This article examines whether the absolute and relative numbers of reviews are increasing in the following three subfields of medical sciences: Tropical Medicine, Infectious Diseases, and Oncology. It further examines if reviews are cited more frequently than are “normal” articles. All research questions are answered affirmatively: The absolute as well as the relative numbers of reviews in these three subfields are indeed increasing. In addition, reviews in these fields are cited more frequently than are normal articles: about 70% more often than are “normal” articles in Infectious Diseases and Oncology and about 50% more often in Tropical Medicine. The article discusses possible reasons for this increase and concludes that medical journals should strive to achieve an optimal balance between review papers and original articles.

Introduction

Almost 50 years ago, Price (1965) estimated that the ratio of review to original research papers was approximately 1:40. This would mean that about 2.5% of all research articles and reviews would be reviews. Different types of reviews used in the health sciences have been studied in detail by Grant and Booth (2009). They argued that there has been an increase in the number of reviews since the 18th century but do not provide supporting evidence.

It is well known that in general, review journals have higher impact factors than do other journals (Garfield, 1987; Rousseau & Van Hooydonk, 1996). At the article level, Aksnes (2003) and Glänzel and Czerwon (1992) found that review papers were overrepresented among all highly cited articles. More recently, Ioannidis (2006) studied the same question and found a large amount of review papers among the top-100 most cited ones in 21 scientific fields. High numbers of reviews were found in Pharmacology and Toxicology (73 of 100), Immunology (43 of 100), and Clinical Medicine (32 of 100). Hou, Li, and Niu (2011) investigated 14,537 articles and 2,580 reviews (Web of Science terminology) published in the categories of Biochemistry & Molecular Biology and Genetics & Heredity during the years 2006 to 2007 and determined the number of received citations in the year 2008. They found that review papers were cited 1.64 times more frequently than were articles.

Patsopoulos, Analatos, and Ioannidis (2005) studied the relative citation impact of various study designs (meta-analysis, randomized controlled trials, cohort studies, case control studies, case reports, nonsystematic reviews, and decision and cost-effectiveness analyses) in the health sciences. They found that meta-analyses (a very special form of review) were cited significantly more than were the other designs while epidemiological studies, nonsystematic reviews, and decision and cost-effectiveness analyses received similar numbers of citations. Case reports received the fewest. Based on responses to a questionnaire sent to Norwegian researchers in different science fields, Aksnes...
(2006) found that researchers felt that the value of their reviews were overestimated in terms of citations.

Because impact factors and citations are increasingly used to evaluate scientists and research institutions and because it is assumed that reviews receive more citations than do normal research articles, our main research question is to ascertain if there has been an increase in the absolute and relative numbers of review papers over time. As a secondary research question, we evaluate if reviews receive more citations—and if so, how much more—than do normal research articles.

Methods

We selected the following three research fields: Tropical Medicine, Infectious Diseases, and Oncology. The first two fields were chosen because of their relevance to the research institute of the first two authors while the third field was chosen as a control. Data were collected from Thomson Reuters’ Science Citation Index during November 2012. For this investigation, we used the Web of Science definitions of what constitutes a review and a “normal” article.

Results

We collected the total numbers of publications, reviews, and “normal” articles for each year during the period 1990 to 2011 in the following domains: Tropical Medicine, Infectious Diseases, and Oncology. We also assessed if reviews were more frequently cited than are articles in these three domains. We restricted data collection pertaining to citation-counting to those reviews and articles published during the period 2000 to 2011. Received citations were collected in November 2012 so that older publications had a longer period in which to accrue citations. (This explains the decreasing tendency of the curves shown in Figures 4–6.)

During the period 1991 to 2011, the total number as well as the relative number of reviews increased in Tropical Medicine, Infectious Diseases, and Oncology (see Figures 1–3). Increases in the absolute numbers of reviews are larger than those in relative numbers, and the effect is larger for Infectious Diseases and Oncology than that for Tropical Medicine, for which the increases occur mainly over the latest years.
For papers published during the period 2000 to 2011 in the fields of Oncology and Infectious Diseases, reviews were cited (on average) about 70% more often than were “normal” articles; in Tropical Medicine, reviews were cited twice as much (see Figures 4–6).

Discussion and Conclusion

This study confirmed that reviews are indeed cited more frequently (on average) than are normal articles. It also demonstrates that during the past 20 years, reviews have come to constitute an increasing proportion of articles in the fields of Tropical Medicine, Infectious Diseases, and Oncology. Hence, our two research questions were answered affirmatively, and Price’s (1965) finding that reviews constitute 2.5% of all articles is certainly no longer valid in the fields that we investigated.

There may be several explanations for this increase. It could be that more review papers are needed because the quantity of research output, particularly in Oncology and Infectious Diseases, has increased enormously during the latest decades. Physicians therefore may have difficulty keeping up with the specialized literature—even in their own domain of expertise. Review papers may help them stay up-to-date with relatively little time investment.

There may, however, be other reasons for the increase. Indeed, as confirmed here, reviews are cited more frequently than are original research papers. Therefore, editors may tend to include more review papers in their journals to increase the impact factor. Similarly, scientists may be keen to write review papers because they are increasingly ranked by number of citations and indicators such as the h-index (Hirsch, 2005). In our opinion, these motives should not be significant determinants of the content of scientific journals.
A further problem is that different journals may publish similar reviews covering the same period. This is a waste of time for scientists as well as for readers (Biondi-Zoccai et al., 2006). To advance science, we need innovative research resulting in original research publications. The quality of these original research papers should be used to determine the quality of the journal and the quality of its authors (and not the other way around).

Notwithstanding the aforementioned remarks, we do not dispute the value of well-conducted reviews. In particular, they help less specialized colleagues to become up-to-date about a certain topic without the need for them to review/follow the specialized literature. Systematic reviews or meta-analyses also are of particular value in answering research questions of very practical importance for clinicians (Moher, Liberati, Tezlaft, Altman, & the PRISMA Group, 2009).

While stressing the need for a good balance between review articles and original investigations, we point to the need for review papers to adequately fulfill their role in the scientific community. This can be determined only by checking the actual content of reviews to see if they need more scientific rigor (Hutchinson, Oxman, & Lloyd, 1995). Writing high-quality systematic reviews and meta-analyses is no easy matter. Following the PRISMA protocol, 27 checkpoints should be taken into account (Moher et al., 2009).

In conclusion, more thought needs to go into how best to ensure that medical journals achieve a good balance between review papers and original articles.

References


