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Associação Portuguesa de Documentação e Informação de Saúde

Publication delay in pharmacy practice journals: a comparative analysis

Tempo de espera para a publicação nas revistas de farmácia práctica: análise comparativa

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Abstract

Introduction: Articles published in scientific journals are a valuable source of information and the main system to communicate research results. Authors frequently complain about the long duration of the editorial process, which includes time of external peer-review, layout formatting, and metadata indexing. Differences in the duration of these processes between areas have not been sufficiently explored. **Aim:** To evaluate the duration of the publication process in pharmacy practice journals compared with other scientific disciplines. **Methods:** From 67 pharmacy practice journals previously identified, 33 indexed in PubMed were selected for data collection. Metadata of all articles published between 2009-2018 were extracted from PubMed. To create a comparison group of randomly selected articles, the first PMIDs of each year between 2009-2018 were identified. Four lag times for the different steps of the publication and indexing process were calculated: Total publication lag (days between 'submission date' and 'online publication date'), acceptance lag (days between 'submission date' and 'acceptance date'), lead lag (days between 'acceptance date' and 'online publication date'), and indexing lag (days between 'online publication date' and 'Entry date'). Impact Factor (IF) and CiteScore data were also collected. Statistical analyzes were performed in SPSS v20 and RStudio v1.2. **Results:** The 33 pharmacy practice journals published a total of 26,256 articles. CiteScore of 25 journals was calculated with mean of 1.34 (SD 0.90); only 8 journals have IF (mean 2.135; SD 0.681). In the comparison group, 5,622 different journals published 23,888 articles with a median of 2 articles per journal (IQR 1-5). CiteScore was calculated for 4,879 of these journals, with mean of 2.61 (SD 2.64); 3,853 journals have IF (mean 3.337; SD 0.811). Comparison journals presented higher report rates for all the editorial process dates than pharmacy practice journals: submission OR=0.9 (IC95% 0.76-0.82), acceptance OR=0.86 (0.83-089), and Online publication OR=0.001 (0.0006-0.002). Acceptance lag was not different between pharmacy practice and comparison group (93 vs. 97 days), while small differences existed in lead lag (15 vs. 25 days; Cohen`s d=0.279). However, a greater difference was found in indexing lag (12 vs. 4 days; Cohen`s d=0.703). The analyses of pharmacy practice journals

showed important variability in acceptance lag (range 13 to 290 days). Open access pharmacy practice journals presented a lower acceptance lag than subscription ones (74 vs. 126 days). Acceptance lag showed no association with CiteScore in both group of journals (p>0.05). The IF presented a significant inverse association, but with no effect size, with the acceptance lag, in both groups (p<0.001). **Discussion:** Although the average acceptance lag of pharmacy practice journals was similar to a generic comparison group, huge variability exists between these journals. While authors may consider the smaller acceptance lag as a good characteristic, literature suggests risks associated to fraudulent peer-review. **Conclusions:** About 95 days since submission are required to have an article accepted, whether in pharmacy practice or in comparison groups of biomedical journals.

Keywords

Journalology; Publication process; Publication delay; Pharmacy practice

Resumo

Introdução: Os artigos publicados em revistas são fontes valiosas de informação e principal sistema para divulgar resultados de pesquisa. Os autores reclamam frequentemente da longa duração do processo editorial, que inclui tempo de: revisão por pares; formatação do artigo; e indexação dos metadados. As diferenças na duração desses processos ainda não foram suficientemente exploradas. **Objetivo:** Avaliar a duração do processo de publicação em revistas de farmácia prática (FP), em comparação com outras disciplinas. **Métodos:** Das 67 revistas de farmácias previamente identificadas, 33 indexadas na PubMed foram selecionadas para coleta de dados. Metadados de todos os artigos publicados entre 2009-2018 foram extraídos da PubMed. Para criar um grupo de comparação (GC) com artigos selecionados aleatoriamente foram identificados os primeiros PMIDs de cada ano. Foram calculados quatro tempos de atraso para as diferentes etapas do processo de publicação e indexação: atraso total da publicação (dias entre 'data de envio' e 'data de publicação on-line'), atraso de aceitação (dias entre 'data de envio' e 'data de aceitação'), atraso de publicação (dias entre 'data de aceitação' e 'data de publicação on-line') e atraso de indexação (dias entre 'data de publicação on-line' e 'data de entrada'). Os dados de Fator de Impacto (IF) e CiteScore também foram coletados. As análises estatísticas foram realizadas no SPSS v20 e no RStudio v1.2. **Resultados**: As 33 revistas de FP publicaram 26.256 artigos. O CiteScore das 25 revistas foi calculado com média de 1,34 (DP=0,90); 8 revistas tinham IF (média=2,135; DP=0,681). No GC 5.622 revistas diferentes publicaram 23.888 artigos com mediana de 2 artigos por periódico (IQR=1-5). O CiteScore foi calculado para 4.879 desses revistas, com média de 2,61 (DP=2,64); 3.853 revistas têm IF (média=3.337; DP=0.811). As revistas de comparação apresentaram taxas mais altas quanto à disponibilização das datas do processo editorial: submissão OR=0,9 (IC95% 0,76-0,82), aceitação OR=0,86 (0,83-089) e publicação on-line OR=0,001 (0,0006-0,002). O atraso na aceitação não foi diferente entre FP e GC (93 vs. 97 dias), enquanto no atraso de publicação houve pequenas diferenças (15 vs. 25 dias; Cohen's d=0,279). No entanto, uma diferença maior foi encontrada na indexação (12 vs. 4 dias; Cohen's d=0,703). As análises das revistas de FP demonstraram variabilidade importante no atraso de aceitação (variação de 13 a 290 dias). As revistas 'open access' de FP apresentaram um atraso de aceitação menor do que as de 'subscription' (74 vs. 126 dias). O atraso na aceitação não mostrou associação com o CiteScore nos dois grupos de revistas (p>0,05). O IF apresentou associação inversa com atraso na aceitação nos dois grupos, mas sem tamanho de efeito (p<0,001). **Discussão**: Embora o atraso médio de aceitação das revistas de FP tenha sido semelhante ao GC existe uma grande

variabilidade entre essas revistas. Embora os autores possam considerar o menor atraso na aceitação como uma boa característica, a literatura sugere riscos que podem ser associados à revisão por pares fraudulenta. **Conclusões**: Cerca de 95 dias após a submissão são necessários para a aceitação de um artigo, seja na FP ou noutras revistas biomédicas.

Palavras-chave

Revistologia; Processo de publicação; Atrasos de publicação; Farmácia prática

Introduction

Diffusion of knowledge represents one of the key aspects of science[1]. Effective communication facilitates the access to information that could benefit other academic investigations and even patients, whether in the same research institution or in a hospital thousands of miles away. For the last three centuries, scholarly articles have been the main instrument of this communication[1]. Today, the hallmark of good research is a publication[2]. Leading universities around the world adopt the number of published articles and the journal Impact Factor (IF) as productivity and quality indicators[2].

Due to beneficial stimuli or not, the volume of submitted and published articles increases dramatically. In 2015, the Web of Science (WoS) registered more than two million records from scientific journals. PLOS ONE, for example, have published about 30,000 articles in different areas of knowledge in 2015[3]. In health sciences the picture is not different. MEDLINE, the life sciences, and biomedical information database, adds more than one million of new records each year[4]. About 7% of the findings obtained through systematic reviews, that should support daily clinical decisions, should be updated each year[5], as a result of the high volume of publications.

It is worth noting that scientific communication is not done just by authors, journals and databases. Other actors such as editors and peer-reviewers are essential elements in this process. Many of the published articles were rejected and peer reviewed at least one time before they were published[6]. There is much to discuss between the steps of submission, acceptance and publication of a scholarly article. In submission, the quality and integrity of the research is fully attributed to the author's responsibility. However, such responsibility will be shared with editors and peer reviewers by the time the article is accepted for publication[7]. Showing the relevance of editors and reviewers in the scientific articles selection and consequently in the published information quality.

However, the peer review model has been the target of much criticism. Primarily for publication delays, but also for possibilities of fraud and plagiarism, or subjective inconsistencies[8], which are inconvenient for authors and publishers. Often surrendered to the “publish or perish” dilemma, publication delays are major barriers to authors’ productivity indicators[6]. On the other hand, the management of the peer review process, which needs to comply the researchers’ periodical publication and ensure a high standard journal, has the publication delays as a major obstacle[9]. In addition, publication delays are also barriers to updating science[10].

Comparisons of the duration of publication processes between pharmacy practice journals or other biomedical areas have not been sufficiently explored.

Aim

To evaluate the duration of the publication process in pharmacy practice journals compared with other scientific disciplines.

Methods

The list of pharmacy journals was obtained from Mendes et al. study[11].That study objectively classified the 285 journals published in the area of pharmacy into six clusters, namely 'Cell Pharmacology' (20 journals) and 'Molecular Pharmacology' (46 journals), Group B with 'Clinical Pharmacology' (57 journals) and 'Pharmacy Practice' (67 journals), and Group C with 'Pharmaceutics' (35 journals) and 'Pharmaceutical Analysis' (60 journals). Of the 67 pharmacy practice journals, 33 are indexed in PubMed (www.pubmed.gov). On February 2019, metadata of all the articles published by these 33 journals between 2009 and 2018 (ten years) were extracted from PubMed to create a pool of pharmacy journal data.

To create a comparison group of randomly selected articles, the first PMIDs of each year between 2009 and 2018 was identified in PubMed. Minimum sample size was calculated after a preliminary analysis of 12380 randomly selected articles extracted from PubMed, which resulted in a mean of 125 days (SD 98) delay from article reception to publication, with 43.4% of the articles providing data for this calculation. Aiming to identify in each year a between-groups difference of the means of ten days, with an alpha error of 0.05 and a power of 80%, a sample 1509 articles was obtained using G*Power (University of Kiel, Kiel). Considering the 50% of potentially incomplete metadata, a sample of 3000 PMIDs per year was created using Research Randomizer website (www.randomizer.org). On February 2019, metadata of the articles indexed with the randomly generated PMIDs were extracted from PubMed to create a pool of comparison journal data. Articles from both groups, although indexed with an entry date between the study limits, but with a date of publication outside the study period were excluded from the analyses.

PubMed records of all the articles in both groups were imported into an EndNote X4 (Thomson Reuters, Toronto), and then exported into an Excel spread sheet (Microsoft, Redmond). Submission date was obtained from the PubMed field PHST-[received]; Acceptance date was obtained from PHST-[accepted]; Online publication date was obtained from the field DEP; Entry date from the field EDAT; publication language from the field LA; and Publication country from the field PL.

Publication countries were grouped using the World Health Organization regional offices distribution (www.who.int/about/who-we-are/regional-offices). CiteScore for 2018, percentile of the journal in 2018 CiteScore distribution, and Scopus Sub-Subject Area were obtained from the Scopus Sources database (www.scopus.com). Journals' IF for 2017 was obtained from the Journal Citation Reports, available through the Web of Science (www.webofknowledge.com).

Five lag times for the different steps of the publication and indexing process were calculated: Total publication lag (days between 'submission date' and 'online publication date'), acceptance lag (days between 'submission date' and 'acceptance date'), lead lag (days between 'acceptance date' and 'online publication date'), and indexing lag (days between 'online publication date' and 'Entry date').

Categorical variables were presented as absolute values and frequencies. Association between two categorical variables was tested with the chi-square test and the odds ratio with 95%

confidence interval. In Continuous variables, normality was calculated through the Kolmogorov-Smirnov with additional visual inspection of the Q-Q plot. Correlation between two non-normal variables was calculated with the Spearman's rho. Two independent non-normally distributed variables were compared with the Mann-Whitney test, and the U was converted into Cohen's d to calculate the effect size following Cohen[12] and Fritz et al. recommendations[13] using the Phychometrica calculator (https://www.psychometrica.de/effect_size.html). Effect sizes were categorised according to Cohen's d as: < 0.1 no effect, 0.1-0.4 small effect, 0.5-0.7 intermediate effect, and > 0.7 large effect[12]. Data were analysed using SPSS v20 (IBM, Armonk) and RStudio v1.2 (RStudio Inc., Boston).

Results

The 33 pharmacy practice journals indexed in PubMed published a total of 26,256 articles between 2009 and 2018. CiteScore could be calculated for 25 of the 33 pharmacy journals indexed in PubMed, with mean CiteScore of 1.34 (SD 0.90), and only eight journals have the IF calculated with a mean IF of 2.135 (SD 0.681).

The 3,000 PMIDs randomly selected per year for the study period resulted in a total of 25,272 valid PMIDs, which led to 23,888 articles for the comparison group after excluding those published out the study period (Table 1). These articles were published in 5,622 different journals with a median of two articles published per journals (IQR 1-5), being PLoS One the most prevalent with 471 articles. These articles were published in 27 different languages, with English (22,644 articles), and Chinese (335 articles) as the most common languages. The journals publishing these articles were published in 76 countries, with United States (9,812 articles), United Kingdom (5,895 articles), and the Netherlands (1,612 articles) as the most productive. CiteScore was calculated for 4,879 of the 5,622 journals, with mean CiteScore of 2.61 (SD 2.64), and 3,853 journals have the IF calculated with a mean IF of 3.337 (SD 0.811).

Table 1. Articles selected for the study

		Entry dates		Publication dates		
year	**First PMID**	**Articles in PubMed**	**Valid PMIDs**	**Comparison****	**Pharmacy**	**Total**
2009	19209947	1,027,488	2,521	1,561	1,637	3,198
2010	20237435	1,656,822	2,526	1,682	2,018	3,700
2011	21894257	737,335	2,518	1,868	2,103	3,971
2012	22631592	644,365	2,462	3,574	2,462	6,036
2013	23275957	1,104,118	2,545	2,631	2,560	5,191
2014	24380075	2,545,809	2,573	1,314	2,743	4,057
2015	26925884	1,238,009	2,349	1,382	3,024	4,406
2016	28163893	1,101,015	2,666	2,080	3,037	5,117
2017	29264908	24,124	2,662	3,584	3,312	6,896
2018	29289032*	1,305,973	2,450	4,212	3,360	7,572
				23,888	26,256	50,144

*first PMID in 2019 (30595005)
**after excluding publication dates out of the study period

Report rates of the publication process dates was significantly lower in the pharmacy practice articles than in the comparison group, with odds ratios between 0.6 and 0.9, except for the online publication date (OR 0.001) that was very highly reported in the comparison group (Table 2). This poorer report of publication process date was mainly associated with the pharmacy practice journals published in U.S., U.K. and Japan, while journals published in France, the Netherlands, Saudi Arabia, Spain and Switzerland have better reporting rates than journals from these countries from the comparison group. Among the pharmacy practice articles, 5,461 (20.8%) reported all the four dates, while 8,113 of the comparison articles (34.0%) reported all the dates (OR 0.51; 95%CI 0.49 - 0.53).

Table 2. Frequencies of article processing dates reported. (Data presented as number and percentage)

	Pharmacy practice	Comparison	p-value*	Odds ratio (95%CI)
Submission date	11,314 (43.1%)	11,676 (48.9%)	<0.001	0.79 (0.76 - 0.82)
Acceptance date	12,244 (47.4%)	12,127 (50.8%)	<0.001	0.86 (0.83 - 0.89)
Online publication date	14,301 (54.5%)	23,869 (99.9%)	<0.001	0.001 (0.0006 - 0.002)

*chi-square test

Acceptance lag was not different between pharmacy practice and comparison articles. Lead lag, and total lag, although with significant difference between the two groups, presented no effect or small effect when evaluated through effect sizes. Conversely, Indexing lag was significantly smaller in comparison articles than in pharmacy practice articles, with a large effect size (Table 3).

Table 3. Lag times (days) calculated in the two groups

	Pharmacy practice			Comparison			p-value	Cohen's d
	n	Median	IQR	n	Median	IQR		
Acceptance lag*	11,279	93	56 - 159	11,166	97	56 - 155	0.800	0.004
Lead lag*	7,969	15	7 - 41	12,068	25	10 - 51	<0.001	0.279
Total lag*	7,958	144	79 - 233	11,114	134	84 - 204	<0.001	0.068
Indexing lag*	13,828	12	4 - 87	22,521	4	2 - 10	<0.001	0.703

*Kolmogorov-Smirnov < 0.001

When analysed pharmacy practice journals only, important variations in acceptance lag were found, ranging from 13 days (IQR 13-39) of J Basic Clin Pharm, followed by 48 days (IQR 33-72) of Pharmacy (Basel), to 290 days (IQR 229-349) of Curr Pharm Teach Learn followed by the 242 days (IQR 127-234) of Int J Pharm Pract. Trend analysis of acceptance lag demonstrated a steady profile in the majority of the pharmacy practice journals during the study period, with few journals presenting significant slopes but with no effect of small effect. Only one journal, Pharmacy (Basel), presented a moderate effect with a decreasing slope (rho = -0.440), reaching the lowest acceptance lag among all the pharmacy practice journals in 2018 with 40 days (IQR 25-55). The complete data of processing lag times are available in Figure 1.

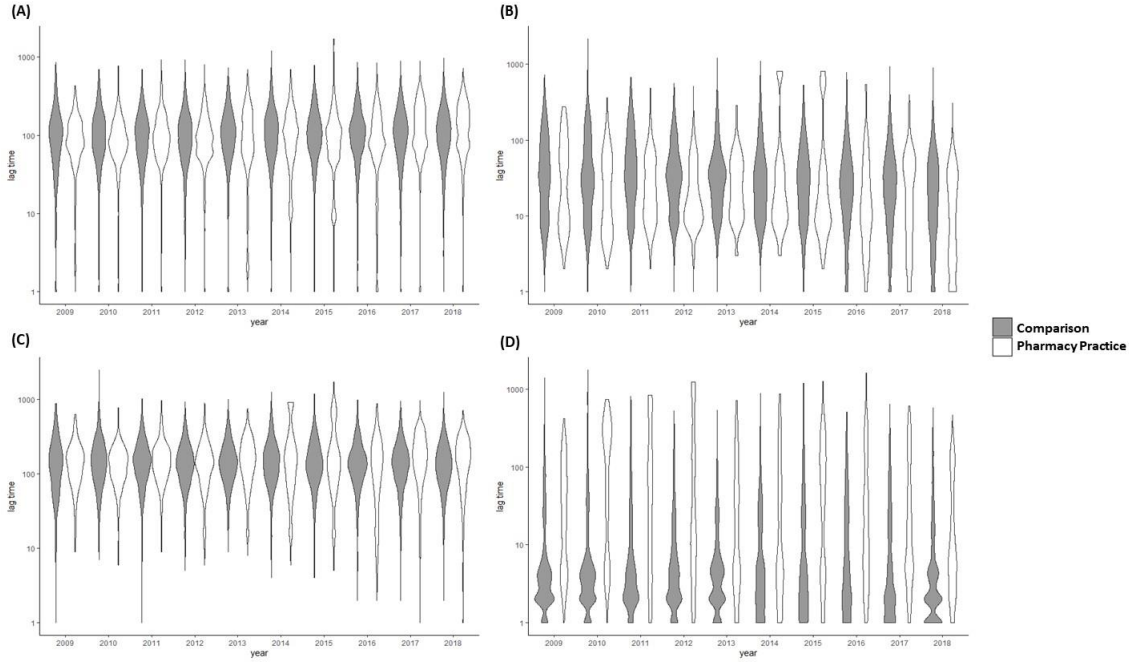

Figure 1. Violin plots of the acceptance lag (A), lead lag (B), total lag (C) and indexing lag (D) for each group (pharmacy practice and comparison group journals) from 2008 to 2018 (Y-axis presented in logarithmic scale).

Lead lag of presented a significant decreasing trend during the study period for almost all the pharmacy practice journals with large effects (Spearman's rho > 0.7) in journals like J Am Pharm Assoc (2003), J Basic Clin Pharm, and Res Social Adm Pharm.

The majority of the pharmacy practice journals presented also a significant decreasing slope for the indexing lag, and five journals had huge indexing lag times with medians over than 100 days (Curr Pharm Teach Learn, Hosp Pharm, J Basic Clin Pharm, J Young Pharm, Saudi Pharm J).

Open access (OA) pharmacy practice journals presented a lower acceptance lag than subscription ones (74 days, IQR 50-97 vs. 126 days, IQR 75-102, p<0.001) and lower lead lag (10 days, IQR 5-28 vs. 16 days, IQR 7-43, p<0.001), but greater indexing lag (117 days, IQR 19-301 vs. 9 days, IQR 4-60, p<0.001). These differences between OA and subscription journals lag times were smaller in the comparison group, with acceptance lag of 100 days (IQR 58-160) vs. 98 days (IQR 57-155) (p=0.064), lead lag of 26 days (IQR 12-49) vs. 23 days (IQR 9-50) (p=0.001) and indexing lag of 4 days (IQR 2-16) vs. 3 days (IQR 2-7) (p<0.001).

Acceptance lag showed no association with CiteScore in the pharmacy practice group (rho = -0.004, p=0.688) and in the comparison group (rho = 0.012, p=0.221). The IF presented a significant inverse association, but with no effect size, with the acceptance lag, both in pharmacy practice journals (rho = -0.077, p<0.001) and in comparison group (rho = -0.082, p<0.001).

Discussion

Although the average acceptance lag of pharmacy practice journals was similar to a generic comparison group, huge variability exists between these journals. While authors may consider

the smaller acceptance lag as a good characteristic, literature suggests risks associated to fraudulent peer-review.

The availability of dates of editorial process steps is important to a correct assessment of publication delays. Reports about incomplete data of editorial dates were previously reported[10,14-16]. In 2016, Powell presented that the lack of transparency in the editorial process dates can lead to some analysis restrictions, often underestimating publication delays[16]. This situation was reproduced in the present study. The full report rate of editorial dates was lower than 40% for pharmacy practice journals (20.8%) and comparison journals (34.0%). The reporting rates of online publication dates were lower for pharmacy practice journals than for the comparison journals (54.5% vs. 99.9%, OR = 0.001). This could compromise total lag and lead lag evaluations. It is important that journals publishers are committed to report all the editorial dates. In this way, the evaluation of publication delay will be more reliable.

In the present study, all lags measured were similar between pharmacy practice journals and comparison journals, except for PubMed indexing lag. However, the total lag increased over the study period in both groups. Therefore, discussion about all publication delay reasons is important.

The technological advances may decrease research production times[17]. An evaluation of articles available on PubMed and published between 1960 and 2015 found that the average time spent in manuscript production decreased by half[17]. On the other hand, the time to publish these manuscripts increased[16]. In the past decade, for example, the peer review lag increased from 37 to 125 days in PLoS ONE[16]. Another study, published in 2018, showed that the time between the discovery of important clinical trial results and the publication of these results to the medical community was of 300 days[18]. That leads us to the question: If manuscript production time decreases with technological progress, why publication delays are increasing?

For pharmacy practice and comparison journals, the total lag was 144 days (IQR 79-233) and 134 days (IQR 84-204) respectively, presenting shorter periods when compared to the study by Lee et al., which presented the total lag of 246.5 days (IQR 178-347) for Korea medical journals[10]. However, the evaluation of publication delays requires a holistic perspective, where we need to consider the different editorial steps and which factors contribute to increasing or decreasing publication delays.

In this context we found the acceptance lag as the main contributing factor in the total lag for pharmacy practice articles (93 of 144 days) and for control group articles (97 of 134 days), since the lead lags were 15 days (IQR 7-41) for pharmacy practice and 25 days (IQR 10-41) for control group. Previous in-depth report about PubMed articles dates had similar results. From the editorial dates available on PubMed, Himmelstein found the acceptance lag around 100 days and lead lag around 25 days[15]. That leads us to detail the factors that interfere in the manuscript acceptance and publication.

In the scientific community there is great pressure to publish as quickly as possible and in journals with the highest possible IF[17]. The final research step is the article publication, which involves manuscript preparation, peer review, manuscript adequacy after review, and in many cases other submissions prior to acceptance[17]. The rejection rates vary from journal to journal and are based on several criteria: journal scope; quality defined by the editors; number of manuscripts submitted; and periodicity and space available in the journal[19]. Peer review is, in theory, the stage that guarantees the quality of publications, regarding scientific rigor and

clarity of the manuscript[17,19]. However, some opinions present peer review as a slow process, very expensive and unreliable[17].

An evaluation about PLOS publications found that the average peer review time has doubled over the past decade from 50-130 days to 150-250 days[16]. Each year about 1.8 million peer-reviewed articles are published. Considering the review by two reviewers, at least 3.6 million reports per year are generated[19], which partly explains the delays in acceptance. Professionals involved with editorial process recognize the high volume of submitted manuscripts makes it difficult to choose appropriate editors and reviewers, leading to considerable delays in publication[9-10,16].

However, other aspects of the review process should also be taken into account. Acceptance lags are also related to: manuscripts poorly formatted and with poor quality; poor agreement among peer-reviewers; high time for review and delivery of the report by the reviewer; failures to deliver the report by the reviewer; peer-review reports with excess subjectivities[9]. Now, it is easier to understand the delays in acceptance of all these issues.

The pressure to publish influences authors, editors, and reviewers. And it is not surprising that different ways are created to mislead the peer-review system and speed up the publication process[20]. In this context, more and more studies about “fake peer review” are published[20-26]. Among the strategies reported are: indication of false reviewers by the authors, in which the authors themselves review and accept the article in a shorter time[20-22] and the presence of predatory journals, where the author pays a publication fee to the journal, which is supposed to send the manuscript for peer review, and is quickly accepted without any change[25]. Before choosing the journal to submit their manuscript, it is up to the authors to evaluate the journal's publication times against the average acceptance time in the area. And it is up to the editors to define strategies that can bar the indication of false reviewers.

When looking at lead lags, time between article acceptance and online publication, a reduction trends in this delay is observed. Our data show a significant reduction in lead lag over the years evaluated for both pharmacy practice journals (15 days, IQR 7-41) and control group (25 days, IQR 10-51). Similar values were found by Himmelstein, where lead lag fell by half from the 2000s, reaching the same median of 25 days of our control group[15-16]. There is speculation that lead lag reductions were driven by technical changes: use of digital publications instead of print publications[10,16]; and redesign internal flow of manuscripts on journal editorial platforms[10].

Journals like PLoS Computational Biology have high lead lags. Not surprisingly, using the same editorial and typographic system, takes PLoS journals into the largest lead lags. On the other hand, journals which publishing online pre-formatted PDF files gets significantly reduction on lead lags, reaching three days for journals such as eLife[14]. This shows, unlike acceptance lags, lead lags can be more easily reduced through digital tools and organization of the journals work processes. Pharmacy practice journals such as J Am Pharm Assoc (2003), J Basic Clin Pharm, and Res Social Adm Pharm showed significant lead lag reductions (Spearman’s rho> 0.7).

Indexing lag in PubMed databases is a problem for clinicians and researchers[27]. The lack of availability of scientific information may impact the quality of the care process of professionals whose acting based in evidence[27]. The time to index articles to PubMed is associated with two main points: 1. time spent for journal to send accepted articles metadata to databases; 2. time spent by NLM to make metadata available via PubMed when they were submitted through PubMed Central. Most of pharmacy practice journals showed a significant reduction in

indexing lag during the study period. Despite the reduction, pharmacy practice journals still maintained higher delays than comparison group (12 days – IQR 4-87 vs. 4 days – IQR 2-10, p<0.001 – Spearman's rho 0.703). This difference can be explained by the presence of five pharmacy practice journals that presented indexing lag medians higher than 100 days. It is therefore important that journals review their work processes so that articles are available as early as possible, benefiting authors and consumers of scientific publications.

Reductions in editorial delays were evident for OA journals when compared to subscription journals. In the Pharmacy Practice group the reductions were significant for acceptance and lead lag, and not significant for PubMed indexing delay. The number of articles published in OA journals continues to increase. Unfortunately, there has also been an increase in attempts to exploit the concept of OA for-profit. In this context, authors pay to submit manuscripts with the promise of prompt publication, and some journals soften or exclude the peer review process to meet the promise of reducing publication delays and thus justify advance payment[25].

In 2018, Wang and colleagues found 5,354 retracted articles indexed in PubMed, with 11.6% being published in OA journals. Until 2010 less than 5% of retractions were related to OA journals, while in 2016 24.6% of retractions corresponded to OA journals[28]. Such data may be related to the decrease in the quality of OA journals, since the exclusion of peer reviews has been recurrent in this type of journals (25). In addition, the main reasons for retraction were: false peer review and discovery of errors or frauds, which corroborates to the need for an appropriate peer review process[28].

The acceptance lag, which includes the peer review step, accounts for the largest portion of the total lag. Peer review is responsible for ensuring higher quality to scientific communication. On the other hand it is the process which involves the largest number of people: editor who needs to find reviewers; reviewers who need to deliver reports; and authors who need to respond to reviews properly, which makes peer review a person-dependent step.

Conclusions

More than 134 days since submission are required in median to have an article published, whether in pharmacy practice or in comparison groups of biomedical journals. Publication delays can be associated with different reasons in different steps of the process.

The peer review process duration is main cause of publication delay. It is important that the research community discuss and propose alternatives to improve and optimize this prolonged but essential process to maintain the quality of scientific communication.

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Acknowledgements

This study was partially funded by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brasil (CAPES) – Finance Code 001.

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