

UCSF

UC San Francisco Previously Published Works

Title

Can Sex and Seniority Predict the Quality of a Journal Reviewers Manuscript Critique?

Permalink

<https://escholarship.org/uc/item/98t505vb>

Journal

International Journal of Radiation Oncology - Biology - Physics, 111(2)

Authors

Jamorabo, Daniel

Deek, Matthew

Yom, Sue

et al.

Publication Date

2021-10-01

DOI

10.1016/j.ijrobp.2021.05.111

Peer reviewed



Published in final edited form as:

Int J Radiat Oncol Biol Phys. 2021 October 01; 111(2): 312–316. doi:10.1016/j.ijrobp.2021.05.111.

Can Sex and Seniority Predict the Quality of a Journal Reviewer's Manuscript Critique?

Daniel S. Jamorabo, MD^{*}, Matthew P. Deek, MD[†], Sue S. Yom, MD[‡], Hasan Rehman, MD[§], Anthony L. Zietman, MD^{||}, Sabin B. Motwani, MD[¶], William M. Briggs, PhD[#], Sinae Kim, PhD^{**}, Daniel T. Chang, MD^{††}, Salma K. Jabbour, MD^{‡‡}

^{*}Department of Medicine, Stony Brook Medicine, Stony Brook, New York;

[†]Department of Radiation Oncology, Johns Hopkins Medicine, Baltimore, Maryland;

[‡]Department of Radiation Oncology, University of California–San Francisco, San Francisco, California;

[§]Department of Medicine, North Shore University Hospital, Manhasset, New York;

^{||}Department of Radiation Oncology, Massachusetts General Hospital, Boston, Massachusetts;

[¶]Department of Radiation Oncology, St. Joseph's University Medical Center, Paterson, New Jersey;

[#]Department of Biostatistics, New York-Presbyterian Brooklyn Methodist Hospital, Brooklyn, New York;

^{**}Rutgers School of Public Health, Rutgers, the State University of New Jersey, New Brunswick, New Jersey;

^{††}Department of Radiation Oncology, Stanford University School of Medicine, Stanford, California;

^{‡‡}Department of Radiation Oncology, Rutgers Cancer Institute of New Jersey, New Brunswick, New Jersey

Abstract

Purpose: To evaluate reviewers' timeliness and review quality for the *International Journal of Radiation Oncology, Biology, Physics (IJROBP)* by sex and seniority.

Methods and Materials: The *IJROBP* editorial office provided data on 3962 individuals invited to review manuscripts from 2011 through 2014. We identified 1657 reviewers who had been invited to provide a review on at least 3 occasions during the study period and compared review timeliness and scoring between male and female reviewers. We confirmed the reviewers' sex after having unblinded their names based on our personal acquaintance with them and via an Internet search on their department websites. We then did a subset analysis of 124 US-based reviewers who had returned a "major revision" decision. We used the Review Quality Instrument (RQI) to rate their reviews. We used odds ratios and *t* tests to look for differences in mean RQI scores and

Corresponding author: Salma K. Jabbour, MD; jabbousk@cinj.rutgers.edu.

Research data are stored in an institutional repository and will be shared upon request to the corresponding author.

factors that might be associated with quality—in particular, Hirsch indices (*h* indices) and year of first certification.

Results: Of the 1657 reviewers of interest, 1245 (75.1%) were men and 412 (24.9%) were women. We found no statistically significant differences between men and women in the time to respond to invitations. There were no statistically significant differences in timeliness or review reminders based on sex. Our subset analysis showed no difference in quality (RQI scores) based on the reviewers' sex, *h* index, or year of first certification.

Conclusions: Women and men render reviews of equal quality regardless of seniority and *h* index, yet women have been invited less frequently to review. This is likely because of the underrepresentation of women in radiation oncology. A more balanced academic population is needed to address this continuing disparity of women's representation in academic publishing.

Introduction

Women have been historically underrepresented in radiation oncology, and despite their growing representation as senior or first authors,¹ as department chairs,² and in training programs, disparities persist. Researchers have noted that women constitute a smaller percentage of invited speakers at the American Society for Radiation Oncology (ASTRO) Annual Meeting and that radiation oncology lags behind other oncology specialties insofar as achieving sex balance among trainees and faculty.^{3,4} Female representation on ASTRO editorial boards has improved during the past decade to about 33% to 44%, whereas all senior editors at the *International Journal of Radiation Oncology, Biology, Physics (IJROBP; Red Journal)* before September 2011 had been men.⁵ To our knowledge, no investigation into sex imbalances among radiation oncology journal reviewers has been done.

Our major aim was to determine whether there were differences in timeliness and review quality by sex among those invited to review for the *IJROBP*. As a secondary aim, we sought to investigate whether seniority, as measured by years since first certification, and publication metrics as reflected by the Hirsch index (*h* index) were associated with the quality of reviews rendered.⁶ The *h* index is defined as the number of papers coauthored by a researcher with at least *h* citations and is a measurement of scholarly productivity.⁷ To assess review quality, we used the Review Quality Instrument (RQI), a validated tool to appraise a reviewer's feedback regardless of the topic or the grader's experience.⁸

Methods and Materials

Study population

For clarity, we henceforth refer to individuals who assessed the *IJROBP* submissions as reviewers and their comments as reviews or critiques. The members of our team who used the RQI to assess these reviews are referred to as scorers, graders, or raters, and their evaluations, which are all numerical, are referred to as scores, grades, and ratings.

All data were provided upon request by the editorial office of the *IJROBP*. The *IJROBP* invited 3962 individuals to review at least 1 submission between January 1, 2011, and December 31, 2014. From this group, we analyzed 1657 reviewers who had been invited on

at least 3 occasions to review manuscripts. For each of the clinical reviewers, we recorded their sex, number of invitations, time to respond to invitations, days taken to complete assignments, and number of reminders needed. We determined the reviewers' sex after having unblinded their names, based on our personal acquaintance with them and via an Internet search on their department websites.

We then identified a subgroup of 333 US-based radiation oncologists who had completed at least 3 reviews during the period of interest. They included 91 women (27.3%) and 242 men (72.7%). Collectively, they had completed 3266 reviews (873 by women, 2393 by men), with an average of 9.6 per female reviewer and 9.9 per male reviewer. We determined their *h* indices at the time of review through Scopus and their year of first certification from the ASTRO directory. We then dichotomized this cohort into those whose year of first certification was 2004 or earlier ("Senior") and 2005 or later ("Junior"). We also defined a "low" *h* index as ≤ 20 and a "high" index as >20 .^{9,10}

From this subgroup, we wanted to select an equal number of reviewers who were Senior and Junior with *h* indices of 0 to 20 or >20 (Fig. 1) for comparison. We randomly selected 31 reviewers within each of these 4 groupings—a total of 124—who had submitted at least 1 critique recommending the manuscript undergo "major revisions." All of these reviews pertained to prospective and retrospective clinical studies. We excluded reviews that recommended rejection, acceptance, or minor revisions, because we found that these reviews were often too brief to analyze. A flow chart of our cohort selection process is shown in Figure 1. This study was exempted from ethics board approval.

Statistical analysis

All 6 raters on our team initially scored 40 reviews—not included in the final cohort—to assess concordance, which was calculated to be 0.7. We later randomly assigned each of the 124 critiques to 1 senior faculty member and to either a trainee or junior faculty member of our team for scoring. Each grader was blinded to article details. The ratings were compiled independently and analyzed by our statisticians.

We calculated odds ratios to evaluate associations between reviewer demographics and the correlation with the ultimate outcome of the manuscript as to whether it was rejected or accepted to the *IJROBP*. We also used *t* tests to determine differences in mean and median RQI scores based on the scorer's seniority as well as on the reviewers' traits. All statistical calculations were done using R, version 3.4.2 (R Foundation for Statistical Computing, Vienna, Austria).

Results

Between January 1, 2011, and December 31, 2014, a total of 3733 individuals were invited to review for the *IJROBP*, of whom 2710 (72.6%) were men and 1023 (27.4%) were women. The 2710 men had been invited 10,863 times for an average of 4.0 invites per individual, whereas the 1023 women had been invited 3575 times for an average of 3.5 invites per individual. We identified 1657 reviewers who had been invited to review at least 3 times. Of these, 412 (24.9%) were women and 1245 (75.1%) were men. The 3:1 ratio of

male to female reviewers persisted when stratifying between those who had scored 0 to 3 manuscripts and those who had scored more than 3. We found no statistically significant difference between men and women regarding the time taken to respond to invitations, rates of accepting or declining invitations, or probability of being uninvited. Although female reviewers were slightly less likely to complete reviews in 1 to 7 days (odds ratio [OR], 0.700; 95% CI, 0.498–0.972; $P = .029$) or to return them early (OR, 0.670; 95% CI, 0.526–0.854; $P = .0008$) compared with male counterparts, there were no statistically significant differences in lateness or review reminders based on sex. Overall, the 412 women had reviewed a total of 1305 manuscripts, for an average of 3.2 papers apiece, whereas the 1245 men had reviewed 4559 manuscripts, for an average of 3.7 papers apiece. Summary data are given in Table 1.

We scored 124 different reviewers, of whom 31 (25%) were women and 93 (75%) were men. MD-PhD holders (19 [15.3%]) composed a minority of the reviewers analyzed. There was no statistically significant difference in the mean number of invites between the men and women. The reviewers overall took a mean of 14.4 days (standard deviation [SD], 11.4 days) and used a mean of 444 words (SD, 305 words) in their feedback. Their mean h index was 23.4 (SD, 14.6), and the mean number of first-authored publications was 20.5 (SD, 19.8).

Approximately 49 (40%) of the 124 reviewers submitted their critiques late, and 86 (69%) had been assigned retrospective clinical studies. Although all 124 reviewers advised major revisions, 67 (54%) reviews were discordant with a journal editor's recommendation that the manuscript be rejected outright. When comparing the 53 manuscripts (43%) that were ultimately accepted for publication in *IJROBP* with those that were rejected or withdrawn (71 [57%]), we found no statistically significant differences in the reviewers' sex, seniority, h index, punctuality in submitting critiques, or MD-PhD status (Table 2).

There were no associations between the reviewers' h index and either the number of days taken to submit critiques or the year of certification. The reviewers' h indices, turnaround time, MD-PhD status, and year of initial certification were not significantly different between manuscripts that were accepted and those that were rejected or withdrawn. We found no statistically significant differences in scoring between the junior and senior raters regardless of the reviewers' sex, number of invitations, h indices, turnaround time, number of words in the review, and year of the reviewer's first certification (Table 3).

Discussion

Our findings highlight a disparity wherein women have been invited to review less frequently for the *IJROBP* compared with men despite having equivalent h indices, years in practice, and review timeliness and RQI scores. Although there was no statistically significant difference in the mean number of invites for male and female reviewers, women composed about 23% to 27% of practicing radiation oncologists during the study period,^{11,12} so the 3:1 male-female imbalance among reviewers is likely a reflection of the general underrepresentation of women in radiation oncology.¹³ Female radiation oncologists

might not be steered toward volunteering as reviewers early in their careers, and sex inequities within and outside medicine may dissuade some women from academic careers.¹⁴

Researchers have previously found that greater time spent reading an article, academic rank, and sex have no significant effect on review quality.^{15,16} We found in this study that sex, seniority, MD-PhD status, and *h* index did not affect either the timeliness or quality of reviews and that female reviewers did not produce a higher level of discordance with editors' ultimate decisions or affect the likelihood of a manuscript to be accepted.

We found that the 3:1 sex disparity persisted among reviewers who did more than 3 reviews during the study period. This relative underrepresentation of female reviewers has downstream implications because a frequent reviewer is likely to develop positive relationships and a positive reputation with editors and journal staff. A lack of female reviewers could thereby lead to fewer women being invited to write editorials and to become editors. Conversely, a diverse editorial board can lead to more invitations to women and other minorities, because researchers have found that editors of both sexes exhibit substantial same-sex preference when appointing reviewers.¹⁷ Overall, more women are needed in radiation oncology to enlarge the pool of potential female reviewers. Currently, women compose about 40% of the editorial board at the *IJROBP* owing to ongoing, focused efforts to ameliorate this disparity. A follow-up study to ours may be able to determine whether this initiative has rectified the sex imbalance among *IJROBP* reviewers.

We opted to evaluate only reviews submitted by a highly selected subgroup who had advised major revisions. This was based on the premise that these reviews were more likely to be detailed compared with those that recommended minor revisions, acceptance, or rejection. We cannot discern how representative the reviews are of each reviewer's work, because we only looked at 1 review per reviewer. Our study likewise focused on men and women specifically; broader analysis across the gender spectrum was beyond the scope of this study, because such data would have required the reviewers' direct feedback. Similarly, analysis by racial and ethnic group could not be done, because this would require self-reported data from the reviewers.

We were nevertheless able to carry out a large study of *IJROBP* reviewers and identify an opportunity for continued growth in the review process. We encourage journals to facilitate the involvement of junior faculty and female faculty and trainees to help improve their representation.

Disclosures:

S.S.Y. reports grants from Genentech, Bristol-Myers Squibb, Merck, and BioMimetix and personal fees from Springer and UpToDate, along with honoraria from the American Society for Radiation Oncology (ASTRO). A.L.Z. received a stipend from ASTRO as editor-in-chief for the *International Journal of Radiation Oncology, Biology, and Physics (IJROBP)*. S.K.J. reports grants from Merck, personal fees from Merck, IMX Medical, and Syntactx, and honoraria from serving as senior editor for the *IJROBP*. No other disclosures were reported.

References

1. Ahmed AA, Egleston B, Holliday E, et al. Gender trends in radiation oncology in the United States: A 30-year analysis. *Int J Radiat Oncol Biol Phys* 2014;88:33–38. [PubMed: 24189127]

2. Beeler WH, Griffith KA, Jones RD, et al. Gender, professional experiences, and personal characteristics of academic radiation oncology chairs: Data to inform the pipeline for the 21st century. *Int J Radiat Oncol Biol Phys* 2019;104:979–986. [PubMed: 30684662]
3. Ahmed AA, Hwang WT, Holliday EB, et al. Female representation in the academic oncology physician workforce: Radiation oncology losing ground to hematology oncology. *Int J Radiat Oncol Biol Phys* 2017;98:31–33. [PubMed: 28587049]
4. Rahimy E, Jagsi R, Park HS, et al. Quality at the American Society for Radiation Oncology annual meeting: Gender balance among invited speakers and associations with panel success. *Int J Radiat Oncol Biol Phys* 2019;104:987–996. [PubMed: 31085284]
5. Knoll MA, Glucksman E, Tarbell N, et al. Putting women on the escalator: How to address the ongoing leadership disparity in radiation oncology. *Int J Radiat Oncol Biol Phys* 2019;103:5–7. [PubMed: 30563666]
6. Saleem T. The Hirsch index—A play on numbers or a true appraisal of academic output? *Int Arch Med* 2011;4:25. [PubMed: 21736756]
7. Hirsch JE. Does the *h* index have predictive power? *Proc Natl Acad Sci U S A* 2007;104:19193–19198. [PubMed: 18040045]
8. van Rooyen S, Black N, Godlee F. Development of the review quality instrument (RQI) for assessing peer reviews of manuscripts. *J Clin Epidemiol* 1999;52:625–629. [PubMed: 10391655]
9. Choi M, Fuller CD, Thomas CR Jr.. Estimation of citation-based scholarly activity among radiation oncology faculty at domestic residency-training institutions: 1996–2007. *Int J Radiat Oncol Biol Phys* 2009;74:172–178. [PubMed: 18990506]
10. Choi M, Holliday EB, Jagsi R, et al. Citation-based estimation of scholarly activity among domestic academic radiation oncologists: Five-year update. *J Radiat Oncol* 2014;3:115–122. [PubMed: 24678385]
11. Holliday EB, Siker M, Chapman CH, et al. Achieving gender equity in the radiation oncology physician workforce. *Adv Radiat Oncol* 2018; 3:478–483. [PubMed: 30370345]
12. Chapman CH, Hwang W-T, Deville C. Diversity based on race, ethnicity, and sex, of the US radiation oncology physician workforce. *Int J Radiat Oncol Biol Phys* 2013;85:912–918. [PubMed: 23122983]
13. Rana S, Holliday EB, Jagsi R, et al. Scholastic activity among radiation oncology residents at US academic institutions: A benchmark analysis. *J Cancer Ed* 2013;28:541–546.
14. Foster CC, Hasan Y, Son CH, et al. Linearly accelerating toward gender equity in radiation oncology. *Int J Radiat Oncol Biol Phys* 2019;104:974–978. [PubMed: 31327430]
15. Black N, van Rooyen S, Godlee F, et al. What makes a good reviewer and a good review for a general medical journal? *JAMA* 1998;280: 231–233. [PubMed: 9676665]
16. Kliever MA, Freed KS, DeLong DM, et al. Reviewing the reviewers: Comparison of review quality and reviewer characteristics at the American Journal of Roentgenology. *AJR Am J Roentgenol* 2005;184: 1731–1735. [PubMed: 15908521]
17. Helmer M, Schottdorf M, Neef A, et al. Gender bias in scholarly peer review. *eLife* 2017;6:e21718. [PubMed: 28322725]

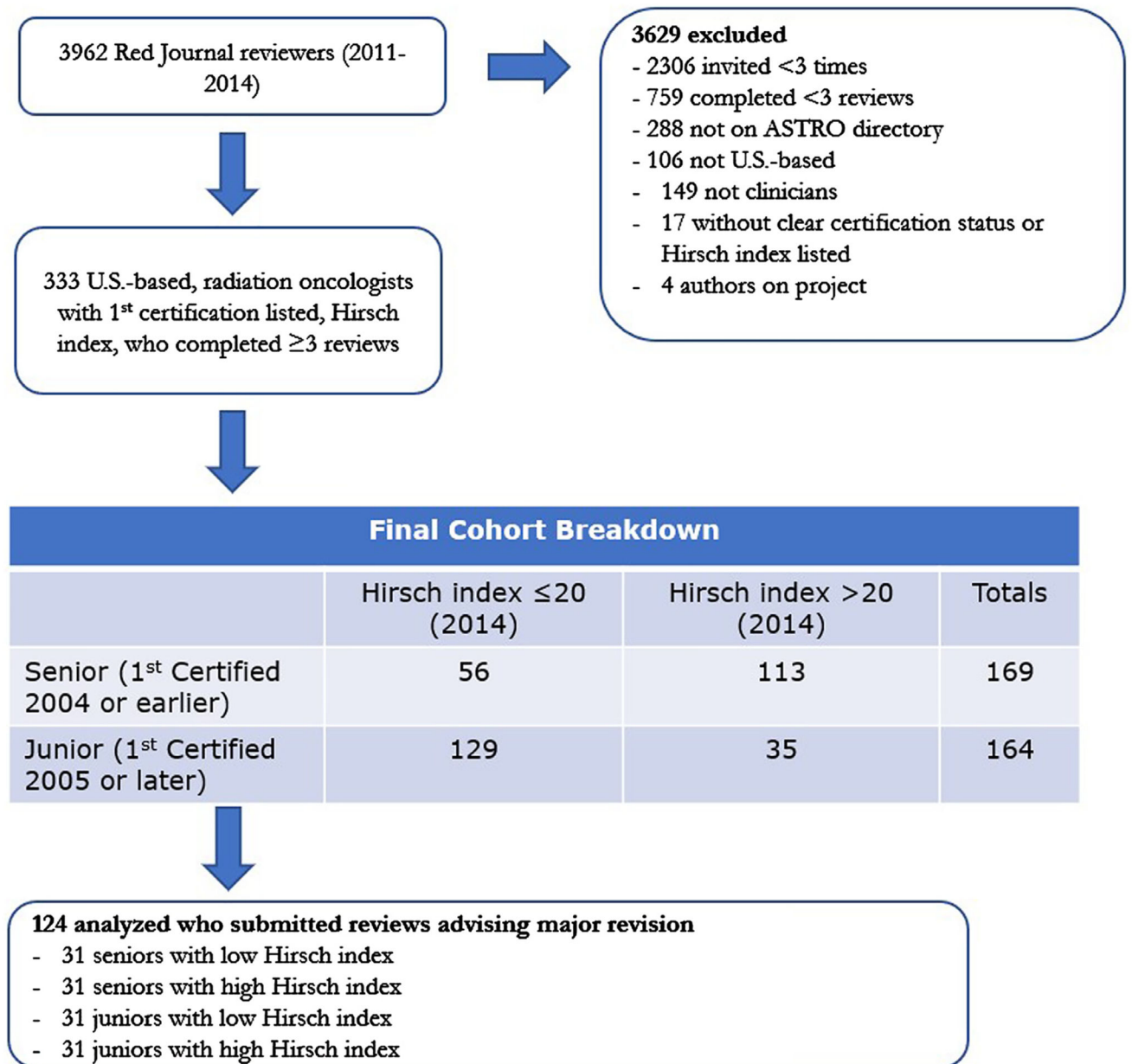


Fig. 1.
Flow chart for reviewer selection.

Table 1

Number of reviewers and manuscripts reviewed, 2011–2014

	Women, no. (%) (n = 412)	Men, no. (%) (n = 1245)	Odds ratio (95% CI)	P value
Total no. of reviewers	412 (24.9)	1245 (75.1)	-	-
Total no. of manuscripts reviewed	1305 (22.3)	4559 (77.7)	-	-
Reviewers who scored 0–3 manuscripts	265 (25.5)	774 (74.5)	1.06 (0.89–1.26)	.51
Reviewers who scored >3 manuscripts	103 (23.2)	346 (76.8)	0.88 (0.68–1.14)	.34

Table 2

Categorical variables and *IJROBP* manuscript decision

Reviewer variables	Manuscript decision			P value
	Accepted, no. (%) (n = 53)	Rejected or withdrawn, no. (%) (n = 71)		
Sex				.54
	Female	12 (22.6)	20 (28.2)	
	Male	41 (77.4)	51 (71.8)	
MD-PhD holder	No	43 (81.1)	62 (87.3)	.45
	Yes	10 (18.9)	9 (12.7)	
Seniority	Junior	26 (49.1)	36 (50.7)	> .99
	Senior	27 (50.9)	35 (49.3)	
<i>h</i> Index	Low	22 (41.5)	41 (57.7)	.10
	High	31 (58.5)	30 (42.3)	
Late review	No	31 (58.5)	44 (62.0)	.71
	Yes	22 (41.5)	27 (38.0)	

Abbreviation: *IJROBP* = International Journal of Radiation Oncology, Biology, Physics.

Table 3

Mean ratings for RQI questions by sex and *h* index

RQI question	Mean rating							
	Junior reviewer (n = 62)				Senior reviewer (n = 62)			
	Men	Women	<i>h</i> Index 0–20	<i>h</i> Index >20	Men	Women	<i>h</i> Index 0–20	<i>h</i> Index >20
Importance?	2.7	2.5	2.6	2.6	2.7	2.9	2.7	2.8
Originality?	2.3	2.3	2.2	2.4	2.4	2.7	2.6	2.4
Strengths/weaknesses?	3.7	3.7	3.7	3.7	3.2	3.3	3.2	3.3
Organization?	3.2	3.3	3.3	3.1	3.2	3.1	3.2	3.1
Constructive feedback?	3.8	3.5	3.7	3.7	3.9	3.9	3.9	3.9
Examples cited?	3.6	3.6	3.7	3.5	3.6	3.5	3.5	3.6
Interpretation of findings?	3.3	3.1	3.2	3.3	3.5	3.3	3.3	3.5
Overall score	3.4	3.3	3.4	3.3	3.4	3.4	3.3	3.5

Abbreviation: RQI = Review Quality Instrument.