

The association between impact factors and language of general internal medicine journals

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Summary

Background: We sought to determine the associations between journal country of origin and language and journal impact factor of general medicine journals.

Methods: For each "Medicine, General and Internal" journal listed in the Institute for Scientific Information (ISI) Journal Citation Reports (JCR), the 2003 impact factor, language (ie, English, multiple languages [including English], or non-English), and country of origin (ie, US or non-US) were determined. The mean log impact factors of the journals by language, country of origin, and a combination of country of origin and language were compared.

Results: Of the 102 "Medicine, General and Internal" journals listed in the ISI JCR, 41 (40%)

were published in the US and 83 (81%) were published in English. English-language journals had a significantly greater 2003 mean log impact factor than non-English journals and journals originating in the US had a significantly greater impact factor than journals originating elsewhere. However, the mean log impact factor of English-language journals originating in the US did not differ significantly from that of English-language journals originating elsewhere.

Conclusion: Journal impact factor is more associated with journal language (ie, English versus non-English), rather than journal country of origin.

Key words: bias; impact factor; journals

Introduction

During January 2001, *Schweizerische Medizinische Wochenschrift*, a multi-lingual journal, became *Swiss Medical Weekly*, an English-language journal. Reasons for the change cited by the editorial board of *Swiss Medical Weekly* included the dominance of the English language in the medical literature and that non-English-language articles are rarely cited, resulting in a dilution of the journal's impact factor [1, 2].

The impact factor is a measure of a journal's visibility and is a means of ranking journals by citation analysis; ie, the more frequently a given journal's articles are cited, the higher the journal's impact factor. Every year, the Institute for Scientific Information publishes impact factors for 5,000 science and technology journals [3]. For a

given year (eg, 2003), a journal's impact factor is calculated by dividing the total number of published citations to articles in the journal during the previous 2 years (eg, 2001–2002) by the number of source items (original research articles, review articles, etc) published by the journal during the same 2 years [3, 4].

Between 1991 and 2001, the median (range) impact factor for the multi-language *Schweizerische Medizinische Wochenschrift* was 0.296 (0.253, 0.317). Since changing to the English-language *Swiss Medical Weekly*, the journal's impact factor has increased every year such that by 2004 it was 1.537 [5]. In this study, we sought to determine the associations between journal impact factor and journal country of origin and language.

Materials and methods

During December 2004, the Institute for Scientific Information listed 102 "Medicine, General and Internal" journals in its Journal Citation Reports. This group of

journals comprised the data set for this study. For each journal, the 2003 impact factor, language (ie, English, multiple languages [including English], or non-English),

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and country of origin (ie, US or non-US) were determined. Because of the method of calculating the impact factor, the 2003 impact factors were the latest available during December 2004. The full list of journals that we analysed is available on request or through the Institute for Scientific Information database.

We found the impact factors to be skewed to higher values. Hence, a log-transformation was done to the impact factor data to obtain a normal distribution. Notably,

the higher the impact factor is, the higher the log impact factor. The Kruskal-Wallis test was used to compare the overall difference of the means of the log impact factors of journals by country of origin, language, and a combination of country of origin and language. The Wilcoxon rank sum test was used to determine if the difference between the mean log impact factors of any two groups of journals was significant. The Bonferroni correction for multiple comparisons was done as appropriate.

Results

Of the 102 "Medicine, General and Internal" journals the Institute for Scientific Information listed in its Journal Citation Reports, 83 (81%)

were published in English and 41 (40%) were published in the US. Mean log impact factors by language and country of origin are found in the table. English-language journals had a significantly greater 2003 mean log impact factor than multi-language (including English) and non-English journals (Kruskal-Wallis, $P < 0.001$). The 2003 mean log impact factor of journals published in the US was significantly greater than that of those published elsewhere (Kruskal-Wallis, $P < 0.001$) (table 1).

Significant differences (Bonferroni) between the mean log impact factors of two groups of journals were found for the following comparisons: English-language versus non-English-language journals (1.305, 95% confidence interval [CI] 0.449–2.160), US versus non-US journals (0.649, 95% CI 0.192–1.105), English-language journals originating in the US versus non-English journals originating outside of the US (1.477, 95% CI 0.481–2.473), and English-language journals originating outside of the US versus non-English-language journals originating outside of the US (1.137, 95% CI 0.143–2.130). All other comparisons revealed non-significant differences including English-language journals originating in the US versus English-language journals originating elsewhere (0.340, 95% CI –0.304–0.984).

Table 1

Mean Log Impact Factors of General Medicine Journals in 2003, According to Journal Country of Origin and Language*

Characteristics of journal	No. of journals	Log Impact factor, mean
Language		
English	83	0.100
Multiple languages**	8	–0.856
Non-English	11	–1.204
Kruskal-Wallis test		$P < 0.001$
Country of origin		
US	41	0.272
Non-US	61	–0.376
Kruskal-Wallis test		$P < 0.001$
Language + country		
English + US	41	0.272
English + non-US	42	–0.068
Multiple languages† + non-US	8	–0.856
Non-English + non-US	11	–1.205
Kruskal-Wallis test		$P < 0.001$

US, United States

* The Wilcoxon rank sum test was also used to determine if the difference between the mean log impact factors of any two groups of journals was significant (see text)

** Multiple languages including English

Discussion

We found that English-language journals had a higher mean log impact factor than non-English-language journals and that US journals had a higher mean log impact factor than journals originating elsewhere. However, the mean log impact factor of English-language journals originating in the US was not significantly different from that of English-language journals originating elsewhere. These results suggest that a journal's impact factor is affected more by the journal's language than the country of origin.

The results of our study also suggest that language bias exists. Language bias occurs when scholars preferentially read, and therefore cite, references in English-language journals and ignore

relevant references from non-English journals (resulting in higher impact factors for English-language journals and lower impact factors for non-English-language journals). Indeed, Gregoire et al. [6] found that in at least 1 out of 36 meta-analyses published in peer-reviewed journals from January 1991 to April 1993, the exclusion of articles because of language produced results different from those that would have been obtained had the language exclusion criteria not been used. Scholars should be aware of language bias as it might affect the results of their research.

In light of the results of our study, the decision to change the multi-language *Schweizerische Medizinische Wochenschrift* to the English-language *Swiss*

Medical Weekly is understandable. We hasten to point out, that in addition to the language change, *Swiss Medical Weekly* implemented other measures to increase its impact factor. Nevertheless, English-language journals appear to have greater visibility, and hence, impact factors, than their non-English counterparts. However, whether other non-English-language journals, should they decide to become English-language journals, will experience the same dramatic increase in impact factor as *Swiss Medical Weekly*, is unknown.

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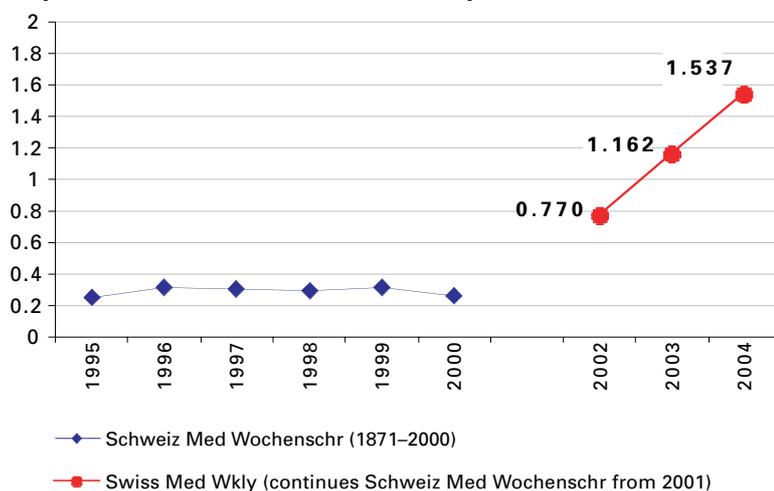
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