

The Quality and Validity of Publications on Traditional Medicine in the Light of Journals' Policies

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Abstract

Herbal medicines have a great impact on the pharmaceutical industry and drug discovery. A significant budget and time are spent on herbal research and phytotherapy. However, achievements for the management or treatment of diseases using traditional medicine are not very commensurate with the extensive ongoing herbal research. The present article aims to show how Journals' policy can help researchers to improve the quality of their research and so the reproducibility and reliability of published results. The current standards of publications on herbal research common between most Journals publishing biomedical, traditional and herbal research have been examined. To improve the quality and validity of final publications, journals with herbal related scopes need to consider some criteria in addition to their existing policies. Accordingly, the rule of three has been introduced as the necessary minimum information for publications on herbal research. Rule one focuses on plant identification. The focus of the proposed rules two and three is on the details of materials, methods, and design of herbal research. With the acceptance of the rule of three as critical principles for considering an article for possible publication or rejection, the validity, quality, and reproducibility of literature on traditional medicine and so the speed of natural-based drug development will be improved.

Keywords: Traditional medicine, Herbal medicine, Reproducibility, Publications.

1. Introduction

Journals can assure the audience of the validity of the studies they publish (1). Scientists are forced to focus on the novelty of the subject and publishing in highly selective journals (2). However, the impact factor of the journal cannot guarantee that the findings are true (3).

Traditional medicine has a long history as long as human culture and civilization. Phytotherapy is a characteristic health-care approach of traditional medicine among the world population. Herbal medicines have a great impact on the pharmaceutical industry and drug discovery.

Digitalin, ergotamine, quinine, and salicylates can be cited as some classical examples of natural-based drugs (4). However, despite a significant budget and time spent on the extensive ongoing herbal research and phytotherapy (4-6), achievements for the prevention, management, or treatment of diseases using traditional medicine are not exact and remarkable.

The aim of the present article is to show how Journals' policy can improve the quality of herbal research by affecting the standards and design of ongoing research, as well as the quality of their outcomes. Herein, the rule of three is introduced as the necessary minimum information for publication on herbal research.

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2. Current standards of publications on herbal research

A comprehensive list of items is provided in all Journals with sufficient information for each item in detail. These common items between most Journals include: about the journal, aim and scope, editorial policy, copyright options, manuscript categories, publication models (open choice, page charges), ethical responsibilities of authors, guidelines for authors, submission guidelines, artwork, editing services, and checklist after acceptance. Almost, all Journals have the same organization for manuscript preparation which includes word limits, graphical abstract, title, authors and affiliations, abstract, keywords, introduction, material and methods, results and discussion, conclusion, acknowledgments, funding, references, abbreviations, figure legends, table captions, and disclosure of potential conflicts of interest. These well-known items were mentioned to emphasize that despite the different tastes, a universally accepted framework for scientific Journals has been built and improved by the time.

Many Journals which publish biological, medical, and biomedical articles emphasize on the use of standardized nomenclature in all fields of science such as the use of SI units, the scientific nomenclature for genus and species, the appropriate genetic nomenclature, and the Recommended International Non-Proprietary Name (rINN) of drugs. Many high-impact Journals which are active in traditional and alternative medicine explain the area and kind of research that are welcomed or not. For instance, preclinical and clinical studies, ethnopharmacological, ethnobotanical, and ethnochemical studies, new analytical methods, and instruments for phytochemical analysis, pharmacokinetic investigations, and delivery systems of natural products are amongst the most preferred area considered for publication. Whereas papers that focus on *in vitro* studies relating to the antioxidant activity or only involves the use of animal models are not usually welcomed. Some Journals also emphasize that activity data need to be reported with comparison to a recognized positive control.

As researchers and scientists, we are familiar with the willingness to publish our works

in high-impact journals. The high-impact Journals usually request detailed information on the source of the herbal specimen and their preparation methods. However, there are many Journals that do not consider some of the above-mentioned criteria such as botanical nomenclature or detailed experimental methods. In this condition, it is hard to properly evaluate a study and to replicate the experiments, which suffer from the lack of transparency and insufficient detail (7).

Such as Journals have reached a collective agreement on issues such as the types of articles and their various sections, an approach to increase the quality of published literature on traditional medicine is to bring the standard levels for published articles closer together and to a high rational level, as proposed in following.

3. Minimum information for publication of herbal research: Rule of three

Chan et al introduced a common scoring system to evaluate the quality of papers that assesses three aspects including, the identification of plants and plant parts used, the processing, and the extraction procedures (8). It is necessary to point out that data of an herbal study is valid and reproducible only when such information is provided. In a study, gaps in the provided information in published articles about herbal management of diabetes mellitus (DM) were highlighted (9). As mentioned previously (10), to improve the quality and validity of final publications, journals with herbal related scopes need to consider some criteria in addition to their existing policies.

Table 1 shows the rule of three, the minimum information necessary for publication on herbal research, which could be considered as an immediate rejection criterion. The quality and safety of studied herbs, phytochemical, and toxicological assessments, as well as pharmacological mechanisms have their own significant impact on the quality of final publications (11). However, such difficult and costly investigations are not feasible for all research teams. Therefore, they were not defined as a separate rule, in spite of their importance.

Table 1. The rule of three as minimum information for publication of herbal research.

Rule 1	Necessity	Rule 3	Necessity
Botanical nomenclature	Essential	Model of study [phytochemical identification, in vitro / in vivo studies]	Essential
The reference of nomenclature [e.g. www.theplantlist.org]	Recommended	Definition of experimental and control groups	Essential
Herbarium voucher number	Essential	Samples number within each experimental group	Essential
Herbarium voucher specimen verified by named botanist	Essential	Dose, duration and the rout of administration [e.g. oral intervention]	Essential
Traditional applications	Essential	Adverse and side effects [if or not]	Essential
The reference of own author traditional medicine	Recommended	Contamination assessments	Recommended
Stature of plant [e.g. endemic, endangered]	Essential	Toxicological studies	Recommended
Rule 2		Statistical analysis	Essential
Sources of herbs [e.g. from nature or commercial sources]	Essential	Ethic issues	Essential
The way to save endangered species while harvesting	Essential		
Season of harvesting	Essential		
Post-harvesting treatment [e.g. sample storage condition and duration]	Essential		
Used part[s] of plant	Essential		
Herbal processing [e.g. washing, drying, slicing, boiling, steaming, etc.]	Essential		
Traditional reference for the processing procedure	Recommended		
Detailed extraction procedure [e.g. volume, mass]	Essential		
Detailed information on procedure and instruments in phytochemical experiments	Essential		
Yield	Recommended		
The quality and reproducibility of process	Essential		

Botanical nomenclature consists of three parts, including the name of genus or the generic name, specific epithet or species epithet, and the author's name (15), e.g. *Olea europaea* L. and *Satureja khuzistanica* Jamzad. Some items have been included according to (8).

4. Why Rule of three?

The high-level scientific standards help to increase data accessibility and clarity (1). Novel discoveries are usually harder for an area of science that experiences rapid advancement over a short period of time (12). This is true for herbal investigation after the discovery of antioxidant, antimicrobial, anti-inflammatory, and anticancer activities of the secondary metabolites of plants. With cumulative reliable information and data, it would be hard to recognize the existing gaps and

so to propose new ideas for further future investigations. In thermodynamic terms, to organize the methods of investigation, to present findings, and to make a conclusion in a standardized framework are in favor of reducing the entropy in available rapidly increasing and scattered scientific data. Accordingly, the rule of three, if accepted by Journals might help that most of the published herbal research is reproducible and reliable. Therefore, a new criterion should be added to the current peer review process of publications on herbal research

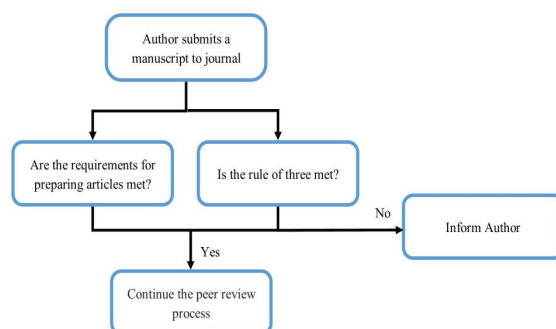


Figure 1. The scheme of peer review process if the rule of three is accepted.

(Figure 1).

The rule one focuses on plant identification. This rule is very significant because the toxicity due to the incorrect identification of herbs is one of the significant hazards of using herbal medicines (10, 13). However, items considered in the mentioned Chan's scoring system (8), including botanical nomenclature, are often ignored in herbal publications despite their great importance and significant impact on the validity and repeatability of herbal research. For instance, none of the reviewed articles about herbal management of DM scored the maximum of the mentioned system as they failed to cite botanical nomenclature and include information on the processing procedure and extraction processes (9) Manohar et al. highlighted the importance of standard terminology to describe herbal medicine and its products (14). Rivera et al. showed that the Latin scientific name of the plants was improperly or even by mistake used in many articles (15). As an extra example, the species of studied herbs in reviewed Iranian articles were not specified in the titles and abstracts of articles (9, 16).

The adverse effect of the ecosystem collapse on human civilization has been compared to nuclear war or global warming (17). Anthropogenic change and traditional medicines likely adversely affect the limited resources available. Cooperation at national, regional, and global levels

is necessary to maintain biodiversity (18, 19). In addition, to conserve biodiversity is a vital necessity that needs people for economic and political support (17). However, before and beyond our expectations from social machines and political institutions, to protect planetary ecosystems, Journals can address these critical issues in their publication policies without any financial costs. For this reason, the status of studied plants, e.g. being an endemic or endangered species, has been considered in the proposed rules one and two.

Goodman SN et al. emphasized the difference between some basic terms, including generalizability, reliability, robustness, replicability, and reproducibility. They showed the importance of a standard nomenclature and terminology on both communication and understanding (20). A defined standard to present data is in favor of methods reproducibility, which in turn benefits results, and inferential reproducibility. The focus of the proposed rules two and three is on the details of materials, methods, and design of herbal research.

I think that with the acceptance of the rule of three as critical principles for considering an article for possible publication or rejection, the validity, quality and, reproducibility of literature on traditional medicine will be improved.

5. Additional suggestions

Misuse of statistics leads to systematic biases that undermine the reliability of the entire literature (20, 21). In my own experience, thanks to the knowledge and careful consideration of esteemed reviewers, I realized some misuse of statistical tests in my research. Although valuable publications on the importance and subtleties of statistical concepts are available (7, 22, 23), I think the design of experiments and the statistical methods used in biological, medical, and biomedical publications need to be examined and evaluated with the cooperation of both statisticians and biostatisticians. It is important if a coauthor of biomedical publications is a statistician. I desire to take a step forward and suggest that any biomedical research should have a corresponding author for statistical examinations. The use of a certain statistical test based on the previous studies is not satisfied. In the author's contribution, it is necessary to be clear that the corresponding author is an expert in statistics. In addition, in the peer reviewing of articles, Journals' chief editors should be sure that at least one reviewer is familiar with both the biomedical and statistical perspectives of the submitted manuscript.

Another critical issue is that an international agreement is needed on the standards of reporting findings of each kind of study, including case reports, clinical trials, animal and *in vitro* studies. In my limited experience, neither consensus international standards are available nor all Journals, even very reputable and high-impact ones, provide such standards in their guidelines to authors. For instance, few Journals ask authors to follow the CONSORT checklist for clinical trials (24) and to state in their publication that the standard was observed. Furthermore, the esteemed reviewers should evaluate whether the authors meet the standards. There is no need to emphasize the importance of this issue because the experience of Food and Drug Administration (FDA), the International Union of Pure and Applied Chemistry (IUPAC), and the Nomenclature Committee of IUBMB (NC-IUBMB) shows the significance of defining and adhering to standards on the quality and validity of outcomes.

The next item that can help to improve the

quality of published papers is to consider the section of "Study strengths and limitation" included in the present sections, including introduction, methods, results and, discussion in which researchers can defend their studies in spite of the existing shortcomings. It is important that researchers could discuss their negative results without any hesitation and anxiety about the rejection of their work. In this way, the audience realizes that the conclusions are based on which kind of limitations.

6. Conclusion

Science has changed over time (25) and scientific research has impacts on society by changing some aspect of our lives (25, 26). Personal responsibility for reproducible science is growing, (27), however, reproducing the work of others needs to be a key part of a scientist's career (2). It is the responsibility of authors that should be open with their methods, all of their findings, and the possible pitfalls that could invalidate their conclusions (1). However, Journals' policy can protect the knowledge against telling stories, uncertainty, and non-reproducibility of results and conclusions and at the same time can help researchers to reach more detailed and accurate ideas and understanding. This is what Journals and Publishers have always done by defining new frameworks and improving the old ones. I want to get help from the statistical concept of mean \pm standard deviation. The best way to release researchers from the pressure of publishing in high-impact journals and to increase the quality of research findings is to bring the existing standards for publication closer to a mean of an acceptable standard with the least possible deviation of each other. The proposed rules of three will improve the organization of articles and the coherence of their scientific contents without any extra financial cost for either Journals or research teams. Accordingly, this hope and expectations can be expected that with the increase in the reliability, validity, and reproducibility of data, the achievements for the prevention, management, or treatment of disease using traditional medicine and discovering of the new drug from herbal medicine will rapidly progress.

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Conflict of Interest

None declared.

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