Author self-citation in the diabetes literature

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Abstract

Background: Author self-citation is the practice of citing one’s previous publications in a new publication. Its extent is unknown. We studied author self-citation, choosing the major clinical field of diabetes mellitus to represent the general medical literature.

Methods: We identified every article about diabetes mellitus in 170 hand-searched clinical journals published in 2000. For every article, we recorded the bibliographic citation and publication type (original or review article) and assessed the methodologic rigour. Citation information was obtained from the ISI Web of Knowledge in April 2003.

Results: Of 49 028 articles, 289 were about diabetes mellitus and had citation information. Citation counts ranged from 0 to 347 (median 6, interquartile range [IQR] 2–12). Author self-citation counts ranged from 0 to 16 (median 1, IQR 0–2). Author self-citations accounted for an average of 18% (95% confidence interval [CI] 15%–21%) and a median of 7% (95% CI 5%–11%) of all citations of each publication that was cited at least once (n = 266). Original articles had double the mean proportion of author self-citations compared with review articles (19% v. 9%; median 7% v. 0%, difference 7%, 95% CI 0–10%). Methodologic rigour and review type were not significantly associated with subsequent author self-citation.

Interpretation: Nearly one-fifth of all citations to articles about diabetes mellitus in clinical journals in the year 2000 were author self-citations. The frequency of self-citation was not associated with the quality of publications. These findings are likely applicable to the general clinical medicine literature and may have important implications for the assessment of journal or publication importance and the process of scientific discovery.

Methods

We identified 170 clinical journals by accessing the impact factors of Science Citation Index (Thomson ISI, The Thomson Corporation, Stamford, Conn.), obtaining recommendations from clinicians and librarians, and evaluating journals’ yields of publications of scientific merit and clinical relevance. For these journals, 6 research associates collected bibliographies from every article in each issue published in 2000 and applied methodologic criteria. The final database included 49 028 articles. Further details on the creation of the database are available elsewhere. Owing to the large number of articles, we limited our study to a single major clinical field (diabetes mellitus) representative of general medicine. We classified all publications about diabetes by type (original article, narrative review, systematic review or meta-analysis) and assessed each publication for methodologic rigour according to explicit criteria for clinical research. A review was defined as any publication in which the title or a section heading identified it as a review, overview or meta-analysis or the text claimed to review or summarize the medical literature on a specific topic. A systematic review was defined as any review in which the authors identified a specific topic, stated how and from what sources data were retrieved, and provided explicit study inclusion and exclusion criteria. All other reviews were classified as methodologically limited. A meta-analysis was defined as any review that combined data from previous publications. The research
associates were trained to assess the methodology of articles, and the level of interrater agreement was very high (Cohen’s kappa value > 0.8).4 On Apr. 1, 2003, the database contained 295 articles about diabetes therapy, prognosis, diagnosis, harm or cause. For each such publication, we retrieved the complete bibliographic citation, the article type and the methodologic grade. During the period Apr. 1–7, 2003, we queried the ISI Web of Knowledge (www.isiknowledge.com [a subscription is required]), which reports citation counts, impact factors and other bibliometric data. For 6 of the 295 articles, the ISI Web of Science did not track citations; these articles were excluded from further consideration. For each of the remaining 289 articles, we collected the citation count — the number of times the publication had been cited in subsequent publications. We examined every such citation, compared the lists of authors of the cited and citing publications, and identified the number of self-citations. Despite the large number of articles and citations, there was no instance in which article or author names caused confusion.

We created frequency tables of counts of author self-citations and all citations for the publications, categorized by type and methodologic rigour. Because the proportion of self-citations among all citations had a skewed distribution, we estimated the median. We also estimated the 95% confidence intervals (CIs) for the medians and for differences of medians (by study type and by methodologic rigour) using the bootstrapping technique with 10,000 iterations.

**Results**

Of the 170 journals, 50 published the 289 publications about diabetes mellitus for which citation information was available (see Table 1, available online at www.cmaj.ca/cgi/content/full/170/13/1925/DC1); there were 256 original articles and 33 reviews. Only 61 of the original articles had rigorous methods. Of the 10 systematic reviews, 8 included meta-analysis. Citation counts of individual publications ranged from 0 to 347 (median 6, interquartile range [IQR] 2–12). Author self-citation counts per publication ranged from 0 to 16 (median 1, IQR 0–2). Author self-citations accounted for an average of 18% (95% CI 15%–21%) and a median of 7% (95% CI 5%–11%) of all citations of each publication that was cited at least once (n = 266).

Original articles had double the mean proportion of author self-citations compared with review articles (19% v. 9%; median 7% v. 0%, difference 7%, 95% CI 0–10%). Methodologic rigour and review type were not significantly associated with subsequent author self-citation (Fig. 1).

**Interpretation**

The important finding of this study is that author self-citations comprise nearly one-fifth of all citations to articles about diabetes published in clinical journals in 2000. In general, however, self-citations had little relation with the quality of an article, and authors did not preferentially cite rigorously performed research or reviews. These findings are likely applicable to the general clinical medicine literature and may have important implications for the assessment of the “importance” of journals and publications and for the process of scientific discovery.

Author self-citation serves necessary functions in medical literature. It allows an author or group to expand on previous hypotheses, refer to established study designs and methods, and justify further investigations on the basis of prior results. Author self-citation may be inevitable when the published data in a specific field are solely the work of 1 investigator or research group. For example, we cited our own work once in this paper in order to refer the reader to relevant methodologic issues. The greatest risk of author self-citation may be its effects on the process of scientific discovery. Citations build connectivity between publications, and this is essential to the growth and progression of medical knowledge.4 Repeated self-citation accentuates one’s credibility or expertise and may perpetuate one’s interpretations or opinions of specific research findings or general constructs. Self-citations, when pervasive, might falsely validate the conclusions of an author or group and could even limit scientific discovery if other investigators do not challenge what might be perceived as developing or accepted concepts.

To the extent that assessors of the importance of a publication rely on bibliometric indices based on citation counts (perhaps for lack of a better metric),41 author self-citation may artificially inflate an article’s importance to the general scientific community. Author self-citation may even be performed knowingly for this purpose alone, a practice that has been satirized.4 Apart from mere ego-
tism, this practice may be promoted by the fact that citations are “a hallmark of academic achievement for authors and journals” and “correlate highly with the opinions of peers as to a scientist’s contributions to his/her field and are used by medical school deans for promotion reviews.” One journal published an open call for authors to cite more recent articles from journals with a high impact factor to raise the former’s impact factor. Although this would affect counts of journal self-citation (as opposed to author self-citation), it makes apparent the motivation and means by which citation counts may be manipulated. Our findings add to the debate regarding the role that bibliometric data should play in judgements about the scientific importance of published work.

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References

1. Garfield E. How can impact factors be improved? BMJ 1996;313:411-3.
2. Fassoulaki A, Paraskeva A, Paplas K, Karabinis G. Self-citations in six anaesthesia journals and their significance in determining the impact factor. Br J Anaesth 2000;84:266-9.
3. Garfield E, Welljams-Dorof A. Citation data: their use as quantitative indicators for science and technology evaluation and policy-making. Sci Public Policy 1992;19:321-7.
4. Callaham M, Wears RL, Weber E. Journal prestige, publication bias, and other characteristics associated with citation of published studies in peer-reviewed journals. JAMA 2002;287:2847-50.
5. DeMaria AN. A report card for journals. J Am Coll Cardiol 2003;42:952-3.
6. Montori VM, Wileczynski NL, Morgan D, Haynes RB. Systematic reviews: a cross-sectional study of location and citation counts. BMC Med 2003;1(1):2.
7. Hyland K. Self-citation and self-reference: credibility and promotion in academic publication. J Am Soc Inf Technol 2003;54:251-9.
8. Craddock N, O’Donovan MC, Owen MJ. Introducing Selfcite 2.0-career enhancing software. BMJ 1996;313:1659-60.
9. Kapoor VK, Aggarwal R. A comparison of citations in the Indian Journal of Gastroenterology with other journals. Indian J Gastroenterol 1993;12(Suppl 1):S12-6.

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