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Call to Action: Women in Neuroradiology's Group (WINNERS) —Is There a Need?

A. Singhal and A. Aiken

It is well-known that radiology is one of the male-dominated specialties in medicine (33.5% women).¹ There has been extensive interest in studying gender disparities in all fields of medicine, including radiology recently.² Improving gender and cultural diversity helps to promote scientific advancement; increases diversity of perspectives, teamwork innovation, and creativity; produces more effective approaches to complex problems; and improves access to care for underserved groups.³⁻⁷ The American Association of Medical Colleges recently launched a strong initiative imploring its member institutions and societies to be intentional in addressing gender inequities, emphasizing that gender equity is a key factor in achieving excellence in academic medicine.^{8,9}

Gender Diversity in Medicine and the Motherhood Penalty

Female physicians are equally as likely as men to enter a career in academic medicine, but the overall proportion of women who are full professors is significantly lower, despite accounting for age, experience, specialty, and measures of research productivity.¹⁰⁻¹² Female faculty physicians are promoted more slowly than men, with more men than women on the tenure track.^{11,13} Female physicians do not achieve the same level of career success, as measured by research funding, publications, promotions, and leadership positions.^{12,14} Several studies have investigated the underlying factors and have shown less opportunity for academic advancement, lack of sponsorship, decreased availability of same-sex mentors, lack of research opportunities with greater difficulty in getting funding from the National Institutes of Health, the difficulty of raising a family while building a career, work-life integration, inequities and biases, and attrition of female faculty.^{10,14-17} Lack of role models for combining career and family and work-life balance and the lack of a supportive environment were found to be important factors in a female physician's decision not only to leave an institution but also to leave the practice of medicine or work part-time.^{18,19}

Physicians who are mothers are affected to a greater degree by societal norms, and a sociologic term called the "motherhood penalty" has been coined to describe discrimination to which mothers are subject in the workplace compared with men with or without children or women without children.^{14,20,21} More than one-third of mothers particularly reported discrimination related to pregnancy, maternity leave, or breastfeeding, and discrimination is associated with higher burnout rates.¹⁴ Motherhood in the workplace has been shown to be associated with decreased pay,

perceptions of lower competence and of lower commitment to one's career, and being less likely to be hired and promoted.²¹⁻²³ Studies, however, contrarily have demonstrated increased productivity of mothers during a career compared with peers without children and that mothers bring unique skills to leadership roles.^{19,21,24} Most female physicians felt the need for more support to thrive in their careers, especially for maternity leave and returning to work, including paid maternity leave, breastfeeding/pumping support, and schedule flexibility.²⁵ In a systematic review of challenges faced by physician mothers, a lack of dedicated women's networks, mentors, sponsors, coaches, role models, and professional development opportunities were found to be the most commonly cited organizational issues.¹⁴ It has been further shown that female physicians were less likely than male physicians to receive career support through networking activities, with the effect increased more for those physicians with children than for those without.^{14,26}

To clarify, mentorship is a longitudinal relationship in which a mentor advises, shares knowledge with, and gives feedback to a mentee for career development, whereas sponsorship is when a protégé is directly advocated and recommended by a sponsor for career-advancing opportunities.^{27,28} Having an identifiable mentor increases a physician's chance of being promoted 2-fold.²⁹ Professionals with sponsors are 23% more likely than their peers to be promoted.^{30,31} Female physician mentorship of female medical students or residents was found to be an important strategy for recruitment in a study in Japan.³² Having facilitating colleague support groups is an effective, preventive intervention in mitigating burnout and distress among mothers at high risk for stress, leading to increased engagement at work and decreased parenting-associated stress.^{14,33}

A study by Gordinier et al³⁴ emphasized that mentorship does not need to be only gender-specific because it reported the ability to successfully balance family and full-time practice as the most commonly cited quality in an ideal mentor. However, female physicians have reported lower satisfaction with existing mentorship programs than males.¹⁶ Lack of women in leadership has been suggested as a factor; increasing the role of women in leadership positions could be a solution.^{10,14} It is critical that physicians who are leaders with experience balancing career and family advocate for mothers who are junior physicians, not only as mentors but also to affect institutional changes including increased job flexibility and institutional support.

Gender Diversity in Radiology

Recent articles have highlighted gender disparities in radiology, including underrepresentation in leadership roles as well as higher promotion ranks in radiology.^{2,10,35} Female radiologists, on average, had fewer total publications, fewer first or last author publications, and lower h-indexes and were less likely than men to have National Institutes of Health funding.^{2,35} Women worked part-time more often and held fewer positions of power in hospitals and on editorial boards and in academic levels of associate and full professors.² Without accounting for any contributing factors in an analysis of US academic radiologists, female radiologists were less likely to hold the rank of full professor compared with men, but

after multivariate adjustment, there was no significant difference found in 1 study. The authors concluded that female radiologists may lack sufficient opportunity to reach parity in research productivity.³⁵ Several barriers found by female radiologists are similar to those in other fields, such as a lack of mentorship, funding, and research opportunities; obstacles related to child rearing, work, and family alignment difficulties; and discrimination and sexual harassment.^{2,10,36-38}

Gender Diversity in Neuroradiology

Specifically in neuroradiology, there are more men working relative to women, with highly significant gender disparity for leadership positions in neuroradiology (87.5% of leadership ranks within academic neuroradiology are held by men).¹⁰ Gender disparity was not found when analyzing academic ranks, with women filling 25% of assistant, 23% of associate, and 21% of full professor positions. These proportions could simply be a reflection of the proportion of female radiology residents (27%), which otherwise points to general underrepresentation of women in radiology compared with the percentage of female medical students (47% in 2015).^{10,39} The median h-index was higher for male (17.5) compared with female faculty members (9). Furthermore, the latest data regarding authorship in 155 international neurology-related journals showed the largest gender disparity in authorship in neuroradiology journals compared with neurology and neurology-related subspecialties.⁶ The proportion of women authors in the studied neurological journals (which included neuroradiology journals) was not reflective of the gender proportions in the respective fields and fell short of them. There was also a tendency for same-gender senior and junior authors to publish together, increasing authorship gender inequities.⁶ The greatest gender disparity was seen in the last authorship position, which likely reflects the proportion of senior leadership in the field. Gender proportion underrepresentation on editorial boards likely also contributes.^{6,38}

Current Effort

American Association of Women in Radiology (AAWR) has a plethora of resources for women in radiology and their allies.^{40,41} With increased momentum toward reducing gender disparities, several academic institutions in the United States have Women in Radiology programs,^{42,43} and there is increased interest in outreach to the medical student levels.^{39,44,45} Radiology societies such as the Society of Interventional Radiology have implemented Women In Radiology programs.⁴⁶ While just more than one-quarter of women are radiologists, which is already low, there is a further relative dearth of women in neuroradiology, with ASNR membership including <18% women in 2018. The ASNR leadership landscape has changed during the past decade with 5 of the 9 Presidents being women in the past decade compared with only 2 of the previous 46 Presidents until 2009.⁴⁷ While it is extremely important and inspirational to see women in top academic societal leadership positions, women in neuroradiology still often lack female colleagues within their institutions, and individual institutional level programs specific to neuroradiology are difficult to implement. Specialty-specific programs have a greater chance of networking opportunities for academic collaboration and mentorship. It is suggested that professional organizations adopt principles that

strategically enhance diversity and inclusion.^{9,48} Recognizing the contributions of women in leadership with awards, developing health policy documents, and reporting data on diversity and inclusion are some of the ways suggested in another specialty to enhance recruitment, retention, and career advancement of female physicians.⁴⁸ The Women in Neuroradiology award instituted by the ASNR in 2012 has also been a positive change in recognizing women with leadership potential and supporting their leadership development with positive outcomes.⁴⁷ Very recently, a new award called the American Society of Functional Neuroradiology-AAWR “Carolyn C. Meltzer” Joint Award has been instituted, aiming to increase the number of women engaged in the field of functional neuroradiology.

Gaps and Proposed Future Effort

While the current effort shows remarkable forward momentum, there are several other strategies, albeit more time- and labor-intensive as discussed above, which have been shown to be helpful in improving gender disparities such as mentorship and advocacy. It is critical to connect women with mentors who have successful work-life integration through positive formal and informal mentorship and sponsorship programs, such as support groups and female-focused networking events.^{2,14,15,30,33,43,45,48,49} Mentorship and sponsorship of women and leadership programs directly impact advancement and career satisfaction and retention of female faculty.^{14,47,50,51} Participation in a female-focused professional organization creates opportunities that facilitate scholarly work and leadership, which ultimately enhances retention and advancement of female physicians.⁴⁹ Additionally, the onus of increasing gender diversity by promoting, mentoring, and including women should not be on women only, especially when in male-dominated fields. Therefore, allyship from men and leaders is also necessary in improving gender equity in various fields.^{8,52-54}

These data and discussions speak of a need to increase effort at a national and international societal level to help support advancement of women in neuroradiology and to attract more female medical students and residents into the field, thereby increasing diversity in the field. The authors, therefore, propose creation of an interest group/branch/subcommittee for women in neuroradiology with a suggested name of WINNERS (Women IN NEuroRadiology’s group). We propose that this group welcome participation by women as well as allies.

The goal of the WINNERS group would be to bring interested female neuroradiologists and allies together for discussion, networking, mentoring, sponsorship opportunities, and academic collaboration to promote advancement and retention of women in neuroradiology and, thereby, increase diversity in the practice of radiology. WINNERS would be a great way to accomplish important goals to increase diversity of the neuroradiology workforce and include more female neuroradiologists in various roles, including leadership, and combat the motherhood penalty.^{19,21} Areas of focus would include the following: 1) providing a forum for women to discuss and suggest processes and pathways that support workplace flexibility and work-life integration for neuroradiologists; 2) facilitating open and nonjudgmental discussions around the topic of work-life balance that can help reset the norm; 3) giving parents professional support and discussing pathways to

leadership; 4) finding innovative ways to research and better understand underlying barriers and ways to address them; and 5) discussing strategies for recruiting and retaining women in neuro-radiology practice and neuroradiology academic departments and sharing aspects of work cultures of institutions they might consider joining. By way of example, the creation of such a group would encourage female radiologists and trainees to envision successful careers in neuroradiology. To achieve the goal of decreasing gender disparities in neuroradiology, current and future female neuroradiologists need to feel included and supported, and bringing them together would be the first step for this endeavor.

Disclosure forms provided by the authors are available with the full text and PDF of this article at www.ajnr.org.

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