Publication metrics

Publication metrics, such as the number of publications, number of citations, journal impact factor, and Hirsch index (h-index) are used to measure academic productivity and scientists' influence.

Publication metrics such as the author-level h-index are often used to evaluate and compare research productivity in academia. The h-index, however, is not a field-normalized statistic and has been criticized as inappropriate for the comparison of authors from different fields. For example, fields such as internal medicine have a larger audience and thus afford publications a higher likelihood of increased citations compared with a perhaps equally impactful paper in a smaller field such as neurosurgery. The National Institutes of Health (NIH) has developed a new field-normalized article-level metric called the relative citation ratio (RCR) that can be used to more accurately compare author productivity between fields. The spine represents a distinct subset of neurosurgery with a designated fellowship and distinct differences in the RCR metrics. The authors look to analyze the unique results found in the academic spine neurosurgeon RCR values compared with all academic neurosurgeons.

Purpose: The assessment of academic physicians should use field-independent publication metrics to measure the improvement of grant outcomes, promotion, and continued evaluation of research productivity. Here, we provide an analysis of RCR indices for 358 academic spine neurosurgeons in the United States, including the mean RCR of each author's total publications and the weighted RCR, which is the sum of all publication-level RCR values of an author. We further assess the impact of gender, career duration, academic rank, and Ph.D. acquisition on the RCR scores of U.S. academic spine neurosurgeons.

Methods: The mean RCR is the total citations per year of a publication divided by average citations per year received by NIH-funded papers in the same field. A value of 1 is the normal NIH-funded standard. iCite database searches were performed for all physician faculty members affiliated with accredited neurological surgery programs who have subspecialized in spine as of November 1, 2019. Gender, career duration, academic rank, additional degrees, total publications, mean RCR, and weighted RCR were collected for each individual. RCR and weighted RCR were compared between variables to assess patterns of analysis.

Results: A total of 358 fellowship-trained academic spine neurosurgeons from 125 institutions were included in the analysis. Exceptional research productivity was noted, with a median RCR of 1.38 (interquartile range = 0.94-1.95) and a weighted median RCR of 25.28 (interquartile range = 6.87-79.93). Overall, gender and academic rank were associated with increased mean RCR and weighted RCR values. Career duration and Ph.D. acquisition were not. All subgroups analyzed had an RCR value above 1.0, with professor-level faculty or department chair having the highest mean and weighted RCR values overall.

Current academic spine neurosurgeons have high median RCR values relative to the NIH standard RCR value of 1.0. Relative to the field of neurological surgery overall, RCR values for the spine subspecialty are comparable. These data offer a more accurate means for self-evaluation of academic neurosurgeons as well as evaluation of faculty by institutional and departmental leaders [1)]

[1)]

Grogan D, Reddy V, Gupta A, Chang YF, Fields D, Agarwal N. Trends in Academic Spine Neurosurgeon

Productivity as Measured by the Relative Citation Ratio. World Neurosurg. 2021 Mar;147:e40-e46. doi: 10.1016/j.wneu.2020.11.097. Epub 2020 Nov 26. PMID: 33248304.