

THE PEER REVIEW PROCESS WHY IS IT IMPORTANT?

Discussion by Patricia M. Khu, MD, MS

Most reputable journals require a peer review of the submitted scientific manuscripts. The increased use of the peer review process is due to two main factors.¹ The first is the proliferation of manuscripts. In the past, editors of journals often had to struggle to collect enough papers to fill the pages of their journals and, thus, did not need to be selective. When the need for evidence-based practice evolved, submissions to scientific journals increased such that editors have to be more selective in what get published in their journals. The second reason is the explosion of new information and technology. Areas of expertise have expanded to become more specialized and sophisticated. The editors were no longer able to be experts in all areas and had to seek opinions and advices from others.²

Nowadays, the peer review process is used by all scientific journals indexed in MEDLINE and other regional indices to assist in the selection of the papers they want published. It is part of quality control used to determine what is published, and what is not. It also acts as a filter for interest and relevance to the objectives of the journal. The International Committee of Medical Journal Editors (ICMJE) defines peer review as “the critical assessment of manuscripts submitted to journals by experts who are usually not part of the editorial staff.”³ Moreover, since “unbiased, independent, critical assessment is an intrinsic part of all scholarly work, including scientific research, peer review is an important extension of the scientific process.”³

The peer review process serves the following purposes:¹

1. To help select quality articles for publication and filter out studies that were poorly conceived, designed, or executed, with the selection based upon the following:
 - a. The scientific merit and validity of the article and its methodology;
 - b. The accuracy of the results obtained and whether they support the conclusion;
 - c. The relevance of the article to the specific clinical practice;
 - d. The presentation and readability of the article.
2. To improve the manuscript whenever possible.
3. To check against malfeasance within the scientific community.
4. To provide editors with evidence to make judgments as to whether the articles meet the selection criteria of the journal.

Reviewers are chosen for the expertise they have in a particular field, obtained by training or research works in the same field or related disciplines. Moreover, it is preferred that they have published papers and are familiar with conducting researches and submitting scientific manuscripts. Major journals indexed in MEDLINE generally have more rigorous peer-review processes and high-calibre peer reviewers who have published extensively, in contrast to journals from developing countries that lack dedicated reviewers and quality papers to review. Hence, it is not surprising that a clinician will prefer to peruse a major journal from a developed nation with high impact factor. This occurs because individual clinicians with varied levels of experience know that a peer-reviewed, published manuscript has been reviewed and deemed worthy by others who often have greater or more varied experience than they possess.¹ While most clinicians have the ability to critically read a research manuscript, they cannot be expected to be experts in all areas and make judgments about topics about which they know little.⁴

Many journals use some form of a checklist for the reviewer to critically appraise the article submitted. Below are some sample review guidelines on how reviewers appraise an original article and which authors should be cognizant of to help them in the preparation of their manuscripts.

SAMPLE REVIEW GUIDELINES (adapted from *Int J Sports Phy Ther* 2012; 7: 453-460)¹

Title: Does it accurately reflect the purpose, design, results, and conclusion of the study?

Abstract: Does it correctly summarize the salient points of the study?

Introduction: Does it provide adequate background and rationale for performing the study?

- Is the literature discussed in the introduction adequate to introduce the purpose of the manuscript?

- Is the clinical significance of the topic established?
- Are the strengths and limitations described such that a need for further study is established?
- Does it clearly state or imply the study hypothesis or null hypothesis?
- Is a clear and strong rationale provided for the importance of the manuscript?

Study design and methodology: Is the sample described in appropriate detail; procedures and data analysis described clearly and in sufficient detail?

- IRB approved?
- Type of study described?
- Is the study design appropriate to answer the research question?
- Is the methodology described in sufficient detail for others to repeat the study?
- Is the study population clearly identified? Informed consent obtained? Inclusion and exclusion criteria clearly specified?
- Power analysis provided? Were enough subjects studied to detect a difference?
- In clinical trials, were subjects randomized? What methods were used? Was randomization assignment concealed?
- External validity: Were the subjects asked to participate in the study representative of the entire population from which they were recruited?
- Internal validity: Was there an attempt to blind study subjects to the intervention they have received? Was there an attempt to blind those measuring the main outcomes of the intervention? Any analysis that had not been planned at the outset of the study should be clearly indicated.
- Was the therapeutic intervention clearly defined and clearly described?
- Was the measurement instrument or method clearly described?
- Are the details as to how the data were derived adequately explained so that they can be confirmed by the reviewer and reproduced by future investigators?
- Is it clear how the data will be interpreted to either support or refute the hypothesis?

Soundness of the Results: Is the outcome of the statistical analysis presented appropriately and interpreted accurately?

- Are the data reported in a clear, concise, and well-organized manner?
- Are the main findings of the study clearly described? Simple outcome data should be

reported for all major findings so that the reader can check the major analyses and conclusions.

- Are the results reported relevant to the study or research problem?
- Do the tables and figures clarify or confuse? Are all the tables and figures needed? Are the tables and figures properly labeled with titles and the correct units?
- Was the appropriate statistical test used? Have the actual probability values been reported rather than <0.5 for the main outcomes except where the probability value is less than 0.001? Have adjustments been made for multiple comparisons?
- Does the study provide estimates of the random variability in the data for the main outcomes?
- Does the analysis adjust for different lengths of follow up of patients, or in case-controlled studies, is the time period between the intervention and the outcome the same for cases and controls?
- If findings are negative, was a sufficiently large population studied?
- Are findings clinically significant? How do the group differences shown compare with the measurement variability?

Discussion and Conclusion: Are the implications of the study consistent with the purpose, methods, and data analysis?

- Are the major findings of the study clearly described and properly emphasized? Is the significance of the present results described?
- Does it point out weaknesses and limitations of the study? Any biases?
- Does it point out the strengths of the study?
- Appropriate discussion on similarities and differences with other studies in the literature?
- Do the authors support their statements with appropriate references?
- Do the authors discuss their data in a manner that provides insight beyond that presented in previous sections?
- Does it suggest the possible direction of future investigations?
- Are conclusions justified by the results of the study?

Organization and Style: Is the manuscript concise?

- Was the paper well written, properly organized, and easy to follow?
- Was proper grammar, spelling, and punctuation used throughout?

References: Are all major references included?

- Are all references cited completely and in the desired format of the journal?
- Are references chosen directly related to the study?

The peer review process is generally similar for all journals. Once an author submits a manuscript, it is initially reviewed by an editor of the journal to determine its suitability according to the guidelines set by the editorial policy. The manuscript could be rejected without additional review if the content does not fall within the scope of the journal, if it does not follow editorial policy and procedural guidelines, or if it has already been accepted in another journal (in press). If the manuscript is not rejected when first received, it is then sent out for review to a minimum of two additional reviewers in the journal's list of reviewers who are considered experts in the content of the paper. This process is usually a closed review adopted by most journals and can be a single-blinded review where the reviewers' identities are withheld from the authors but the reviewers are aware who wrote the paper they are evaluating, or a double-blinded review where the identity of the authors is also concealed during the review process.⁵ When the chosen reviewers have accepted their assignment, they are given a time period to review the paper, usually with the help of a checklist similar to the sample given above. The reviewers return their recommendations and report to the editor who assesses them collectively and then makes a decision whether to reject the manuscript

outright, to withhold judgment pending major or minor revisions, to accept it pending satisfactorily completed revisions, or to accept it as written (which is rare).¹ For a manuscript requiring revisions, the authors have to submit the revised manuscript incorporating the recommendations of the reviewers. Once the manuscript has been revised satisfactorily, it is accepted and prepared for publication that may take several months.

The review process generally does not change the basic nature of the submitted manuscript; rather, it assists the authors in improving the presentation of their work. This can only happen when knowledgeable reviewers take time to participate in the peer review process and evaluate submissions with care and sensitivity.¹

For in-depth discussion of the peer review process, please refer to reference 1.

REFERENCES

1. Voight ML, Hoogenboom BJ. Publishing your work in a journal: understanding the peer review process. *Int J Sports Phys Ther* 2012;7:453-460.
2. Burnham JC. The evolution of editorial peer review. *JAMA* 1990;263:1323-1329.
3. International Committee of Medical Journal Editors. *Recommendation for the conduct, reporting, editing, and publication of scholarly work in medical journals*. www.icmje.org (updated December 2015).
4. Gannon F. The essential role of peer review. *EMBO Reports* 2001;2:743.
5. Ware M. Peer review: Recent experience and future directions. *New Rev Information Networking* 2011;16:23-53.

WHEN TO USE P VALUES & CONFIDENCE INTERVALS FOR REPORTING INTERGROUP COMPARISONS

Patricia M. Khu, MD, MS
Presented at APAME 2015 Manila

Reporting research results usually requires the investigator to subject the collected data to a statistical procedure determining the degree to which the data are consistent with the specific hypothesis under investigation. This is the test of significance for the p value.

There are six features common to significance tests.¹ First, there is a hypothesis about the population; that there is no difference between the two groups to be compared or the null hypothesis (H_0). Second, the sample taken from the population is random. Third, there is a set of comparable events

(2 x 2 tables). Fourth, the probability distribution of the test statistic is based on the assumption that the null hypothesis (H_0) is true and the sampling uncertainty is random. Fifth, there is a ranking of all possible outcomes in a set of comparable events according to their consistency with the null hypothesis. Lastly, the probability that sample uncertainty, called chance, would produce outcome no more consistent with H_0 than the outcome observed is calculated. This probability is called the significance level of the data with respect to H_0 .

The resulting p value obtained is the likelihood