


Duplicate Publication and Related Problems in the Pediatrics Literature

Global Pediatric Health
January-December 2014: 1–5
© The Author(s) 2014
DOI: 10.1177/2333794X14564442
gph.sagepub.com


Rebecca Haworth, BSc^{1,2}, Katherine Anderson, BSc^{1,2}, and Paul Hong, MD^{1,2}

Abstract

Objective. The aim of this study was to (a) determine the rate of redundant publication in the pediatrics literature and (b) to characterize these articles. **Methods.** Index articles in *JAMA Pediatrics*, *Pediatrics*, and the *Journal of Pediatrics* from 2010 were identified using PubMed. Possible redundant material from 2008 to 2012 were searched using the authors' names. Suspected duplicates were categorized into "duplicate publication" or "salami-slicing" (part of the index article repeated or continued). **Results.** Of the 1838 index articles, 39 (2.1%) were found to have some form of redundancy. Specifically, 45 articles were identified as salami-sliced, which corresponded to the 39 index articles. Fifteen salami-sliced articles did not reference the corresponding index article, 2 vaguely referenced the index article, and 28 had clear references to the respective index article. **Conclusion.** Salami-slicing was a common practice. Salami-slicing may be acceptable in certain cases but authors should clearly reference the index article.

Keywords

duplicate publication, redundant publication, pediatrics, salami-slicing

Introduction

Duplicate or redundant publication describes a practice where 2 or more articles that share substantially similar information are published by the same author(s), without clear, visible reference to the previous publication.¹ Duplicate publications are highly unethical and have been widely condemned.²⁻⁵ It is time and resource wasting for the readers, peer reviewers, and editors and unnecessarily saturates the literature with redundant results.⁶ This undermines the integrity of the scientific literature as a whole. Furthermore, when redundant publications are unintentionally included in a systematic review or meta-analysis, the conclusion of that review may be incorrect.⁷

Another related practice involves dividing up a single study to publish multiple articles. Generally, this practice is referred to as "salami-slicing."^{8,9} The exact definition of salami-slicing is, however, controversial. Some consider it another form of producing redundant material.^{2,5,9} This definition usually refers to articles that share similar hypotheses, methodology, and results. Another phrase that may be used to describe such a practice is "least publishable unit."^{5,10} It refers to the creation of multiple publications out of material that may, perhaps more suitably, be published as a single article. Obviously, when articles fit *this* definition of salami-slicing, the practice should be deemed inappropriate and unethical.

However, some consider salami-slicing to be a legitimate practice. Typically, such cases involve large studies with multiple objectives and analyses.^{1,4,9} In other words, if a single sample/cohort or data set is used to test a different hypothesis with different outcome measures and results, salami-slicing may be considered appropriate. It may lead to publications that are more presentable and readable, which can benefit editors, reviewers, and readers. As such, the act of salami-slicing involves the judgment of the authors, and in certain circumstances, it may be considered appropriate. Yet authors must clearly cross-reference and acknowledge the other article(s) in instances where salami-slicing is being practiced.^{2,10}

The issue of redundant publication and salami-slicing has been reported in some surgical disciplines.¹¹⁻¹⁴ However, very little is known about redundant publication and related problems in the general pediatrics literature. The objectives of this study were (a) to determine the rate of redundant publication and salami-slicing in the pediatrics literature and (b) to characterize these publications.

¹IWK Health Centre, Halifax, Nova Scotia, Canada

²Dalhousie University, Halifax, Nova Scotia, Canada

Corresponding Author:

Paul Hong, IWK Health Centre, 5850 University Ave, PO Box 9700, Halifax, Nova Scotia, Canada B3K 6R8.

Email: Paul.Hong@iwk.nshealth.ca



Methods

Index Publication Search

Index articles were defined as the original articles of interest (reference articles). The subsequent literature searches looked for other articles (redundant or salami-sliced publications) similar to the index articles.

Index articles in *JAMA Pediatrics* (formerly known as *Archives of Pediatrics & Adolescent Medicine*), *Pediatrics*, and the *Journal of Pediatrics* in the year 2010 were identified using PubMed. Only original articles in print (not published online ahead of print) were considered. The following types of publications were excluded: case reports, editorials, letters, reviews, systematic reviews, and meta-analyses.

Duplicate Publication Search

Potential redundant and salami-sliced publications were identified by searching PubMed for the combination of the first or second, and last authors' surnames and their first initials associated with the index articles. All journals listed in PubMed were searched to identify potential duplicates. The dates were limited to include articles published between 2008 and 2012, encompassing a 5-year period with respect to the year of the index articles. If a single search yielded more than 200 titles and abstracts, or if the search involved only one author, a keyword from the title of the index article was added to limit the search results. Non-English potential duplicates were excluded at this point.

All identified titles and abstracts were reviewed for content at this stage by 2 authors (RH and KA) and those that addressed similar topics as the index articles were included for full text review. The same 2 authors independently analyzed the full texts to determine if the articles met the definition of "duplicate publication" (identical or nearly identical methods, results and conclusions) or "salami-slicing" (substantial part of the index article repeated or continued) as defined by Schein and Paladugu.¹⁴ Specifically, the study methods including objectives and hypotheses being tested, and results including tables and figures, were contrasted to ascertain the degree of overlap. Disagreements regarding classification of the suspected duplicates between the 2 authors were resolved with discussions involving the senior author (PH).

Characterization of Publications

As mentioned above, the definition of salami-slicing can vary. Therefore, the initial definition used in this study¹³ (as above) was intentionally broad to include all potential redundant material.

The full texts of those articles chosen with the aforementioned methods, considered to be suspected duplicates or salami-sliced publications, were reviewed by all 3 authors. The salami-sliced articles were then further characterized, and a decision was made as to whether the salami-slicing was considered legitimate. The definition of legitimate salami-slicing at this stage was (a) the presence of clear reference to the index article and (b) the assessment of different contexts or testing of different hypothesis than the index article.

Results

A total of 1838 original index articles were identified as published in 2010 in the 3 pediatrics journals (Figure 1).

The initial duplicate search using authors' names, as described above, yielded 321 titles and abstracts. Further review identified 170 titles and abstracts that covered similar topics as their respective index articles ($n = 126$). Full texts of the 170 potential duplicate articles published between 2008 and 2012 were then retrieved, further reviewed, and compared to the 126 index articles (22 index articles in *JAMA Pediatrics*, 62 in *Pediatrics*, and 42 in the *Journal of Pediatrics*).

After full text review, 45 of the 170 (26.5%) suspected duplicates, which corresponded to 39 of 126 (31.0%) index articles, were found to have some form of redundancy (9 *JAMA Pediatrics* index articles, 15 *Pediatrics* index articles, and 15 *Journal of Pediatrics* index articles). Of the 45 suspected duplicates, none were classified as a "duplicate publication." Therefore, all 45 articles were considered to be "salami-sliced" (Figure 1).

Of the 39 index articles (corresponding to 45 salami-sliced articles), most (92.3%) were associated with only 1 salami-sliced publication; 2 (5.1%) index articles had 2 salami-sliced publications each; and 1 (2.6%) index article was associated with 4 salami-sliced publications. Five (12.8%) index articles were of level 1 evidence (RCTs), 31 (79.5%) were of level 2 evidence (low-quality RCTs, or prospective or retrospective cohort studies with or without a control/comparison group), and 2 were of level 3 evidence.¹⁵ One was a qualitative study. Using the corresponding author's mailing address, the country of origin of the index articles was identified: 24 (61.5%) were from the United States, 13 (33.3%) were from Europe, 1 (2.6%) was from China, and 1 (2.6%) was from Canada.

Regarding the publication year of the salami-sliced articles, 14 (31.1%) were published in the same year as the index articles, 8 (17.8%) were published within 2 years (2008-2009) prior to the index articles, and 23 (51.1%) were published within 2 years (2011-2012) after the index articles. Most (95.6%) of the salami-sliced

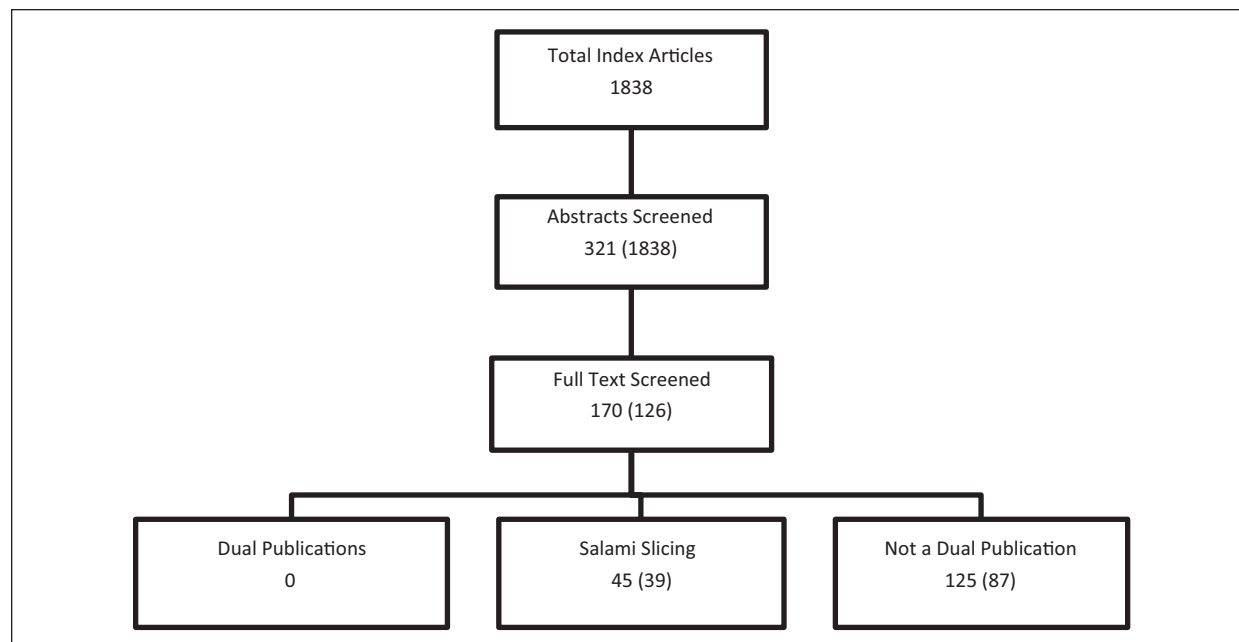


Figure 1. Flow diagram of the search and review process for inclusion of studies in the literature review. The corresponding number of index articles are found in parentheses.

articles were published in journals with lower impact factor than the index journals.

Twenty-one salami-sliced articles (corresponding to 19 index articles) were judged to be legitimate since they clearly cross-referenced the index article. Most ($n = 15$) contained either secondary or different analyses using the same or similar sample/cohort; 6 articles used data from a large database or trial (ie, the index article was not the original source of data but also used the same database).

The remaining ($n = 24$) salami-sliced articles (corresponding to 20 index articles) were judged not to be completely legitimate, according to the definition agreed on by the authors (see above). Seven studies had clearly cross-referenced the index articles but either performed very similar analyses with the same or similar sample/cohort, or simply performed the same analyses but for longer duration. It was unclear whether salami-slicing was truly necessary for these publications since the articles may have been combined. Two studies had performed slightly different analyses but attained similar results and conclusions; they also only vaguely referenced the respective index article (ie, only mentioned with other studies in the introduction or discussion sections). Six studies conducted different analyses with the same cohort with data from a large database or trial, which was clearly referenced but the index article was not cross-referenced.

The remaining 9 salami-sliced articles did not contain any reference to the index article (or other sources

of data). Five studies used different outcome measures with the same cohort; 1 study performed longer analysis with the same cohort; and 2 other studies contained slightly different analysis with the same or similar cohort. One was a qualitative study with semistructured interviews, and although these 2 articles assessed different contexts, identical data (quotes from participants) were used in both analyses within the different contexts. Again, none of these studies cross-referenced the corresponding index articles.

Discussion

Redundant publications continue to be a persistent problem despite the widespread recognition that it is an unethical practice. There are many negative consequences associated with duplicate publications. They can dilute the scientific literature, artificially exaggerate published evidence, increase the workload of editors and reviewers, alter systematic review and meta-analysis conclusions, and reduce the opportunity of other studies being published due to the limited physical space available in most journals.¹² As well, publishing redundant material can violate copyright agreements, which is unlawful.

To our knowledge, this is the first study to specifically address the issue of duplicate publications and related problems in the general pediatrics literature. Overall, no “duplicate publication” was identified with our search method; however, salami-slicing was a much

more common practice. Specifically, 45 salami-sliced articles were identified, which corresponded to 2.4% of all index articles. Interestingly, the duplicate rates in other medical fields have been mostly reported to be slightly higher. A recent study in otolaryngology that used a similar search method showed an overall redundant publication rate of 7.5%.¹² Other studies in plastic surgery (<1%)¹³ and in the *Journal of Hand Surgery* (5.5%)¹⁶ also demonstrated similar rates of duplicates, although the search methods were different. Even with similar search methods, classifying suspected duplicates is a subjective process as the definition of salami-slicing, as mentioned above, can vary. This caveat should be noted when interpreting these studies, as well as the present study. To this end, future studies may employ plagiarism detection software that can provide a more objective analysis. However, there are concerns even with plagiarism detection software since most are designed to look for word matches, and if authors simply alter wording or phrases, redundancy may not easily be detected.¹⁷

Although salami-slicing is not always considered unethical, it is regarded by many to be a deceptive practice.^{5,7,9,18} There are legitimate circumstances where salami-slicing should be instituted. For instance, multiple studies can originate from a large complex database or different qualitative themes can be reported using a single cohort's in-depth interviews. In other words, there are scenarios where dividing up data from the same or similar source may be appropriate and can actually help the publication to be more presentable and readable. Yet it is a practice that has been discouraged by many editors of prominent medical journals.^{5,9,10} At the very least, the previously published article should be clearly referenced in the subsequent article. As well, authors should be encouraged to declare in their initial publication that they intend to perform and publish follow-up studies, if possible. This may allow editors and reviewers to ascertain whether there is a future potential for salami-slicing and to judge whether this should be considered appropriate.

In the current study, most of the salami-sliced articles clearly referenced the index study. However, some authors did not reference the index article, even though there was clear overlap. Furthermore, some of the studies were a continuation of the index study. That is, the salami-sliced article reported longer follow-up data but the methods, results, and conclusions were identical or very similar to the index article. Again, such practice may not technically be unethical, but the original study should clearly be referenced in the subsequent article(s), even if authors explicitly acknowledge the reuse of data sets in the letter of submission. Perhaps authors should

publish follow-up studies with similar findings as "brief scientific communications" with a clear reference to the initial study or delay publishing until the entire study has been completed.

We adopted a simplistic approach to categorize salami-sliced articles as legitimate (see above), and others may define legitimate salami-slicing differently. That is, some of the salami-sliced articles that were judged not to be in the legitimate category in this study may be acceptable to some authors. Although there is variability in defining what may be considered legitimate salami-slicing, we believe there should be increased awareness of this practice in readers of pediatrics journals.

Three prominent pediatrics journals were selected to identify the index articles. They were chosen because they have the highest impact factors,¹⁹ and most researchers aspire to publish in such reputable journals. However, the acceptance rate for these journals is relatively low due to the rigorous review process and the high number of manuscript submissions. Thus, it is likely that the duplication rate could have been higher if more or other journals were used to identify the index articles. As well, there are numerous open access journals that are not indexed in PubMed and the gray literature, which may both contain more duplicates.

Similarly, the index articles from only 1 year (2010) were selected, and the duplicate search period involved 2 years before and 2 years after to span a total of 5 years. Presumably, some authors may have published redundant articles beyond the searched time period, thus underrepresenting the duplication rate. However, previous studies have shown that most duplicates tend to occur within a few months of each other.¹² One potential reason for this close timeline may be due to authors submitting dual studies at or near the same time to avoid literature search detection by the reviewers and editors.

Another search factor that may have led to the underestimation of the duplication rate may have been the inclusion of only select authors' names and the inclusion of only English language articles. However, our search was more exhaustive than previous studies since we combined first *or* second, *and* last authors' names of the index articles, while previous studies used narrower search methodology. Regarding the language limitation, there is evidence that redundant publication in the form of different languages is common in some parts of the world.²⁰ Future studies should therefore be more inclusive.

The cause of duplicate publication has not been well studied. The most likely motivation behind this practice is to expand one's number of publications on their curriculum vitae. Presumably, this is done to achieve career

advancements within the academic reward system.^{12,13} Perhaps there should be more meaningful and sensible methods to assess the merit of a researcher's scientific contribution rather than relying on the number of publications.⁹ More emphasis should be placed on the scientific rigor and content, and measures such as citation indices may help reduce the rate of duplicate material in the scientific literature.

Conclusion

Salami-slicing was a common practice in the general pediatrics literature identified with our search method. The scope of this finding requires further research in both extent and impact. Studies of high level of evidence, such as RCTs, were at greatest risk for salami-slicing and thus continued surveillance and rigorous review in the future is warranted.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was supported by an IWK Summer Studentship awarded to Rebecca Haworth and a Division of Otolaryngology Dr James S. Hammerling endowment awarded to Katherine Anderson.

References

- International Committee of Medical Journal Editors. Overlapping publications. <http://www.icmje.org/recommendations/browse/publishing-and-editorial-issues/overlapping-publications.html>. Published 2013. Accessed December 11, 2014.
- The Surgical Journal Editors Group. Consensus statement of the submission and publication of manuscripts. *Surgery*. 2001;129:662-663.
- Definition of "sole contribution." *N Engl J Med*. 1969;281:676-677.
- National Institutes of Health. *Guidelines for the Conduct of Research in the Intramural Research Program at NIH*. 3rd ed. Bethesda, MD: National Institutes of Health; 1997.
- Rivara FP, Christakis DA, Cummings P. Duplicate publication. *Arch Pediatr Adolesc Med*. 2004;158:926.
- Huston P, Moher D. Redundancy, disaggregation, and the integrity of medical research. *Lancet*. 1996;347:1024-1026.
- Tramèr MR, Reynolds DJ, Moore RA, McQuay HJ. Impact of covert duplicate publication on meta-analysis: a case study. *BMJ*. 1997;315:635-640.
- Broad WJ. The publishing game: getting more for less. *Science*. 1981;211:1137-1139.
- The cost of salami slicing [editorial]. *Nature Materials*. 2005;4:1. <http://www.nature.com/nmat/journal/v4/n1/full/nmat1305.html#Reference>. Accessed May 7, 2014.
- Bier DM, Fulginiti VA, Garfunkel JM, et al. Duplicate publication and related problems. *Pediatrics*. 1990;86:997-998.
- Rosenthal EL, Masdon JL, Buckman C, Hawn M. Duplicate publications in the otolaryngology literature. *Laryngoscope*. 2003;113:772-774.
- Cheung VW, Lam GO, Wang YF, Chadha NK. Current incidence of duplicate publication in otolaryngology. *Laryngoscope*. 2014;124:655-658.
- Durani P. Duplicate publications: redundancy in plastic surgery literature. *J Plast Reconstr Aesthet Surg*. 2006;59:975-977.
- Schein M, Paladugu R. Redundant surgical publications: tip of the iceberg? *Surgery*. 2001;129:655-661.
- Phillips B, Ball C, Sackett D, et al. Oxford Centre for Evidence-based Medicine—Levels of evidence (March 2009). <http://www.cebm.net/index.aspx?o=1025>. Accessed June 2, 2014.
- Chennagiri RJ, Critchley P, Giele H. Duplicate publication in the journal of hand surgery. *J Hand Surg Br*. 2004;29:625-628.
- Roach ES, Gospe S, Ng YT, Sahin M. Trust but verify: the introduction of plagiarism detection software. *Pediatr Neurol*. 2014;50:287.
- Rogers LF. Duplicate publications: it's not so much the duplicity as it is the deceit. *AJR Am J Roentgenol*. 1999;172:1-2.
- Medical journal impact factors 2010. <http://impactfactor.weebly.com/paeds.html>. Accessed January 4, 2014.
- Amos KA. The ethics of scholarly publishing: exploring differences in plagiarism and duplicate publication across nations. *J Med Libr Assoc*. 2014;102(2):87-91.