Association of $h$-index of Editorial Board Members and Impact Factor among Radiology Journals

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Rationale and Objectives: $h$-Index has been proposed as a useful bibliometric measure for quantifying research productivity. In this current study, we analyzed $h$-indices of editorial board members of Radiology journals and tested the hypothesis that editorial board members of Radiology journals with higher impact factors (IF) have higher $h$-indices.

Materials and Methods: Sixty-two Radiology journals with IF $>1$ were included. Editorial board members were identified using the journals’ websites. Editors’ affiliations and research fields of interest were used to distinguish investigators with similar names. Bibliometric indices including number of publications, total citations, citations per publication, and $h$-index for each editorial board member were obtained using the Web of Science database. Chi-square or Wilcoxon rank-sum tests were used to test for differences in bibliographic measures or demographics between groups.

Results: Among the editorial boards of 62 journals, the median (interquartile range) board $h$-index was 26 [18, 31] and had 36 [17, .56] members. The median journal IF was 2.27 [1.74, 3.31]. We identified a total of 2204 distinct editors; they had a median [interquartile range] $h$-index of 23 [13, 35], 120 [58, 215] total publications, 1938 [682, 4634] total citations, and an average of 15.7 [9.96, 24.8] citations per publication. The boards of journals with IF above the median had significantly higher $h$-indices ($P = .002$), total publications ($P = .01$), and total and average citations (both any $[P = .003, .009]$ and nonself-citations $[P = .001, .002]$) than journals below the median.

Conclusions: Our data indicate that board members of Radiology journals with higher IF have greater $h$-indices compared to lower IF journals.

Key Words: $h$-Index; radiology; impact factor.

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INTRODUCTION

Scientific productivity of scholars has been traditionally assessed based on simple measurements such as total number of publications. To date, these measurements continue to play an important role in comparing scientific accomplishments among faculty members, and in their evaluation and consideration for promotion or tenure. This method of evaluating research productivity is not precise enough and does not account for the scientific impact of the counted publications. To overcome such challenges, other methods of evaluating scientists have been proposed (1). In 2005, J. E. Hirsch described $h$-index as a measure to quantify research productivity of an individual researcher (2). Since its introduction, $h$-index has received a great amount of acceptability. It was originally used among physicists (2), but is now being applied to measure scientific performance of researchers and faculty members in many fields of science, including several medical disciplines (3–6).

According to the definition, a researcher has an $h$-index of $h$ if he or she has $h$ publications that have been cited at least $h$ times each (2). For example, an author of 10 papers that have been cited 10, 10, 9, 8, 7, 7, 4, 4, 1, and 0 times respectively, has an $h$-index of six (six papers cited six times or more). So, it has the advantage of taking into account total publications of a researcher and his or her citations at the same time.

Although during the recent years $h$-index has been widely investigated in various medical disciplines, there are only a few studies that have investigated $h$-index as a measure to assess scientific impact of radiologists (7–9). In another recent study, combined departmental $h$-index in a university radiology center has been described over time (10). In the present study, we studied the research productivity of editorial board members of Radiology journals, by analyzing their $h$-indices. We tested the hypothesis that editorial board members of Radiology journals with higher impact factors (IFs) have higher $h$-indices.

METHODS

All data were collected in April 2016. Sixty-two Radiology journals with IFs $>1$ were chosen for this study. We made
an initial list of journals using Journal Citation Reports of the Institute for Scientific Information by using subject categories of “radiology, nuclear medicine & medical imaging” or “neuroimaging.” Additional inclusion criteria included the journal being written in English and having a clinical scope. Radiation oncology journals were excluded. Editorial board members were identified using each journal’s website. We included the editors who were listed under the group titles of Editorial Board or Associate Editors. We did not include Editors-in-Chief, Deputy Editors, Editors Emeriti, Editorial Executive Committee, and Executive Deputy Editors. For the journals with different classifications of the editors with no Editorial Board or Associate Editors, the editors listed as Advisory Board, Section Editors, or Consulting Editors were included. Bibliometric indices including number of publications, total citations, nonself-citations, and h-index for each editorial board member were obtained using the Web of Science database. Average citations per publication were also directly obtained from the Web of Science database and average nonself-citations per publication were calculated by dividing total nonself-citations by total publications. Editors’ affiliations and research fields of interest were used to distinguish investigators with similar names.

Descriptive statistics are presented as N/percent for categorical variables and median/interquartile range (IQR) for continuous variables. The h-index, total publications, total citations, and average citations per publication for the journal were taken to be the median value of the members appearing on the editorial board. Number of citations and average citations per publication are presented as both total (any) and nonself-citations. Comparisons between groups (above vs. below median journal IF, US vs. non-US journals) used chi-square or Wilcoxon rank-sum tests for categorical and continuous variables, respectively. Correlation between median board member h-index and journal IF was calculated using Spearman’s rho. P values less than 0.05 were considered significant. Presented P values have not been adjusted for multiple comparisons. Statistical analysis was performed using R (version 3.2.0; Vienna, Austria) (11).

RESULTS

There were a total of 62 Radiology journals (Appendix 1) selected for review with a total of 2592 board positions. The journals had a median [IQR] IF of 2.27 [1.74, 3.31], 36 [17, 56] editors on their boards, median board h-index of 26 [18, 31], and were 61.3% US-based (Table 1).

There were a total of 2204 distinct editors represented (Table 2). The editors had a median [IQR] h-index of 23 [13, 35], 120 [58, 215] total publications, 1938 [682, 4634] total citations, and an average number of citations per publication of 15.7 [9.96, 24.8]. When only nonself-citations were included, the number of citations declined to 1794 [639, 4341] and average citations to 14.8 [9.17, 23.3].

Results for the comparison between above-median-IF and below-median-IF journals are presented in Table 3. Journals with an IF greater than the median (IF ≥ 2.27) had a significantly higher number of editors on their boards (P = 0.02), editors with higher h-indices (P = 0.002), higher total publications (P = 0.01), and higher total and average citations (both any [P = 0.003, 0.009] and nonself [P = 0.001, 0.002]) than journals with lower IFs. The distribution of editor h-indices for all board positions represented is shown in Figure 1. No significant differences were found between US-based and non-US journals for any of the metrics measured (Table 4).

The relationship between journal IF and median h-index of its editorial board is shown in Figure 2. Overall, the correlation between the two was found to be significant (rho = 0.49, P < 0.001).

DISCUSSION

h-Index has been introduced in an attempt to provide an objective quantification of an author’s academic accomplishment. Although it has been widely applied for this purpose in many fields of science, its use has only recently increased within medicine. So far, h-index has been examined in various fields of medicine, including neurosurgery and otolaryngology (3–6). However, there are only a few studies that have investigated h-index as a measure to assess the scientific impact of radiologists (7,8).

In our current comparison of h-index across Radiology journals, we found that the editorial board members of higher IF journals had significantly greater h-index values than those of the lower IF journals. These results suggest that the scientific
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