statements borrowed from half a dozen review papers and other secondary sources replete with errors. Instead, it is a meticulous analysis of data gathered essentially from primary sources, bringing new evidence to light [8].

- State the matter that you are about to discuss.
- Carry out a thorough, critical analysis of the causes and significance of events.
- Evaluate the reliability of your sources. Give precedence to primary sources in your MS. These are materials produced in the time span under consideration; they reflect the attitudes and behaviours of contemporaries. Primary sources are very diverse: correspondence, diaries, memoirs, speeches, dispatches, scientific treatises, church records, census data, parliamentary debates, economic data, newspaper articles, literature, art, photographs, film, etc. Secondary sources are materials produced after the time period under study; data, in this case, are thus approached with a degree of hindsight. The quality of secondary research should be scrutinised closely since the origins of the information may be questionable: one should thoroughly evaluate how it was gathered, analysed and presented. Only scholarly secondary sources should be taken into account.
- Discriminate among conflicting interpretations.
- Avoid vague statements and generalisations [9, 10].

Observational studies

Cross-sectional-, cohort-, case-control-, longitudinal- and ecological studies are collectively referred to as observational studies. The first three categories are addressed here; these are often the only means of investigating certain issues, such as

(i) aetiology,
(ii) a condition of low prevalence,
(iii) instances where a randomised controlled trial (RCT) would be unethical.

Cross-sectional study

A study of this type is used to determine prevalence (the overall proportion of subjects within a population who, at a particular time, present a certain characteristic or suffer from a given disease). It can be completed within a short time and is easy to carry out, but ranks low in the scale of priorities of many editors. Indeed, these studies are particularly prone to bias: the latter, which may affect any research, reflects the possibility that the sample assessed is not representative of the population it was drawn from and/or the population at large (e.g., employment being generally associated with better health, the underrepresentation of unemployed people in the sample will be the cause of biased results).

Moreover, cross-sectional studies are purely descriptive, do not assess the effects of an intervention, cannot establish causal links, bring to light information that often could be predicted, and are so much specific to the population group and geographical area concerned that their results cannot be extrapolated to other people and regions. Findings are of little usefulness to healthcare personnel and stakeholders from outside the geographical area assessed. Often these inquiries are meaningless.

Cohort studies

Cohort studies may be prospective or retrospective. They are used to determine the incidence (the number of new cases per year) and natural history of a condition. As they take into account the chronology of events they enable one to distinguish between cause and effect. A cohort is a group of subjects, mostly people, from which baseline measurements are registered, and then is followed-up over time for outcomes. The time to complete the study is as long as is needed to gather and analyse the data – generally a number of years or even decennia. Sometimes two cohorts are compared. The results are expressed as risk ratios (RRs). Survival curves are a good means of showing how the cohort evolves. In a cohort study, exposures of interest must be defined before initiating the observation, but the study protocol may conceivably be designed without specific outcomes being taken into consideration, and outcomes may be added [11].

Prospective cohort studies. A group of people is chosen who do not have the outcome of interest, but have the

potential of developing it; for instance, colon carcinoma. Investigators then measure diverse variables which might be relevant to the development of this tumour and observe, over a length of time, whether the subjects in the sample develop the malignancy. In single cohort studies subjects who do not develop the condition constitute the internal controls. When two cohorts are confronted, one has been exposed to or treated with the agent of interest whereas the other, which has not, acts as an external control.

Retrospective cohort studies. These analyse data already gathered for other purposes. The same methodology applies but events which occurred within the cohort are assessed retrospectively.

Additional, useful information on cohort studies is to be found in an article by C. J. Mann [12].

Case-control studies

Such studies are useful for identifying the aetiology or predictors of outcomes of rare diseases. People affected by the ailment are identified and matched with controls. Information on past exposure to a possible causal factor for the condition concerned is then gathered by questioning or scrutinising medical files. The two groups are compared retrospectively. The results are expressed as odds ratios (ORs). Hypotheses are then formulated which may be verified by means of prospective cohort or other studies [12].

Prospective randomised study

To avoid confounding variables from impacting the results, one should carry out a prospective randomised controlled trial (RCT). A study protocol of this type, whereby exposure is assigned by chance, ensures that confounding factors are present in nearly identical numbers in both groups.

The investigation

- Plan the study before starting.
- Seek assistance from experienced investigators.
- Involve a statistician from the earliest stage on. Errors in the design or conduct of a study cannot be resolved afterwards. The statistical methods applied must be appropriate. The British Medical Journal (www.bmj.com) and other journals provide statistical advice and checklists for authors. Statistical thinking should permeate the entire process: from (i) the formulation of the questions through, (ii) the choice of the study design, (iii) drafting of the research protocol, (iv) logistical planning and conduct of the study, (v) handling of changes to and deviations from the protocol, to (vi) the final stages of analysis, presentation and interpretation of the results.
- Power the study sufficiently for results to reach statistical significance.
- The methodology must be rigorous, accurately described, and reproducible.
- Carry out the study in a double-blind fashion: neither the subjects nor the experimenters should know the conditions during data collection. If not double-blinded, avoid bias with regard to randomisation, and collection/analysis of data.
- It is presently considered unethical to use a placebo in a comparative trial if efficacious treatments are at hand; a new therapeutic approach should be tested against the best currently available treatment.
- Specify the number of subjects, the manner whereby those in the study group were selected and others excluded, how the control group was assembled, the method of randomisation (the gold standard being telephone randomisation of subjects already fully signed up and committed to the study), what the mandatory informed consent entailed, the variance of variables measured, the precision of methods of measurement, the intra- and inter-observer variance, the power calculations used to determine the number of experiments.
- Groups should be comparable at the start of the trial and, aside from the experimental intervention, be treated identically.
- Have the protocol approved by an ethical organ.
- You may have to register the trial before starting enrolment.

The report

- You must read the papers by Kenneth F. Schultz et al [13] and by David Moher et al [14] so that you will correctly report on design, conduct, analysis and interpretation of your trial.
- Pay particular attention to the "Materials and methods" section, for informed readers – which includes the editorial team about to evaluate your MS – this is the most important part of the paper. Insert in this section a flowchart representing the cascade of successive events: (i) enrolment, (ii) intervention allocation, (iii) follow-up and (iv) data analysis. In each frame of the diagram mention the number of subjects/cases concerned. Mention the references for standard methods; the latter should not be characterised in detail. Describe the statistical analysis; to say that the results were analysed 'on a computer" is insufficient.
- The confidence limits of the observed effects should be determined.
- In accordance with the "intention-to-treat" requirement, all subjects enrolled should be accounted for and remain within the group they were assigned to, at completion of the trial. This applies to participants who withdrew before the trial ended, those who did not submit to the intervention, and even those who – for whatever reason – received the intervention that was planned for the other/another group.
- Analyse data and arguments against your theory.
- Also negative results of an RCT should be reported. Only by consistently doing so will data on record be better balanced, thus allowing physicians to practise a medicine which will be more evidence-based. At present, a "publication bias" prevails, whereby positive trials are more likely to be published than negative ones [15]. Do refer to this discrepancy and the need to

remedy it in the cover letter which you will address to the Editor of the journal, when submitting the paper.

Review article

A good review article summarises knowledge and provides a new look at data on record. Do not cherry-pick the literature, quoting only studies that support your thesis. The review should cover all the literature published within the chosen time span of publication (mention onset and end thereof), including articles in other languages (which must be specified). Several search engines (PubMed, EMBASE, Cochrane Library, SCISEARCH, BIDS) must be resorted to. Complete the search with papers mentioned in reference lists and, if accessible, unpublished studies. Describe in great detail how you selected the articles you retained for analysis. Explain how the paper is structured; a flow diagram will be useful to illustrate the process.

Articles selected should have been read! Do not rely on abstracts alone or citations in secondary sources. As for any type of paper, choose carefully the key words.

"Narrative" reviews have been nearly completely superseded by systematic reviews; many experts consider that, from now on, all reviews should be systematic.

Systematic review

An article of this type starts with specifying

(i) the matter to be addressed, in the form of unambiguously worded questions and search terms;
(ii) the languages of the papers you intended to read and the period covered;
(iii) the type of articles to be reviewed (RCTs, case-control studies, meta-analyses, …);
(iv) the inclusion- and exclusion (e.g., duplicate papers) criteria for retaining papers, and
(v) whether the search was completed with articles or other sources mentioned in the reference lists of the papers initially harvested. The methodology must be described in detail.

Confirm that two authors (who should be identified) assessed independently the articles and confronted their divergent views, if any, in order to arrive at a consensual opinion. State the number of articles that were excluded and the reasons for rejection, and the number of those you ended up with. The review goes on with listing the studies considered relevant to the aforementioned questions, and assessing – ideally being blind to the results – their quality. A flow diagram clarifying how you proceeded is indispensable. The study characteristics and results are displayed in one or more, properly structured tables and differences between studies are explored. Meta-analysis, where possible, is employed to collate results. Conclusions are accepted as accurate and reliable. Recommendations for practice are made, and the relevance of the findings is discussed [16].

Unlike what some may think, a literature review is not easy to write, even if computer technology makes assembling a myriad of papers a piece of cake. It requires:

- prior knowledge of the topic addressed,
- complete objectivity,
- a critical insight and much skepticism, and
- the ability to formulate sensible and evidence-based suggestions concerning future developments.

Systematic reviews of randomised, triple-blinded, controlled trials with allocation concealment and complete follow-up involving a homogeneous patient population and medical condition provide the strongest evidence. This is what the Cochrane Collaboration does [17, 18].

Meta-analysis

It is a kind of systematic review intended to answer a focused clinical question. The method combines the results of several studies into a summary conclusion, using quantitative strategies that will allow consideration of data in research reports of diverse format. It is particularly useful when many trials related to a certain topic are on record, each too small to give a conclusive answer. Writing a meta-analysis [19] requires knowledge of statistics that is beyond the scope of this article.

Qualitative research

Also this topic cannot be discussed in any depth within the confines of this paper. The relevant chapter in Trisha Greenhalgh's monograph [20] contains useful information.

The manuscript

Sections of a scientific article

The IMRAD model is currently used in research reports:

- Abstract: informative summary of the paper;
- Introduction: reasons for having carried out the study;
- Methods: detailed description of how the investigation was conducted;
- Results: findings;
- Discussion: critical analysis of the meaning of the findings;
- Conclusion: the key "take-home messages";
- List of references: existing articles which are of interest.

The title

It should indicate the nature of the study, and be concise and attractive.

The authors

Authorship is mandatorily based on the following four criteria:

1. Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
2. Drafting the work or revising it critically for important intellectual content; AND
3. […] approval of [the final draft of each] version [of the submitted MS]; AND
4. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

All those designated as authors should meet all four criteria for authorship, and all who meet the four criteria should be identified as authors. Those who do not meet all four criteria should be acknowledged [at the end of the paper]" [21]. To have only "read and approved the final manuscript" is not sufficient for being listed as an author.

Occasionally, it is crystal clear to the Editor that one or more authors (sometimes listed first), mentioned in the original MS, had little if any part in its writing. This raises the question of "complimentary authorship" (person who should not be listed as an author, but is) in addition to that of "ghost authorship" (person who should be listed as an author, but is not). Both are unacceptable and a cause for rejection.

Industry-sponsored papers are often written by ghostwriters, who may do a very poor job. In such cases, the media overkill that permeates the MS from start to finish may sound like music to the firm's Marketing Department but will be perceived as extraordinarily irritating by expert and honest reviewers. The scientific character of the text is grossly neglected in favour of cut-and-dried – and moreover frequently inaccurate – locutions (e.g., with regard to efficacy of the medication concerned).

The Abstract

The Abstract mentions the purpose of the article, the methods employed and the main findings; it ends with the message(s) the authors want to convey. Many journals require that this section be structured: (Background and) objectives; Methods; Results; Conclusion. The Abstract should be written after completion of the remainder of the MS, and be based on- and in strict accordance with the former. It should evidently deliver the same message as the Conclusion, at the end of the Discussion, and, although worded differently, it should likewise stand on its own. It is wise to have a colleague, unfamiliar with the authors' work, read the Abstract. Does it make sense? Is it informative? Does it bring new evidence to light? The Abstract is the business-card of the article: it must deliver a clear, palatable and understandable message. Writing its conclusion requires the same skills as writing a Haiku, a Japanese poem only three verses long. In a few sentences the essential findings of the study and the potential future applications are disclosed. Only then will readers be enticed to proceed with reading the paper in extenso [22].

Keywords

Keywords allow interested readers to retrieve the published article. Most journals request authors to submit up to ten key words. They should be carefully chosen and refer to the most important matters addressed in the text.

Introduction

This section should keep to the essence. Refrain from explaining what is generally known and do not go back in time to the Ebers papyrus. The hypothesis is mentioned and the objectives of the study stated. The study is placed in proper context, and the inadequacies of earlier work, if any, are highlighted.

Materials and methods

Basically, this most important section of all describes in detail

(i) the subjects investigated, their means of selection/exclusion and number;
(ii) the controls and the way they were assembled;
(iii) the intervention(s);
(iv) the power calculations used to determine the number of experiments, and
(v) the statistical analyses carried out.

Studies involving human subjects, tissues or animals should have a statement of approval from appropriate research ethics establishments. The reproducibility of the experiments is an essential feature of their description. Make a liberal use of subheadings in this section. Do not mix Methods with Results or Discussion – they are dealt with later.

Results

They should relate to the research questions and the purpose of the study, and be concise, clear and complete. Compared groups should be similar at baseline or appropriate adjustments should be made. Actual values should be reported (means, frequencies, standard deviations, confidence intervals, etc.). Percentages should be mentioned without decimal places. If the experimental number is less than 50, only absolute numbers, not percentages, should be mentioned.

Results to be found in tables or figures should not be presented again in the text.

Tables

They are the best way to arrange numerical data. A table is better than a tedious enumeration of items in ten 75-word sentences.

The caption should describe the table's content. A Table, with its caption, should be able to stand on its own. Abbreviations must be explained.

Figures

Carefully selected, correctly conceived and meticulously constructed illustrations augment the appeal of an article. Each figure must have a descriptive legend that allows the figure to make sense on its own.

The structured discussion

The Discussion in research papers should be structured as recommended by Michael Docherty and Richard Smith, in 1999 [23]. Such a systematic approach contributes to the coherence of this section; it is the optimal safeguard for addressing all important aspects and avoiding hollow digressions. The five following items must be discussed.

Findings and interpretation

The Discussion starts with summarising the relevant findings of the current study. Interpret your findings objectively and report on these likewise. Arguments must be well thought-out and backed by logical thinking. Eliminate mercilessly speculation. Statements in the Discussion and in the Abstract should be in strict accordance with the Results. Keep in mind

(i) that correlation (=association), however strong, does not mean causation (The cock's crow does not cause the sun to rise!), and

ii) that an increase/decrease which is not statistically significant must be interpreted as an absence of change.

Strengths and weaknesses of the study

Be critically minded. Weed out every possible bias and identify confounding variables, which could not be neutralised: they modify exposure and affect outcomes. List those that could not be eliminated or corrected as limitations of the study (e.g., the fact that many of the papers you reviewed related to studies sponsored by the pharmaceutical industry, which introduced a selection bias affecting favourably the data you presented). Comment on the shortcomings of the surrogate markers you may have measured; they are often only tenuously associated with the real disease.

Differences in results and conclusions in relation to other studies

Take into consideration the latest and the most reliable evidence.

Relevance of the findings – implications for clinicians and policymakers

Appraise critically and objectively the quality of the gathered evidence.

Unanswered questions and future research

It is meaningless to state that "there is need for more research". Instead, you may specifically recommend investigating particular aspects which were not or insufficiently explored to date.

Conclusion

It must be a "strong finish", not an anticlimax. Be brief, balanced, and informative. This section should not be a duplicate of the Abstract. The conclusion must follow logically from earlier arguments and be supported by evidence, not by opinion. Mention what the principal findings were and explain why the study is important. Do not introduce new arguments, new data, new ideas, or information unrelated to the topic. Do not present statistical significance as implying relevance. Remain objective in the interpretation of your findings.

Declaration of interest

There is a conflict of interest when an author has activities that could influence his/her objectivity. These may be financial (support for a project or honoraria as a speaker or a consultant for a company), professional (being employed by a company) or relational (personal relationships). The conflict must be clearly and completely identified. Mention fees (for having served as a speaker, consultant or advisory board member), travel grants, research funds, etc. received during the past five years from the industry or other entities, which might have influenced your judgement.

List of references

Science is international. The bibliography may reflect this, but most references should be in the language of the journal. Papers listed must have been published (or be in print) and be accessible. The references must be accurate and appear only once. They must be worded in accordance with the journal's Guidelines for authors.

Writing style: it matters!

Authors submitting manuscripts to international journals frequently have an insufficient command of the English language, and this constitutes a huge problem. Pay considerable attention to

(i) writing style (which must be fluent and lively, yet compatible with the scientific nature of the paper), and

(ii) readability.

This comment pertains not only to terminology and grammar, but also to the coherence of the argumentation and the logical and smooth flow of ideas.

Write simply, and practise the "art of understatement". Sentences should be short. Eliminate those that are unnecessary; then, remove redundant words. Terms such as "behaviour", "to use", "to perform", … should not appear 753 times.

Acronyms, when first used, must be characterised in full, and unnecessary abbreviations avoided. In English only a ship is a "she", all other things are "it". "Which" applies to things, "who" to people. "Fewer" refers to entities that can be counted (e.g., people, white blood cells, …); "less" to those which cannot be counted (e.g., water, time …).

Spelling and nomenclature should be English (e.g., "anaesthetist") or American (e.g., "anesthesiologist") – and not a hodgepodge of both. Use the spell-checker on your computer for identifying errors, but be aware that it will fail to distinguish between "their" and "there", "form" and "from", "effect" and "affect", "principle" and "principal", "dependent" and "dependant", and many more. Most words ending in "-ise" can also be spelt "-ize", but not all. Therefore, use "-ise" consistently.

Improper terminology

Keep in mind that

(i) women using a combined hormonal contraceptive do not "menstruate" but have "withdrawal bleedings";

(ii) data, studies, surveys, tables and figures do not "report": investigators or authors do;

(iii) women are not "females";
(iv) the "fetus" does not implant, the "blastocyst" does;
(v) "data" is a plural;
(vi) the plural of "midwife" is "midwives";
(vii) "actual" is not synonymous for "current" or "present".

Out of consideration for the already overworked editor, eliminate before submission abominations such as "anti-concipients", "vulnerable sexuality", "inconsiderable relation", "the risk inclines with age", "formerly aborters", "were opposed stigmatically the women's contraceptive use in the legacy of Islam".

Elude each of the following pitfalls: verbosity, jargon (e.g., "Sexual and reproductive behaviours that occur in adolescence without prior access to skills, information or health services put adolescents at risk of significant consequences as…"), redundancies, repetitions, generalisations, self-evidences (e.g., "The slightly higher rate of utilisation in our study may be explained by an increase in prevalence over time."), adjectives, adverbs, superlatives, tautologies (e.g., "sleeping insomnia", "subcutaneous vessels of the skin", "oral contraceptive pills"), and discursive preface remarks (e.g., "It has long been held that…").

Sentences should not start with an Arabic numeral (e.g., replace "45% …" with "Forty-five percent …"). Percentages should be rounded to the nearest unit (e.g., "34.7%" should be replaced with "35%").

Avoid mentioning more than once the trade name of a product: otherwise, you may create the impression that you intend to bash and brainwash the reader of a common accord with the manufacturing firm (e.g., after having mentioned it a first time, replace Nexplanon® with "etonogestrel implant", "the implant"or "the method").

With regard to taxonomy, only when the Linnaean binomial system is used, whereby first the genus then the species are mentioned by name (e.g. "*Chlamydia trachomatis*"), do these two words need to be italicised. This does not apply when only the genus (e.g., "Chlamydia") is mentioned.

When the the MS is written, rewrite it. And then again.

Foreign authors

One is a "native speaker" in only one language – the person's mother tongue! Foreign authors should have their MS read and corrected by an experienced colleague whose native language is that used in the journal; if this cannot be achieved, by a professional translator.

Ethical issues

The number one criteria with regard to scientific publications are honesty and transparency. Competent editors have developed a flair for detecting transgressions to ethical rules applying to the writing of manuscripts such as, among others, plagiarism (e.g., the copy-pasting of sentences or entire paragraphs "borrowed" from published documents), "salami slicing" (the data gathered during a single investigation are divided over several papers submitted to different journals), and forgery of data. During my tenure as Editor-in-Chief (EiC) of the EJCRHC (a little over eight years) there were two cases of duplicate submission, identified in time. We were less successful in our fight against complimentary- and ghost authorship. At times we had good reasons to believe that the contribution to the writing of the manuscript of persons mentioned in the "Acknowledgements" for their editorial assistance was greater than that of some of the authors listed. This lack of transparency, affecting more particularly papers sponsored by the industry and others submitted by members of university departments, calls for a strict regulation [22]. Annette Flanagin et al. reported that among articles published in first-rate medical journals (e.g., JAMA, NEJM, Am J Obstet Gynecol, ...) 19% had evidence of honorary authors, 11% had evidence of ghost authors, and 2% had evidence of both [24]. Concerning these data, Robert B. Taylor commented that "the suspected prevalence of honorary and ghost authorship is appalling, especially since authors published in these prestigious journals are generally respected academicians" [6].

A sound advice? Stick to the rules.

Conflict of interest

This was discussed earlier on (see "Declaration of interest").

Plagiarism

A caesura in the writing style, with some sentences very poorly written and others not, is immediately apparent to an experienced editor. In many instances it concerns copy-pasting from publications by other authors. Such plagiarism is unacceptable. A sentence which is borrowed from another text must be identified as a quotation by means of double quotation marks, and be followed by the corresponding reference number. Yet, quotations should be few; they cannot be the building stones of a patchwork of statements made by others. The lack of originality in the thinking and the writing raises the question whether the investigation, its results and its interpretation are not affected by the same flaw.

Duplication

Another reason for not taking a MS into consideration is that its publication would amount to duplication. This applies when an very similar paper, based on the same dataset, was published in another journal. To avoid the embarrassing conflict which would arise afterwards, authors should mention that the paper has already been published, in the cover letter addressed to the Editor.

Previous rejection of the manuscript

Some editors (e.g., BJOG) like the authors to mention a previous rejection, the reviewers' comments, and how the latter were addressed.

Forged data

The British Medical Journal "Misconduct Survey" 2012 [25], based on 2700 responses, showed that 13% of British investigators or medical practitioners knew of colleagues who, in the research they carried out or in the paper they wrote, had knowingly falsified or invented data. Six percent of the respondents were informed about possible cases of fraud in their institution, which had not been seriously investigated. Jenny Allan commented these findings as follows: "Given the BMJ's alleged extent of such research misconduct, it would seem statistically probable that many of the researchers contacted had themselves also been involved with research misdemeanours. It should also be noted these researchers had all either written articles for the BMJ, or were involved with BMJ peer reviews. This was not a "random" survey of UK research scientists" [26].

According to Ferric C. Fang et al, "most retractions of scientific papers are due to misconduct. A review of all 2,047 biomedical and life-science research articles indexed by PubMed as retracted on May 3, 2012, revealed that only [21%] of retractions were attributable to error. In contrast, [67%] of retractions were attributable to misconduct, including fraud or suspected fraud [43%], duplicate publication [14%], and plagiarism [10%]. […] The percentage of scientific articles retracted because of fraud has increased [about ten-fold] since 1975. Retractions exhibit distinctive temporal and geographic patterns" [27].

Be aware that discovery of forgery is severely sanctioned.

Which journal?

Journals with high impact factors are thought to have more rigorous peer review and editorial processes. This is by no means the rule: abominable papers have been published in leading journals.

Before submission

Each of the co-authors, with a fresh mind, should have a close look at the latest version and pay particular attention to

(i) content: gross errors (e.g., "coitus interruptus and rhythm methods are barrier methods"; "the Lippes loop is a copper IUD"; "progesterone-only oral contraceptive"; "double-blinded study" when, actually, the three products compared had a different aspect) should be corrected at this stage, trivial errors may be forgiven;

(ii) structure: the paragraphs should follow each other in a logical sequence;

(iii) writing style: one should eliminate improper terminology, repetitions of a same term in a paragraph or even in a sentence, tautologies (e.g. "anticipated expectations"), poorly constructed or excessively long sentences, other errors and inadequacies;

(iv) conceptual thinking: self-evidences (stating the obvious; e.g., "Understanding their patterns of CM use [...] has the potential to increase our understanding of CM use.") detract from the quality of a text and make a bad impression.

The proof of the pudding

The weariness experienced at trying to keep one's attention focused will make one stop reading a text. Indeed, a sloppy presentation correlates often with a sloppy content. A really good paper is one whose take-home messages are effortlessly memorised [22].

Cover letter

The cover letter must be to the point and divulge in a couple of sentences why the authors believe their MS is important. The corresponding author who does not wish that the EiC of the EJCRHC should know that the paper was rejected beforehand should not utilise the letter formerly addressed to the EiC of Contraception (or some other journal) without changing the name of the addressee, like happened a few times during my tenure.

Revision

Peer-reviewing is an essential part of the processing of a paper and the opinions expressed by the reviewers, independently from each other, demonstrate time and again the usefulness of the approach. The suggestions formulated vary but are complementary and, if appropriately addressed, greatly contribute to upgrading the quality of the article and the interest it will elicit. Therefore, it is only fair that authors wishing to have their MS accepted follow the instructions given by reviewers, whose intention is to help authors, not to write the paper. In view of the finite number of pages at our disposal yearly and the ever rising number of good manuscripts submitted, those that will be processed further are the object of a severe selection.

The 'take-home messages' of a former editor-in-chief

1. Think before you start. The assistance of experienced colleagues and of a statistician, when devising the protocol of the study, is paramount.
2. Abide by each of the Guidelines for authors of the journal to which you intend to submit the MS. Upon completion of the paper, double-check whether you have not omitted instructions.
3. Write simply! Avoid being verbose and using jargon; reword sentences that are grand-sounding – and probably meaningless. St. Bernardino of Siena [1380-1444] recommended that one should "first, be clear. Then, be brief. Finally, be eloquent." A spritz of humour is alright; why must scientific literature be dull?
4. Be meticulous to the point of being paranoid with regard to every aspect. Keep Murphy's law in mind: "If anything can go wrong, it will."

5. Statements should not be based on the authors' opinions, but supported by hard evidence.
6. Eliminate mercilessly biases; if not, identify these as weaknesses of the study.
7. If you think the paper may be too long, then it is. A MS makes a better chance of being considered when all redundant material has been eliminated prior to submission, the writing style is beyond reproach, and the Guidelines for Authors have been painstakingly taken into account. Editors are aware that sloppiness of the text often goes hand in hand with sloppiness of the investigation.
8. Even better can be improved.
9. If intending to submit the MS to an English-language journal, have it read and corrected by a native English speaker unless one of the authors has a perfect command of that idiom.
10. Last, avoid receiving a rejection letter in which the Editor wrote: "If you should contemplate to submit another MS, kindly inform me at once. To be out of reach I shall instantly book an eight-months cruise to the Bermuda Triangle." Instead, do the utmost to receive a comment such as "I liked the paper from start to finish." Now, get to work: writing that paper must have become a piece of cake; almost.

Declaration of interest

The author was formerly Editor-in-Chief of the European Journal of Contraception and Reproductive Health Care. The author alone is responsible for the content and the writing of the article.

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APPENDIX – testing your critical appraisal of texts

I was asked to give advice on the following study:

"An oxytocin infusion of 30 units diluted in 500 ml normal saline is prepared. This gives an oxytocin concentration of 60 units per litre or 60 mU/ml. At this concentration, the infusion rate in ml per hour is equal to an oxytocin dose in mU per min. Thus, the infusion pump settings (in ml per hour) would correspond numerically to an oxytocin dose in mU per min, thereby making calculation simple and reducing mathematical errors."

Abstract

Objective: To compare two different regimens of oxytocin for induction of labour

Methods: This study was conducted at the [name of the institution, town and country]. Two hundred women at ≥37 weeks of gestation were randomly assigned to Group I (received oxytocin at 6 mU/min with similar increments every 45 min till adequate contractions were established) and Group II (3 mU/min with similar increments every 45 min till adequate contractions were established), to a maximum of 42 mU/min. Labour, delivery and newborn outcomes were compared.

Results: In Group I, the caesarean rate was higher (18% vs. 6%, p=0.009), more women had contraction abnormalities (35% vs. 14%, p=0.0005) and mean neonatal bilirubin levels were higher (7.99±2.70 vs. 6.80±2.65, p=0.002) than in group II. The mean induction-delivery interval (IDI) was similar in the two groups (10 h 13 min in Group I and 11 h 5 min in Group II). The mean maximum oxytocin concentration received by Group I women was higher than in Group II (31.94±10.70 mU/min vs. 26.64±11.33 mU/min, p=0.001). When only nulliparous women were compared (n=65 in Group I and n=63 in Group II), the mean maximum oxytocin concentration required by Group I women was higher (34.09±11.31 mU/min vs. 27.94±8.23 mU/min in Group II, p=0.006) and the caesarean rate was also higher (16/65 or 24.6% in Group I vs. 5/63 or 7.9% in Group II, p=0.011).On the other hand, in multiparous women, the mean maximum oxytocin concentration was similar (27.94±8.23 versus 24.65±9.77) and the caesarean rate was also similar in the two groups (2/35 or 5.7% vs. 1/37 or 2.7%).

Conclusion: The oxytocin regimen of 3 mU/min at 45 min increment interval is an "intermediate dose" regimen which has advantages over the high-dose regimen as it resulted in more vaginal deliveries, less contraction abnormalities and lower neonatal serum bilirubin levels. Nulliparous women benefited more than multiparous women with this regimen.

My comments

- The protocol should have been submitted to me before starting the study, instead of the Abstract of the MS after its completion!
- Was the protocol submitted for approval to an Ethical Commission?
- Were the patients told that side effects could occur with the dosage schemes planned and did they give give informed consent?
- Patients should have been assigned to the groups on the basis of strict randomisation, the process of which should have been described in detail in the Methods section.
- Explain why you selected precisely these two dosage increments schedules. The FDA recommends an initial dose of 1-2 mU/min; your initial dosages and dosage increments are considerably higher and may be expected to be associated with increased adverse effects. Your max. dosage of 42 mU/min is excessive: at this dose water intoxication has been reported.
- *The Abstract* is excessively long (307 words).
- *A table* should provide information on the relevant characteristics of the enrolled patients and thus show whether the two groups were comparable in terms of (mainly):
  – parity (this seems to be the case),
  – gestational age,
  – indication for induction,
  – Bishop score.
- *The assignment* of the patients to either group should have been blinded to the clinical staff in charge and to the investigators until completion of the analysis of all results. If this was not done, the lack of blinding should be mentioned in the Discussion as a major limitation of the study.
- Information concerning analgesia requirements for the women, fetal heart rate abnormalities during induction, and the infant's condition at birth should be provided.
- *Results:* What were the confidence intervals? Percentages should not be mentioned with decimal places (e.g., replace "5.7%" with "6%"). The unit (presumably mg/dL) used for expressing bilirubin levels should have been specified.
- *Structure the Discussion* in accordance with the recommendations of M. Docherty and R. Smith (BMJ 1999; 318: 1224–5.).
- *Conclusion:* the oxytocin regimen with 3 mU/min increments is NOT an "intermediate-dose" regimen. BOTH regimens are high-dose and entail risks for both woman and infant.