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## Practice, Policy &amp; Education

## Gender diversity among editorial boards of radiology-related journals

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## ABSTRACT

**Purpose:** To investigate gender diversity in editorial boards among a wide range of radiology-related journals, the trend in time, and its association with the journal's impact factor (IF).**Method:** The Journal Citation Reports website was searched for radiology-related journals with IF > 2.0. Gender of the editor-in-chief and all editorial board members as listed on each journal's official website were determined. Mann-Whitney *U* test and Spearman's rho test were used for statistical analyses. Current data were compared to historical data.**Results:** Fifty-seven radiology-related journals were included. The names of 4176 persons were extracted. A woman was in charge as the only editor-in-chief in 5 of 57 journals (8.8%). Median percentage of female editorial board members was 21.5% (range 3.2%–52.0%). Female editorial board members were in the majority in only two journals, with proportions of 51.4% and 52.0%. IFs between journals with female and male editors-in-chief were not significantly different (median 3.00, range 2.21–7.82 vs. median 3.31, range 2.02–10.98; *P* = 0.951). There was no significant association between percentage of female editorial board members and a journal's IF (Spearman's rho = −0.019, *P* = 0.889). The proportion of women has increased compared to historical data.**Conclusion:** Women are underrepresented in a wide range of radiology-related journals. Comparison with historical data shows that the proportion of women on editorial boards has increased. Nevertheless, gender composition of the editorial board shows no association with IF. This suggests similar gender bias exists across a broad spectrum of high impact factor journals, with no added bias in journals with higher IF.

## 1. Introduction

Gender diversity enhances organizational effectiveness, and this also applies to the field of radiology.<sup>1</sup> Gender diversity in leadership positions is considered necessary for the current and future success of radiology.<sup>1</sup> However, women are currently underrepresented in higher academic ranks and other leadership positions in radiology.<sup>1–6</sup> The roles of editors-in-chief and editorial board members of the 129 radiology-related journals (i.e., journals which are listed in the category “Radiology, Nuclear Medicine & Medical Imaging” by Journal Citation Reports (JCR)<sup>7</sup>) are extremely important, because they are responsible for the quality, content and decision making of all scientific work. Two previous studies suggested that the proportion of female editors-in-chief and female editorial board members disproportionably lagged behind compared to the proportion of female authorship contributions in 2017.<sup>8,9</sup> However, these studies included only 4 and 9 radiology-related journals which were all from American origin, and all had a high impact factor (IF) (Piper et al.<sup>8</sup> included 4 American general radiology journals

with the highest IF and Jalilianhasanpour et al.<sup>9</sup> included 9 radiology journals with the highest IF). Another study<sup>10</sup> reported significant gender disparity (only 19.1% women) among journal editorial board members of the six largest international general radiology societies in 2018. However, that study did not use a representative sample of radiology as a whole either.<sup>10</sup> As such, the proportion of positions held by woman among a wider range of radiology-related journals remains unclear. In addition, it is unclear whether gender diversity has changed over time. Furthermore, a journal's IF (i.e., the yearly average number of citations which respect to the number of citable articles published by the journal in the previous 2 years<sup>11</sup>) is commonly used as an indicator of the prestige and relative influence of a journal.<sup>12–14</sup> However, it is also unclear whether the proportion of female editors-in-chief and female editorial board members is associated with the IF of a radiology-related journal. This information is crucial to define the current position of women in these journal leadership positions, which can be used as a baseline measurement to monitor and improve upon in the future. Therefore, the purposes of our study were to investigate gender diversity

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in editorial boards among a wide range of radiology-related journals, the trend in time, and its association with the journal's IF.

## 2. Methods

Ethics committee approval was not applicable for this study.

### 2.1. Data collection

The JCR website<sup>7</sup> was searched for all journals in the category “Radiology, Nuclear Medicine & Medical Imaging” with an IF of 2.0 or more. Journals in radiation oncology and physics were excluded. A research fellow (R.H.M.A) extracted the names of the editor-in-chief and all editorial board members as listed on each journal's official website. Persons with an administrative role (e.g., editorial assistant/coordinator, staff contact, and web manager), emeritus editors-in-chief, emeritus editorial board members, founding editors, and honorary members were excluded. If only initials but no first name was listed on a journal's official website, first names were searched using Google (by finding individuals' institutional or personal websites) and/or MEDLINE (by finding individuals' published full-text articles). In case no first name could be retrieved or if there was persistent uncertainty with regard to the gender after using a gender checking database,<sup>15</sup> that individual was excluded from further analyses. Furthermore, the country of origin of each editor-in-chief was extracted.

### 2.2. Data analysis

IFs between journals with female and male editors-in-chief were compared using the Mann-Whitney *U* test. Spearman's rho was used to determine the association between percentage of female editorial board members and a journal's IF. Current data were compared to historical data, i.e. studies which reported the proportion of female editorial board members in editorial boards of radiology-related journals since the 1980s. Historical data were retrieved by a search in MEDLINE using the terms “editorial board”, “women” OR “females”, and “radiology”. Statistical analyses were performed by using IBM SPSS Statistics for Windows (Version 20.0, IBM Corporation, Armonk, NY, USA).

## 3. Results

### 3.1. Journals

Seventy-four radiology-related journals with an IF of 2.0 or more were identified on the JCR website.<sup>7</sup> Seventeen journals were excluded because they involved radiation oncology or medical physics. Eventually, 57 journals were included (Table 1). Summary characteristics of these 57 journals are displayed in Table 2. The names of 4176 persons (editors-in-chief and editorial board members) were extracted. Eight persons were excluded because the gender of their names could not be determined with certainty.

### 3.2. Current gender diversity among editorial boards

The majority of editors-in-chief (52.9%) were from the United States. A woman was in charge as the only editor-in-chief in 5 of 57 journals (8.8%). Five journals had 2 co-editors in chief (0% females in two journals and 50% females in three journals) and one journal had 7 co-editors in chief (28.6% females). The percentage of female editorial board members with respect to journal IF is displayed in Fig. 1. Median percentage of female editorial board members was 21.5% (IQR 12.3%, range 3.2%–52.0%). Female editorial board members were in the majority in only two journals: *American Journal of Roentgenology* (51.4%) and *Journal of the American College of Radiology* (52.0%). IFs between journals with female and male editors-in-chief were not significantly different (median 3.00, IQR 3.41, range 2.21–7.82 vs. median 3.31, IQR

**Table 1**

Names of the 57 included journals and their IF.

Journal name	Already existing in 1982	Current IF
JACC-Cardiovascular Imaging	No	10.975
Medical Image Analysis	No	8.880
IEEE Transactions on Medical Imaging	Yes	7.816
Radiology	Yes	7.608
Journal of Nuclear Medicine	Yes	7.308
European Journal of Nuclear Medicine and Molecular Imaging	Yes	7.182
Clinical Nuclear Medicine	Yes	6.703
Investigative Radiology	Yes	6.091
Circulation-Cardiovascular Imaging	No	5.813
Neuroimage	No	5.812
Ultrasound in Obstetrics & Gynecology	No	5.595
European Heart Journal-Cardiovascular Imaging	No	5.260
Photoacoustics	No	5.250
Journal of Cardiovascular Magnetic Resonance	No	5.070
Ultraschall in der Medizin	Yes	4.613
Human Brain Mapping	No	4.554
Journal of Nuclear Cardiology	No	4.112
European Radiology	No	3.962
Radiographics	Yes	3.923
Biomedical Optics Express	No	3.910
Magnetic Resonance in Medicine	No	3.858
Seminars in Nuclear Medicine	Yes	3.798
Journal of the American College of Radiology	No	3.785
Journal of Magnetic Resonance Imaging	No	3.732
Korean Journal of Radiology	No	3.730
NMR in Biomedicine	Yes	3.414
Molecular Imaging and Biology	No	3.341
Journal of Cardiovascular Computed Tomography	No	3.316
Computerized Medical Imaging and Graphics	No	3.298
American Journal of Neuroradiology	Yes	3.256
American Journal of Roentgenology	Yes	3.161
Cancer Imaging	No	3.153
Quantitative Imaging in Medicine and Surgery	No	3.074
EJNMMI Research	No	3.000
European Journal of Radiology	No	2.948
Magnetic Resonance Materials in Physics Biology and Medicine	No	2.836
Journal of Vascular and Interventional Radiology	No	2.828
Clinical Neuroradiology	No	2.800
Ultrasonics	Yes	2.598
Journal of Digital Imaging	No	2.572
Journal of Biomedical Optics	No	2.555
Neuroradiology	Yes	2.504
Nuclear Medicine and Biology	Yes	2.492
Ultrasonic Imaging	Yes	2.490
Diagnostic and Interventional Imaging	No	2.486
Journal of Neuroradiology	No	2.467
Academic Radiology	No	2.267
Ultrasound in Medicine and Biology	No	2.205
International Journal of Computer Assisted Radiology and Surgery	No	2.155
Abdominal Radiology	Yes	2.147
Magnetic Resonance Imaging	Yes	2.112
Clinical Radiology	Yes	2.082
Journal of Neuroimaging	Yes	2.080
Journal of Thoracic Imaging	No	2.078
Neuroimaging Clinics of North America	No	2.046
Pediatric Radiology	Yes	2.022
Magnetic Resonance Imaging Clinics of North America	No	2.011

2.71, range 2.02–10.98;  $P = 0.951$ ) (Fig. 2). There was no significant association between percentage of female editorial board members and a journal's IF (Spearman's rho =  $-0.019$ ,  $P = 0.889$ ).

### 3.3. Comparison to historical data

In 1982, the proportion of female editorial board members in prominent radiology-related journals at that time (*American Journal of*

**Table 2**  
Summary characteristics of the 57 included journals.

IF	Median 3.30, IQR 2.35, range 2.01–10.98
Number of editors-in-chief per journal	Median 1, IQR 0, range 1–7
Country of origin of the editors-in-chief	USA (52.9%), Germany (7.4%), UK (7.4%), France (5.9%), Austria (4.4%), Switzerland (4.4%), Australia (2.9%), Denmark (2.9%), Hong Kong (2.9%), Italy (2.9%), The Netherlands (2.9%), South Africa (1.5%), Korea (1.5%)
Proportion of females as the only editor-in-chief	8.8%
Proportion of female editorial board members	Median 21.5%, IQR 12.3%, range 3.2%–52.0%

Neuroradiology, American Journal of Roentgenology, Cardiovascular and Interventional Radiology, CRC-Critical Reviews in Diagnostic Imaging, Current Problems in Diagnostic Radiology, Gastrointestinal Radiology, Investigative Radiology, Journal of Clinical Ultrasound, Journal of Computer Assisted Tomography, Journal of Nuclear Medicine, Journal of Ultrasound in Medicine, Neuroradiology, Pediatric Radiology, Postgraduate Radiology, A Journal of Continuing Education, Radiology, Seminars in Roentgenology, and Skeletal Radiology) was nearly zero.<sup>16</sup> Note that the journals CRC-Critical Reviews in Diagnostic Imaging and Postgraduate Radiology, A Journal of Continuing Education have ceased to exist, whereas the journal Gastrointestinal Radiology has changed its name into Abdominal Radiology. Furthermore, 36 of the 57 journals which were included in our study did not exist yet in 1982 (Table 1). From 2004<sup>17</sup> to the present, the proportion of female editorial board members of the journals Radiology and American Journal of Roentgenology has increased from 15.9% to 26.9%, and from 16.3% to 51.4%, respectively. From 2011<sup>18</sup> to the present, the proportion of female editorial board members of the journals JACC-Cardiovascular Imaging, Radiology, Journal of Nuclear Medicine, Neuroimage, and Human Brain Mapping, has increased from 9.4% to 14.4%, from 12.2% to 26.9%, from 9.9% to 17.7%, from 25.0 to 29.9%, and from 14.0% to 22.0%, respectively.

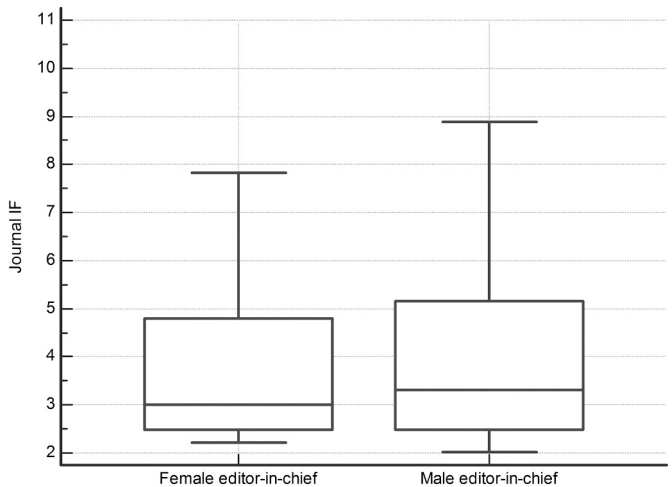
4. Discussion

Journal editorial board membership is considered a marker of influence and prestige for those in academic medicine.<sup>17</sup> Our study shows that gender diversity among a wide range of radiology-related journals with an IF>2.0 is unequally distributed: women are in charge as the only

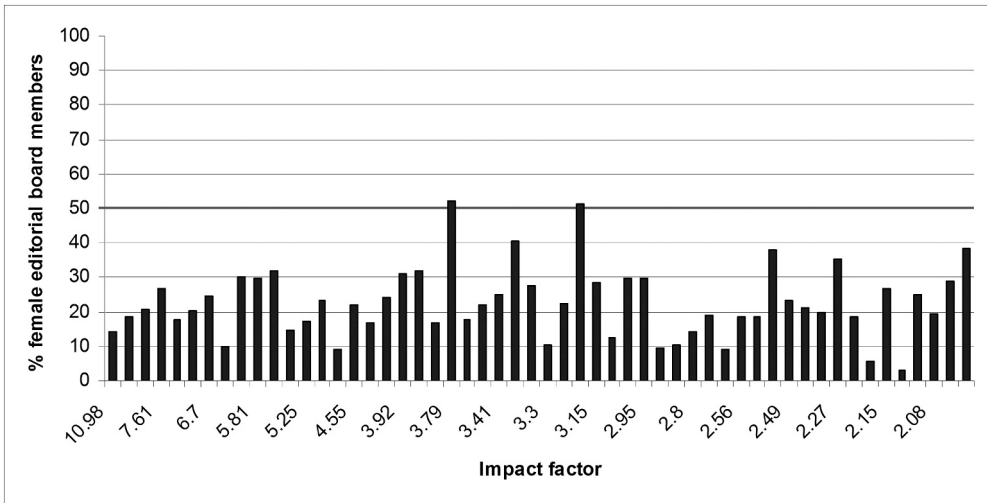
editor-in-chief in only a small minority (8.8%), whereas female editorial board members were in the majority of only two (3.5%) journals. Journal IFs were neither significantly associated with gender of the editor-in-chief, nor with the proportion of female editorial board members.

Women have been underrepresented in the editorial boards of major medical journals for many years.<sup>17–20</sup> However, a comparison of our results to historical data suggests that there has been an increase in the proportion of female editorial board members among radiology-related journals. Since 1982, the proportion of female editorial board members in prominent radiology-related journals has increased from nearly zero<sup>16</sup> to a median of 21.5% among journals which hold a current IF>2.0. More recently, since 2004,<sup>17</sup> the proportion of female editorial board members of the journals Radiology and American Journal of Roentgenology has increased from 15.9% to 26.9%, and from 16.3% to 51.4%, respectively. Since 2011,<sup>18</sup> the proportion of female editorial board members of the journals JACC-Cardiovascular Imaging, Radiology, Journal of Nuclear Medicine, Neuroimage, and Human Brain Mapping, has increased from 9.4% to 14.4%, from 12.2% to 26.9%, from 9.9% to 17.7%, from 25.0 to 29.9%, and from 14.0% to 22.0%, respectively.

The absence of significant associations between a journal's IF and



**Fig. 2.** Box-and-Whisker plots showing IFs for journals with female and male editors-in-chief.



**Fig. 1.** Percentage of female editorial board members with respect to journal IF. Three of the 57 included journals (*Seminars in Nuclear Medicine*, *Neuroimaging Clinics of North America*, and *Magnetic Resonance Imaging Clinics of North America*) are not displayed in this figure, because no editorial board members were listed on their official websites.

gender diversity in editorial boards suggests that there is no added gender bias as the prestige and relative influence of a journal increases. Nevertheless, we propose that journals with a high IF could go one step further by actively increasing the proportion of qualified female editorial board members. Although there are no formal quota, some have suggested that a reasonable proportion of female editorial board members would be as high as the proportion of female authorship contributions,<sup>8,9</sup> which was around 25–30% between 2011 and 2015.<sup>21</sup> The Lancet and their specialty journals have set an example: they announced the #LancetWomen project in December 2017<sup>22</sup> and monitored progress in 2018,<sup>23</sup> which has resulted in editorial board gender parity (at least 50% woman).<sup>23</sup>

Our study has some potential limitations. First, although the IF of a journal is commonly used as an indicator of the prestige and relative influence of a journal,<sup>12–14</sup> it may not be the best metric of a journal's performance.<sup>24–27</sup> However, we also did not find any significant association between gender diversity and other journal influence metrics, including Eigenfactor score and article influence score (data not shown, available on request). Second, our study is a snapshot in time, because the composition of editorial boards is continuously changing. However, the findings from our study can be used as a baseline measurement to monitor and improve upon in the future.

In conclusion, women are underrepresented in a wide range of radiology-related journals. Comparison with historical data shows that the proportion of women on editorial boards has increased over the past four decades. Nevertheless, gender composition of the editorial board shows no association with IF. This suggests similar gender bias exists across a broad spectrum of high impact factor journals, with no added bias in journals with higher IF.

#### Declaration of competing interest

All authors have no conflicts of interest to declare.

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#### References

- [1] Kubik-Huch RA, Vilgrain V, Krestin GP, et al. Women in radiology: gender diversity is not a metric-it is a tool for excellence. *Eur Radiol* 2020;30:1644–52. <https://doi.org/10.1007/s00330-019-06493-1>.
- [2] Hamidizadeh R, Jalal S, Pindiprolu B, et al. Influences for gender disparity in the radiology societies in North America. *AJR Am J Roentgenol* 2018;211:831–8. <https://doi.org/10.2214/AJR.18.19741>.
- [3] Qamar SR, Khurshid K, Jalal S, et al. Gender disparity among leaders of Canadian academic radiology departments. *AJR Am J Roentgenol* 2020;214:3–9. <https://doi.org/10.2214/AJR.18.20992>.
- [4] Surawicz CM. Women in leadership: why so few and what to do about it. *J Am Coll Radiol* 2016;13:1433–7. <https://doi.org/10.1016/j.jacr.2016.08.026>.
- [5] Battaglia F, Shah S, Jalal S, et al. Gender disparity in academic emergency radiology. *Emerg Radiol* 2019;26:21–8. <https://doi.org/10.1007/s10140-018-1642-7>.
- [6] Qamar SR, Khurshid K, Jalal S, et al. Academic musculoskeletal radiology: influences for gender disparity. *Skeletal Radiol* 2018;47:381–7. <https://doi.org/10.1007/s00256-017-2836-x>.
- [7] Journal citation reports (InCites). <https://jcr.clarivate.com/>. [Accessed 18 May 2020].
- [8] Piper CL, Scheel JR, Lee CI, Forman HP. Representation of women on radiology journal editorial boards: a 40-year analysis. *Acad Radiol* 2018;25:1640–5. <https://doi.org/10.1016/j.acra.2018.03.031>.
- [9] Jalilianhasanpour R, Charkhchi P, Mirbolouk M, Yousem DM. Underrepresentation of women on radiology editorial boards. *J Am Coll Radiol* 2019;16:115–20. <https://doi.org/10.1016/j.jacr.2018.08.017>.
- [10] Abdellatif W, Shao M, Jalal S, et al. Novel geographic thematic study of the largest radiology societies globally: how is gender structure biased within editorial boards? *AJR Am J Roentgenol* 2019;11:1–6. <https://doi.org/10.2214/AJR.18.20965>.
- [11] Garfield E. The history and meaning of the journal impact factor. *JAMA* 2006;295:90–3. <https://doi.org/10.1001/jama.295.1.90>.
- [12] Citrome L. Impact factor? Shmimpact factor!: the journal impact factor, modern day literature searching, and the publication process. *Psychiatry (Edmont)* 2007;4:54–7.
- [13] Krampl. Journal citation reports. *J Med Libr Assoc* 2019;107:280–3. <https://doi.org/10.5195/jmla.2019.646>.
- [14] Fersht A. The most influential journals: impact factor and Eigenfactor. *Proc Natl Acad Sci U S A* 2009;106:6883–4. <https://doi.org/10.1073/pnas.0903307106>.
- [15] Gender Checker. <https://genderchecker.com/pages/search-engine>. [Accessed 18 May 2020].
- [16] Gooding GA. The status of women radiologists: membership on editorial boards and participation in upper echelons of radiologic societies. *Radiology* 1983;147:595–9. <https://doi.org/10.1148/radiology.147.2.6836141>.
- [17] Morton MJ, Sonnad SS. Women on professional society and journal editorial boards. *J Natl Med Assoc* 2007;99:764–71.
- [18] Amrein K, Langmann A, Fahrleitner-Pammer A, Pieber TR, Zollner-Schwetz I. Women underrepresented on editorial boards of 60 major medical journals. *Gend Med* 2011;8:378–87. <https://doi.org/10.1016/j.genm.2011.10.007>.
- [19] Kennedy BL, Lin Y, Dickstein LJ. Women on the editorial boards of major journals. *Acad Med* 2001;76:849–51. <https://doi.org/10.1097/00001888-200108000-00021>.
- [20] Jaggi R, Tarbell NJ, Henault LE, Chang Y, Hylek EM. The representation of women on the editorial boards of major medical journals: a 35-year perspective. *Arch Intern Med* 2008;168:544–8. <https://doi.org/10.1001/archinte.168.5.544>.
- [21] Campbell JC, Yoon SC, Grimm LJ. Authorship and impact of gender-specific research in major radiology journals. *J Am Coll Radiol* 2019;16:240–3. <https://doi.org/10.1016/j.jacr.2018.08.024>.
- [22] Clark J, Zuccala E, Horton R. Women in science, medicine, and global health: call for papers. *Lancet* 2017;390:2423–4. [https://doi.org/10.1016/S0140-6736\(17\)32903-3](https://doi.org/10.1016/S0140-6736(17)32903-3).
- [23] Clark J, Horton R. What is the lancet doing about gender and diversity? *Lancet* 2019;393:508–10. [https://doi.org/10.1016/S0140-6736\(19\)30289-2](https://doi.org/10.1016/S0140-6736(19)30289-2).
- [24] Grzybowski A. The journal impact factor: how to interpret its true value and importance. *Med Sci Monit* 2009;15:SR1–4.
- [25] Fersht A. The most influential journals: impact factor and Eigenfactor. *Proc Natl Acad Sci U S A* 2009;106:6883–4. <https://doi.org/10.1073/pnas.0903307106>.
- [26] Bradshaw CJ, Brook BW. How to rank journals. *PLoS One* 2016;11:e0149852. <https://doi.org/10.1371/journal.pone.0149852>.
- [27] Paulus FM, Cruz N, Krach S. The impact factor fallacy. *Front Psychol* 2018;9:1487. <https://doi.org/10.3389/fpsyg.2018.01487>.