



The peer review process: an integrative review of the literature*

O Processo de revisão por pares: uma revisão integrativa de literatura

El Proceso de revisión por pares: una revisión integrativa de literatura

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ABSTRACT

Objective: To evaluate the available evidence in the literature about the process of peer review for scientific articles in the area of health. **Methods:** An integrative review of the literature, which was conducted using searches of databases of Latin American Literature and of the Caribbean Health Sciences, *National Library of Medicine, Medical Literature Analysis and Retrieval System Online* and the *Cumulative Index to Nursing and Allied Health Literature*. A total of 12 studies was analyzed. **Results:** It was shown that many criticisms of the process exist because of its subjectivity, but that it is still believed there is a need for it. **Conclusion:** This process is essential for the diffusion of knowledge, as an essential step in the judgment of scientific manuscripts; however, it is important to consider changes to reduce subjectivity to ensure credibility of the process. **Keywords:** Peer review; Nursing research

RESUMO

Objetivo: Avaliar as evidências disponíveis na literatura sobre o processo de revisão por pares de artigos científicos na área da saúde. **Métodos:** Revisão integrativa de literatura, na qual foram realizadas buscas nas bases de dados da Literatura Latino-Americana e do Caribe em Ciências da Saúde, *National Library of Medicine, Medical Literature Analysis and Retrieval System Online* e *Cumulative Index to Nursing and Allied Health Literature*. Um total de 12 estudos foi analisado. **Resultados:** Foi demonstrado que existem muitas críticas ao processo em razão de sua subjetividade, porém acredita-se na necessidade dos mesmos. **Conclusão:** Este processo é imprescindível para a difusão do conhecimento, sendo uma etapa essencial no julgamento de manuscritos científicos, no entanto, considera-se importante que se façam mudanças no sentido de reduzir a subjetividade para garantir credibilidade ao processo. **Descritores:** Revisão por pares; Pesquisa em enfermagem

RESUMEN

Objetivo: Evaluar las evidencias disponibles en la literatura sobre el proceso de revisión por pares de artículos científicos en el área de la salud. **Métodos:** Se trata de una revisión integrativa de literatura, en la cual fueron realizadas búsquedas en las bases de datos de la Literatura Latinoamericana y del Caribe en Ciencias de la Salud, *National Library of Medicine, Medical Literature Analysis and Retrieval System Online* y *Cumulative Index to Nursing and Allied Health Literature*. Fueron analizados un total de 12 estudios. **Resultados:** Fue demostrado que existen muchas críticas al proceso en razón de su subjetividad, sin embargo se cree en la necesidad de los mismos. **Conclusión:** Este proceso es imprescindible para la difusión del conocimiento, siendo una etapa esencial en la deliberación de manuscritos científicos, entre tanto, se considera importante que se hagan cambios en el sentido de reducir la subjetividad para garantizar la credibilidad al proceso. **Descriptorios:** Revisión por expertos; Investigación en enfermería

* Paper produced in the Course "ERG 5868 – Knowledge Communication in Nursing", Graduate Program in Fundamental Nursing, University of São Paulo at Ribeirão Preto College of Nursing – USP – Ribeirão Preto (SP), Brazil.

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INTRODUCTION

The evaluation of scientific activities goes beyond routine; it is a part of the scientific knowledge construction process. Through evaluation, the course of scientific contents, related institutions and career orientations are defined^(1,2).

Peer review, aka referee system⁽³⁾, *refers to an critical evaluation of research manuscripts. The peer review process involves experts in the research area who are not part of the study. Hence, it can be considered an important extension of the science process*^(4,5).

This process makes it easier for journals to improve the quality, precision, reading and credibility of contents for publication, as well as to comply with established publication standards and ethical and legal guidelines^(6,7).

Peer review is a scientific process that contains subjective elements, and therefore is not free from problems or flaws^(2,6,8-10). These flaws derive from the fact that any evaluation exercise implies certain values, elements, premises, conditions and context variables⁽¹⁾.

The peer review process started in the initial seventeenth-century scientific societies and academies, when scientists idealized their own ways to report and control scientific work, through the control of research result records that had been labeled scientific for example. These procedures rapidly spread across other European countries' scientific societies and, from that point onwards, only results of properly reported, scrutinized trials other practitioners present as true could be acknowledged as scientific⁽¹⁾.

Since then, 1665, the *Académie des Sciences* in Paris, followed by the *Royal Society* in London, constituted a group of editors to review manuscripts submitted for publication to their scientific journals. These editors were scientists other members had acknowledged as competent and thus constituted the authority structure that was able to transform a simple print-out of a scientific paper into its publication^(1,6,9).

In terms of type, essentially, two peer review systems exist: the open system – *open review*, in which both parties know the authors and reviewers' identity, and the double blind system – *double blind review*, in which authors and reviewers ignore each other's identity⁽¹¹⁾.

As a result of the peer review process, the manuscript may be accepted without any alterations, acceptance may depend on the suggested corrections, or it may be rejected. The peer review can gain pedagogical characteristics, when the reviewers indicate flaws and shortages, offer suggestions and encourage the authors to improve their manuscripts in a constructive tone, or punitively, when the reviewers give negative, "harsh" comments, in a disrespectful tone, which can negatively influence the author⁽³⁾.

Evidence has shown that the methodological quality of papers published is higher in journals that adopt peer review in the editing process XX than in journals that do not⁽¹²⁾.

Considering peer review as a vital contribution to scientific knowledge dissemination, the aim in this study is to identify available evidence in health literature on the peer review process of scientific manuscripts.

METHODS

An integrative literature review was developed, a research technique that systematically or and orderly joins and summarizes relevant publications on a given theme or question, contributing to further elaborate knowledge on the research theme, and permits drawing conclusions on a specific study area^(13,14). To develop the integrative review, six steps need to be followed^(14,15):

1. Identification of the theme or formulation of the guiding question:

The following guiding question was formulated for this study: "What has been published on the peer review process until date?"

The search was done in the databases LILACS (Latin American and Caribbean Health Science Literature), PubMed (*National Library of Medicine*), MEDLINE (*Medical Literature Analysis and Retrieval System Online*) and CINAHL (*Cumulative Index to Nursing and Allied Health Literature*). The descriptors used to search publications in the databases were chosen. For LILACS, the Health Sciences Descriptors (DeCS) "*Revisão por pares*", "*Enfermagem*" and "*Pesquisa em Enfermagem*" were chosen and, for PUBMED, MEDLINE and CINAHL, the *Medical Subject Headings* (Mesh) "*Peer review*", "*Nursing*" and "*Nursing Research*" were used.

2. Establishment of inclusion and exclusion criteria and sampling or literature search:

The following inclusion criteria were established: full versions of papers published electronically between 2005 and 2010 in Portuguese, English and Spanish. In these results, only papers containing *Peer review* or *Revisão por pares* in the title were selected.

3. Study ranking:

The descriptors chosen for the searches were combined in each database. For the sake of a systematic evaluation of the selected papers, an instrument validated by Ursi⁽¹⁶⁾ was used. The papers were classified and the results summarized according to content similarity.

4. Evaluation of studies included in the review:

Based on the study ranking, the publications were evaluated based on their objectives, method, results and conclusion.

5. Discussion and interpretation of results:

In this phase, the selected publications were analyzed, departing from the guiding question. We attempted to determine the points of agreement and disagreement among the studies, independently of the research design (quantitative, qualitative, quantitative-qualitative, review articles and experience reports).

6. Synthesis of knowledge obtained from the review papers:

Out of 12 selected papers, five were quantitative, two qualitative, one quantitative-qualitative, two reviews and two experience reports. Based on the analysis of the material, we decided to present the results according to the research design.

RESULTS

The search resulted in 130 publications: 59 in Cinahl, 55 in MEDLINE, 12 in PubMed and four in Lilacs. Forty-six papers were selected for reading. Then, editorials, letters to the reader and publications to evaluate posters, papers discussing the theme from the research funding perspective, methodological and instrument validation studies, totaling 34 publications, were excluded.

This integrative review was based on the analysis of 12 publications, as presented in Table 1. Fifty percent of the papers reviewed came from MEDLINE.

Concerning language and year, data in Table 2 reveal that 91% of the publications were in English, showing a

Table 1 – Number of publications retrieved (n = 130) and selected for analysis in the databases Lilacs, PubMed, MEDLINE and Cinahl, 2010

| DATABASES | Publications retrieved n = 130 | Publications selected n = 46 | Publications excluded n = 34 | Publications analyzed n = 12 |
|-----------|-----------------------------------|---------------------------------|---------------------------------|---------------------------------|
| LILACS | 4 | 1 | 1 | 0 |
| PUBMED | 12 | 10 | 8 | 2 |
| MEDLINE | 55 | 20 | 14 | 6 |
| CINAHL | 59 | 15 | 11 | 4 |
| TOTAL | 130 | 46 | 34 | 12 |

Table 2 – Ranking of publications per year, country and language, 2010

| Country | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | TOTAL |
|-----------------|------|------|------|------|------|------|-------|
| USA | 2 | | | 1 | 1 | 2 | 6 |
| Canada | 1 | | | | | | 1 |
| United Kingdom | | 1 | | | | | 1 |
| Australia | | | 1 | 1 | | | 2 |
| Switzerland | | | | 1 | | | 1 |
| Brazil | | | | | 1 | | 1 |
| Total | 3 | 1 | 1 | 3 | 2 | 2 | 12 |
| Language | | | | | | | |
| English | 3 | 1 | 1 | 1 | 1 | 2 | 11 |
| Portuguese | | | | | 1 | | 1 |
| Total | 3 | 1 | 1 | 1 | 2 | 2 | 12 |

lack of publications on the theme in Portuguese. Most publications came from the United States.

According to research design, 42% were quantitative studies, 17% qualitative studies, reviews and experience reports, respectively and 8% qualitative-quantitative studies, as presented in Table 3.

Table 3 – Ranking of publications per research design, 2010

| Design | n (%) |
|-----------------------------------|----------|
| Quantitative research | 5 (42) |
| Qualitative research | 2 (17) |
| Review paper | 2 (17) |
| Experience report | 2 (17) |
| Qualitative-quantitative research | 1 (8) |
| Total | 12 (100) |

Four out of five quantitative studies discuss the theme focusing on the acceptance or rejection of manuscripts submitted for publication, totaling 80%.

DISCUSSION

The analysis of the 12 selected publications revealed that the study by Kravitz⁽¹⁷⁾ was aimed at analyzing the agreement among reviewers' opinions: to what extent the journal takes into account their recommendations to make the decision on whether to publish the manuscript or not and to what extent the reviewers' style influences the recommendations. Therefore, 2,264 manuscripts were analyzed between 2004 and 2008, 47.7% of which were accepted for publication without corrections, 45.4% subject to alterations and 6.9% rejected. The authors found a higher agreement level (47.7%) on the non-rejection of the manuscript than on its rejection (6.9%). The reviewers' recommendations seem to exert significant influence on the editors' decision. The authors concluded that the reliability of the reviewers' recommendations is low, suggesting that this may also be the case in other journals. They recommend the use of a checklist to standardize the evaluation and improve the quality of reviews.

Thus, it was verified that many journals already adopt the checklist to systemize manuscript analysis. The subjectivity of the process, however, is inherent in any evaluation process, as it involves a value judgment, based on knowledge and preliminary experiences⁽¹⁾. In that sense, the more defined the evaluation procedure and criteria, the more coherent the review results will be.

The study by Isemberg et al.⁽¹⁸⁾ was developed between 2000 and 2005 to investigate whether guaranteeing the authors' anonymity to the reviewers would

influence opinions on whether or not to publish the manuscript. They found 61.1% of rejection for manuscripts by anonymous authors; in other words, a higher percentage of acceptance for publication when the reviewers know the authors' names (77.7%). They concluded that guaranteeing anonymity can improve the quality of reviews and reduce bias.

Shattell et al.⁽¹⁹⁾ developed a study between 2005 and 2007 to analyze the quality of peer review in three nursing journals from the authors' perspective. They found that most authors who answered the questionnaires (73%) considered that the reviewers' comments were constructive and 75.6% that the opinions were consistent. As for negative aspects, the authors found references to some reviewers' disrespectful tone towards the authors, lack of consistency in the opinions and insufficient information to enable the authors to improve the manuscripts.

In practice, however, it was verified that some authors feel offended by the reviewers' observations and comments and sometimes end up desisting from a new submission or try another, perhaps "less demanding" journal. They are ignoring the considerable increase in the production of manuscripts though, while the research quality is sometimes doubtful, justifying an accurate analysis on the consistency of the presented studies. In combination with this issue, there is the need for new knowledge production to contribute to the growth of science. Therefore, the review process needs to be strict and accurate, which often does not please the author.

Bormmann and Daniel⁽²⁰⁾ developed a study between 2000 and 2003, during which they investigated whether a certain journal's peer review process would be capable of selecting manuscripts that were worth publishing. For this purpose, they screened 1,021 manuscripts the journal under analysis had rejected to discover whether they had been published in other journals. They managed to determine that 75% had been published without alterations in other journals, while 25% had been reduced or amended or had been published with other research results. They also evaluated the citation rate of the manuscripts the journal under analysis had published and observed that it was 40% to 50% higher than that of the rejected manuscripts that were later published in other journals. The authors concluded that the analyzed journal's peer review process was adequate and suggested that other journals should develop this kind of study.

Concerning the citation rate, the impact factor determines the quality of the publication by checking other researchers' level of interest in that study, measured by the number of times it is cited within a given period. If we consider that, in the journal analyzed, the

citation rate was higher than in the authors, we might suppose that the quality of its publications was better. It should be taken into account, however, that renowned researchers are interested in publishing their studies in “important” journals. Thus, less accepted journals in the scientific community have less opportunity to improve their “Qualis” ranking, creating a cycle that is hard to break.

In 2007, Baggs et al.⁽²¹⁾ developed a study to evaluate nursing journal reviewers’ opinion on authors’ anonymity for the reviewers and vice-versa or none, or both. They found that the 93.6% of the reviewers who participated in the study chose the “*Double-blinded*” method, although some identified some advantages in the “*unblinded open review process*”. They concluded that the “*Double-blinded*” system is one way to guarantee quality and scientific rigor, as it maintains objectivity and avoids critical bias.

Among the qualitative studies under analysis, the research by Job et al.⁽³⁾ is aimed at knowing the reasons why a manuscript is rejected. They analyzed 191 opinions for the period between 1997 and 2007 and joined 1,030 items into 77 motives and seven categories. The findings showed that 51.36% of the reasons to refuse manuscripts refer to methodological problems, 19.22% to a lack of theoretical depth, 11.94% non-compliance with journal standards, 10.19% writing problems, 3.11% lack of originality, 2.62% problems related to the study question or research instrument and 1.55% to ethical problems.

The demand for research funding and intellectual production may be influencing the considerable growth in the number of submissions, sometimes without the respective care. Among the reasons for rejection, Job et al.⁽³⁾ found non-compliance with journal standards in approximately 12% of cases, which is a mandatory condition to start the review process.

The study by Kearney and Freda⁽²²⁾ aimed to evaluate the inter-reviewer reliability of the peer review process and the importance of reviewer training and anonymity as strategies to improve the manuscript review process. Participants were 88 editors from 19 countries, who received a 108-item questionnaire by e-mail. Answers were grouped through content analysis. The primary aim of the study is not described in the article. As for the other aims, the authors found that 80% of the editors considered the “*Double-blinded*” method important in the peer review process. As regards reviewers’ training, the authors affirmed that its benefits could not be proven in that study and added that skills like good writing and critical analysis should be part of the professional education program.

Concerning the start of the development of writing and critical analysis skills in professional education

programs, these are already developed and explored at this education level, and are therefore inherent in professionals graduated in any area. It should be highlighted, however, that these skills are enhanced across one’s professional life and, hence, holding the academy responsible for developing experts in the peer review process does not seem to be appropriate and sufficient to guarantee the quality of the process.

Snell and Spencer⁽²³⁾ developed a quantitative-qualitative study to explore the peer review process from the reviewers’ perspective, including their perceptions on the time spent, difficulties and facilities in the process, benefits, opinions on the *blinded process* and *open process* and ways to make the review process less complex. They also discussed the reviewers’ experience and training for the process. The authors forwarded a questionnaire and a manuscript for evaluation to medical journal reviewers (n= 221) during five months in 2002. The data were analyzed through descriptive statistics and content analysis. The results appointed that the mean time spent on the review process was three hours; 66% affirmed that they would like to have received training for this purpose, but only 14% were formally trained for the process; 79.5% would like to know a colleague’s opinion on the manuscript and 90% would like to receive other reviewers’ comments. Seventy-four percent of the total would be happy to sign their own opinions and believed that the *open process* would be more transparent, honest, fair and constructive, and that the review quality would be better if the reviewers were identified. Three quarters of the respondents liked serving as reviewers and believed that this was a professional responsibility and opportunity for learning.

As for the review papers under analysis, the study by Smith⁽²⁴⁾ proposed a critical analysis of the peer review process, focusing on its limitations. The author discussed flaws in the process, including its subjectivity, excessive time spent on the review, inconsistency among opinions, bias and abuse in the peer review process, referring to plagiarism, conflicts of interest and fraud. The same author adds that it is rare for reviewers to provide the authors with detailed suggestions to improve their manuscripts and discusses some points for improvement, like the authors and reviewers’ anonymity or not and the reviewers’ training. Finally, it was concluded that the peer review process is flawed and full of distortions, and that little evidence exists that it actually works. It is highlighted, however, that scientists and editors believe in the process and, thus, that it tends to continue, also because, according to the author, there is no clear alternative.

In the studies by Isemberg et al.⁽¹⁸⁾, Baggs et al.⁽²¹⁾, Snell and Spencer⁽²³⁾ and Smith⁽²⁴⁾, it was perceived that no agreement exists on whether “*Double-blinded*” is a

condition to guarantee the quality of and reduce the risk of bias in the evaluation. In this matter, not only the technical, but also the ethical component should be taken into account.

What the reviewer's identification is concerned, in their studies, Snell and Spencer⁽²³⁾ found that 74% of the 221 consulted reviewers affirmed that review quality would benefit if the publication mentioned who reviewed the manuscript. It is believed that, besides holding the reviewer accountable, this strategy would serve as a stimulus and acknowledgement of reviewers' hard work.

In their study, Triggler and Triggler⁽⁶⁾ aimed to discuss aspects related to the integrity of science nowadays and call attention to the implications for the peer review process. The authors discuss plagiarism, sabotage, conflicts of interest, journal founding by companies interested in selling their products and highlight the reviewers' responsibility in this context. They alert that there is a trend for editors to publish only studies that present "positive data", and affirm the need to publish data that, although negative, can contribute to the advancement of knowledge in the area. Possible suggestions for improvement include a reform in the peer review system and the creation of supervisory entities and specific legislation for scientific fraud cases. They highlight the importance of transparency and validity in the process and present the *open review process as an alternative. The authors underline the importance of education at all levels, with a view to raising awareness on the extent and implications of scientific fraud.*

Schilling et al.⁽²⁵⁾ published a study to disseminate social assistance experts' concern with the quality and impact of journals in the area, as well as with publication and peer review processes, in view of a consensus that improvements are necessary. The study results from discussions that took place in a roundtable session held by the Society of Social Assistance in January 2005, about assertions that the peer review process journals in the area adopt is not strict enough, that the quality is inferior and that reviewers are not experienced for this purpose. They presented suggestions for improvements, involving editing, the review process and publication. The authors suggest setting deadline for the reviews, submission and manuscript review by e-mail, in order to optimize time and specialized and methodologically competent reviewers with substantial knowledge, who assumed the commitment to provide in-depth reviews. They also suggest that editors should encourage letters by readers and authors' replies and the publication of reviewers' opinions.

The study by Happell⁽²⁶⁾ was aimed at describing the importance of peer review and providing nursing professionals interested in this activity with a guide.

The author discusses the importance of the reviewer's experience, professionalism and rigor, as well as the need to evaluate the relevance of the theme for the profession and the level of interest it will arouse among readers. Also, the pedagogical nature of the review is highlighted, which should be critical but constructive.

As for the studies' relevance, the range, pertinence and depth of nursing knowledge as an area have been evolving; nevertheless, nursing researchers are hardly able to complete with other correlated knowledge areas in terms of highly qualified productions⁽²⁷⁾. The peer review process can certainly contribute to improve the quality of its products. It should be underlined, however, that knowledge production should involve much more than methodological, technical and political competences. Knowledge needs to contribute to the advancement of the profession but, at the same time, remain committed to "*taking care of the human being's health*"⁽²⁷⁾

FINAL CONSIDERATIONS

Based on the analysis of the study material, it could be observed that great criticism exists against the peer review process, coming from reviewers themselves and authors. The problems appointed ranged from technical issues like inconsistency, incompetence, slowness, to ethical issues like conflicts of interest. The peer review process was contextualized in the studies under analyzed as extremely labored and detailed, and generally non-remunerated.

The steep rise in the number of studies is highlighted, demanding increased efficiency to guarantee the publications' quality and detect possible frauds.

As suggestions to reduce problems in the peer review process, the authors analyzed formulated proposals, ranging from the creation of supervisory entities, specific legislation, use of checklist instruments and reviewer training. Concerning the "*double blinded*" system and "*unblinded open review process*", no agreement was evidenced in the studies reviewed as to the best method to guarantee the reliability of the review process.

It is emphasized, however, that most studies analyzed were international, possibly contextualizing distinguished realities. Further Brazilian research is needed to recognize and understand the peer review process in Brazil, its potentials and weaknesses, demystifying and disseminating this work.

In conclusion, despite its limitations, the peer review process is fundamental for knowledge dissemination and an essential step in the evaluation of scientific manuscripts. Therefore, it is important to make changes with a view to reducing the process' subjectivity and, thus, guaranteeing its credibility.

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