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Review

The proportion of male and female editors in women's health journals: A critical analysis and review of the sex gap☆

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ABSTRACT

Background: Historically, women have been underrepresented in leadership positions in medicine. The reasons for this are multifactorial. In recent years, women's representation in medicine has improved. However, inequities in the proportion of men and women in medical leadership remain, especially with regard to editorial journal boards.

Objective: This study aimed to explore current trends of women in leadership positions on journal editorial boards.

Methods: A comprehensive search for women's health journals was performed in collaboration with university librarians in February 2019 using EMBASE, Scopus, SciFinder, and MEDLINE records for journals with relevance to women's health. Each journal was e-mailed to verify the accuracy of the journal editorial boards listed on their respective webpages. Five categories, as well as the totals for each journal, were analyzed for the proportion of women versus men: editor-in-chief, associate editor, deputy editor, and section editor, and other.

Results: Women comprised the minority of positions on women's health editorial boards. Of the total 1440 board members included, 602 members (42%) were women and 838 members (58%) were men. Women occupied 54 of 132 editor-in-chief positions (41%), 257 of 596 associate editor positions (43%), 13 of 42 deputy editor positions (30%), 46 of 120 section editor positions (38%), and 232 of 549 other editor positions (42%).

Conclusion: Although the sex gap in leadership in medicine is improving, it is still present. Our findings suggest that women are underrepresented as editors at most levels in women's health journals centered on topics such as reproductive health, obstetrics and gynecology, perinatology, gynecological oncology, and breastfeeding. With sponsorship/mentorship for women, flexible scheduling, and considerate thought in leadership appointment, this sex gap will continue to improve.

Contents

☆ No human subjects were included in this study. No animals were used in this study.

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Introduction

Between 2015 and 2017, the number of female matriculants to medical school increased by 9.6% compared with that of male matriculants, which decreased by 2.3% (Heiser, 2017). In 2017, women surpassed men as the majority of incoming medical students for the first time, at 50.7% of incoming medical students; Heiser, 2017). This trend continued into 2018, when women composed 51.6% of medical school matriculants. This trend, however, has not translated into academic leadership. Many female students are still in training, so these numbers may improve with time. A 2015 cross-sectional study demonstrated that 38% of full-time faculty positions were held by women, but only 21% of women held full professorships (Jena et al., 2015).

In another 2012 cross-sectional study that analyzed the sex composition of leadership positions at the Johns Hopkins University School of Medicine, there were 258 leadership positions and only 35% were held by women (Monroe et al., 2015). In the same study, division director positions had a much higher disparity with 88% of positions held by men (Monroe et al., 2015). A study of the American Board of Medical Specialties (ABMS) in 2016 showed more neutrality in sex distribution among board of director positions. This study showed that women held the majority of positions in seven ABMS specialties: anesthesia, internal medicine, neurology, plastic surgery, ophthalmology, nuclear medicine, and surgery (Walker et al., 2016). The reason for the greater proportion of women's representation may be that the ABMS board of directors does not require a faculty appointment or academic rank,

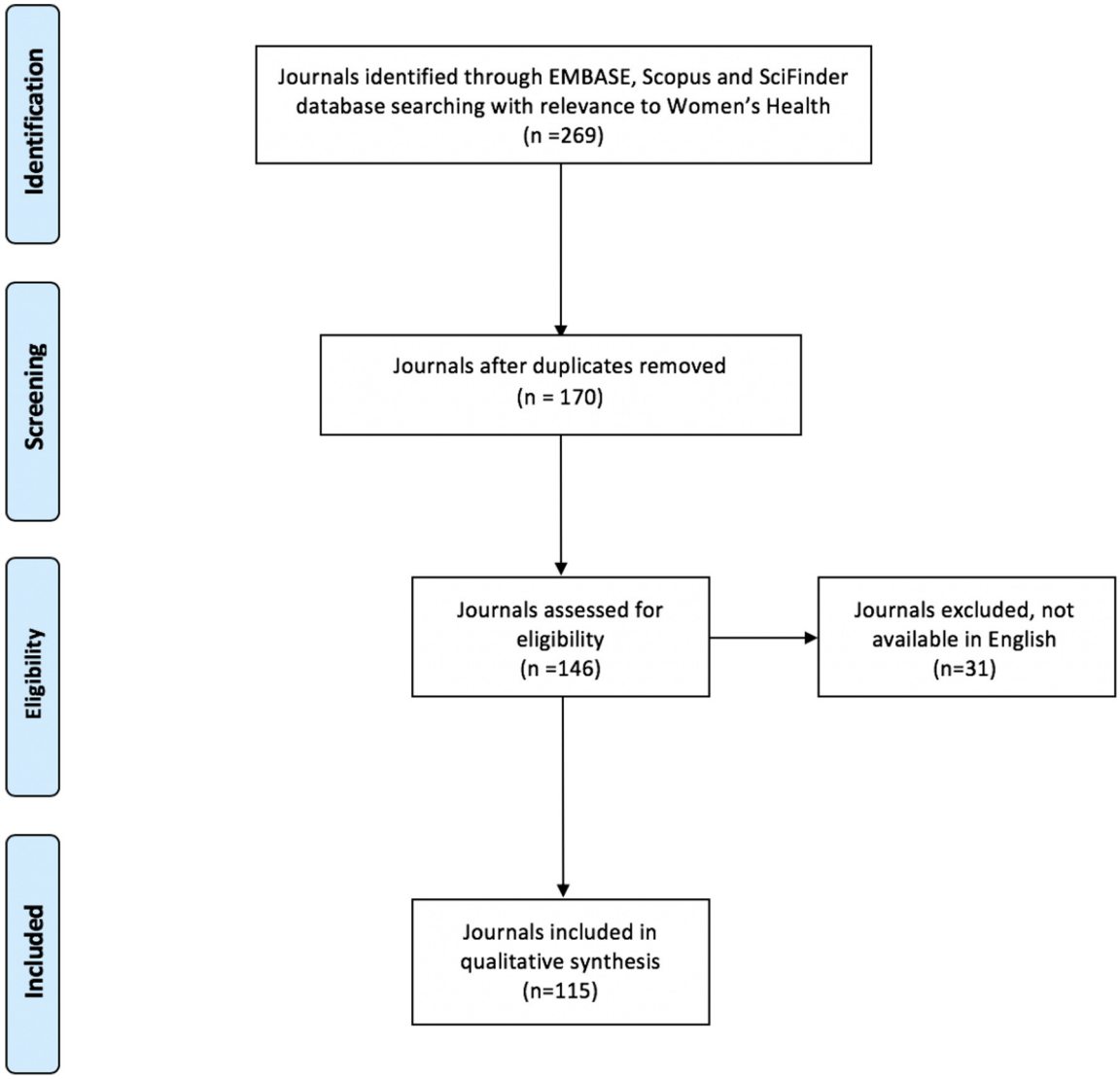

Fig. 1. PRISMA flow diagram representation of database search methodology.

Table 1
Examples of high-impact women's health journals.

Scimago impact factor*	Journal title
5.317	*Human Reproduction Update*
2.700	*American Journal of Obstetrics and Gynecology*
2.647	*Ultrasound in Obstetrics and Gynecology*
2.643	*Human Reproduction*
2.563	*Obstetrics and Gynecology*
2.339	*Gynecologic Oncology*
2.250	*Fertility and Sterility*
2.111	*International Journal of Obstetrics and Gynaecology*
1.921	*Contraception*
1.837	*Archives of Disease in Childhood: Fetal and Neonatal Edition*

* SclImago uses a weighted citation score with more weight given to citations from prestigious journals to calculate impact scores.

allowing for a transition into leadership roles for women who may not have previously had experience or ties with academic medicine (Walker et al., 2016).

Although women are attaining more representation in the medical field, leadership positions in medicine favor men. The aim of this study was to examine the current trends in editorial board composition across women's health journals, to theorize why these trends exist, and to offer discussion on potential ways to improve the sex disparity.

Methods

A comprehensive search for women's health journals indexed in major databases was performed with the assistance of librarians at the University of Nebraska Medical Center (Fig. 1). The search was performed in the EMBASE, Scopus, and SciFinder and included MEDLINE records, as well as records for journals not indexed in MEDLINE. A total of 3166 journals were screened for relevance in the following topics: women's health, menstruation, obstetrics/gynecology, childbirth, pregnancy, reproduction/fertility, perinatology, and breastfeeding. Two searches were performed: one for journals that published articles including the phrase "women's health" and another for journals indexed concerning "women's health."

The top 10 highest impact journals from obstetrics/gynecology included in our review are provided in Table 1. After the initial screen for relevance, 269 journals remained. Journals were then screened for duplicate records, after which 170 journals remained. The records were then screened for those available in the English language, after which 146 journals remained. Finally, journals were screened for active publication status, after which 115 journals remained to be included in our review.

Editorial teams were categorized into five distinct categories: editor-in-chief, associate editor, deputy editor, section editor, and other editor. Other editors were verified (1) to be part of the editorial team and (2) in a position of leadership, including positions such as manuscript editor, web editors, and emeritus editors. Individuals with supportive or administrative roles such as interns and copy editors were not included in the analysis, including individuals listed under editorial board roles if their credentials were unclear. Information on board composition was collected through internet searches and verified, when possible (67 of 115 journals; 58.2%), through e-mail correspondence with a journal administrator. Sex was determined for all editorial board members through internet search using a combination of professional photographs, pronouns, and name.

Results

Overall, women occupied the minority of editorial board positions (Fig. 2). Of the 1440 board members included, 602 members (42%) were women and 838 members (58%) were men. Fifty-four of 132 women (41%) held editor-in chief positions, 257 of 596 women (43%) held associate editor positions, 13 of 42 women (30%) held deputy positions, 46 of 120 women (38%) held section editor positions, and 232 of 549 women (42%) held other editor positions.

Discussion

This review demonstrates that women hold a minority of editorial positions on women's health journal boards across all editor positions. This trend is not limited to women's health journals. In six major general medical journals (*Annals of Internal Medicine, BMJ, JAMA, JAMA Internal Medicine, The Lancet, and The New England Journal of Medicine*), the percentage of female reviewers ranged from 16.6% to 28.8% in 2010 and 2011 (Erren et al., 2014). Although there are more women represented as editors of women's health journals than in other specialty literature, such as dermatology journals where women represent 18% to 36% of editorial positions (Lobl et al., 2019) and only 9% of editorial board members of orthopedic surgery journals (Rynecki et al., 2019), representation is still far from equitable.

In women's health in particular, this representation is striking, considering a 2017 American College of Obstetricians and Gynecologists study found that 58.7% of practicing obstetrics and gynecology physicians are women (Rayburn, 2017). This trend is not limited to women's health journals nor to editor positions only. There are few studies in certain specialties, such as pediatrics, that have quantified female authorship and leadership on editorial boards. Although 61.9% of pediatricians are women, none of the

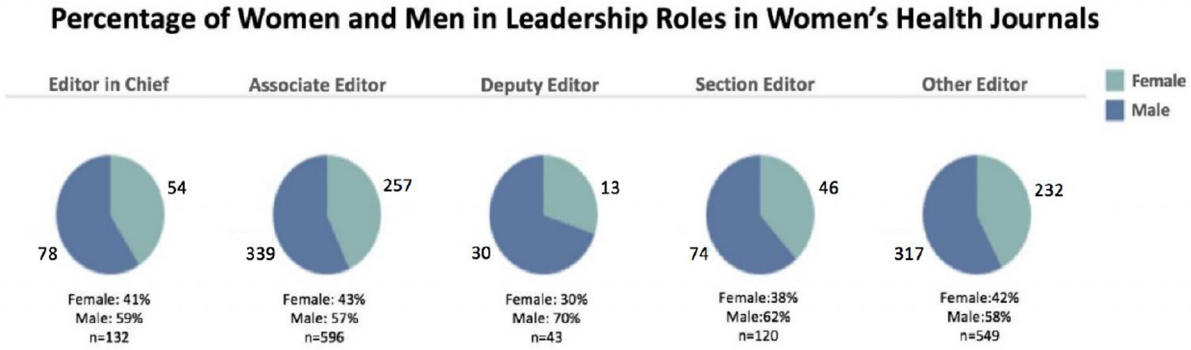

Fig. 2. Percentage of women and men as editors in chief, associate editors, deputy editors, section editors, and other editors in women's health journals.

top four pediatrics journals in a 2018 JAMA study employed a female editor in chief (Silver et al., 2018).

Our search did not yield any studies in the area of women's health that have analyzed these trends. In this paper, we explore potential causes for our results and the larger sex gap in academic medicine and propose solutions to help retain women in academic medicine.

Publishing and productivity

First, the discrepancy in women achieving editorial positions may be partially due to differences in how men and women engage with the publishing process. A study using papers where titles began with "invited" on PubMed found that men are estimated to receive twice as many invitations from journals to submit work (1.7–2.1 times as likely; $p < .00001$; Holman et al., 2018). When men and women contribute equally to a paper (are both listed as first authors), men are more likely to have their name printed first in the publication, not consistent with alphabetical ordering (57.59% listed a man first; $p = .005$; Broderick and Casadevall, 2019).

This is extremely relevant because publications in high-impact journals, especially first and last authorships, are an influential factor for career advancement in academic medicine. Publication is used as a measure of productivity and is emphasized in the promotion process (Jagsi et al., 2006). Men may benefit from a systematic bias in the publishing process, but they may also be more proactive in promoting their work. One study created an algorithm that showed that men are reported to cite their own work >50% more frequently than women (Fowler and Aksnes, 2007; Mishra et al., 2018). Self-citation does not count toward H-indices but does increase visibly and in doing so will likely increase citations by other authors, which will affect H-indices. This may affect impact metrics, ultimately leading to less perceived academic activity for women.

Increased comparative proactiveness by men in the publication process and unconscious forms of bias may affect how many papers by female authors are accepted. Although men may be more actively engaged in the publication process, there may also be sex differences in how a paper is processed when submitted to a journal, as evidenced by the improved representation of women with double-blind review. Double-blind review has been found to increase representation of female first authors by 7.9% ($p = .03$; Budden et al., 2008; Darling, 2014). Currently, many journals use a single-blind review whereby the reviewer is anonymous but the authors' identities are visible, which may affect unconscious bias. Other confounders or sources of additional bias may include geographic or language bias, as well as institutional prestige. A possible solution is for journal leadership to implement blind review of journal submissions.

Differences in how men and women are affected by the publication process may affect the visibility of women in research. Prevalence of female first authorship in six high-impact medical journals was determined for original research articles published between 1994 and 2014. After adjustment for topic, study type, and region, female first authorship increased from 27% to 37% during this time period ($p < .001$; Filardo et al., 2016). Few women serving as editors of medical journals may be intimately tied to the number of women achieving first and senior authorships of manuscripts. Additionally, the lower number of women achieving first author positions in publications is also likely a contributing factor to the lower number of women receiving high editorial positions.

Furthermore, the disparity in the proportion of women receiving funding from the National Institutes of Health is an important inequity that contributes to the publishing productivity of women in academic medicine and thus overall success in leadership positions. The reasons for this discrepancy are multifactorial, but one reason proposed is that less than one third of grant applications received are from female investigators (Hechtman et al., 2018). Women are comparatively as successful in obtaining first-time grants, although there does tend to be sex-associated attrition over career spans (Hechtman et al., 2018).

Distribution of academic time

Several studies have indicated that women choose to spend more time with patients and teaching rather than in research. However, research is more likely to lead to advancement in academic medicine given statistics comparing the correlation with promotion and hours spent in research compared to other academic professor responsibilities (Buckley et al., 2000). One study from the National Institute of Health career development award winner interviews found that leadership positions in academic medicine were more important to male award recipients than to their female colleagues (38.9% vs 34.3%; $p = .03$; Jones et al., 2016). Female medical school pediatrics professors spend 40.1 hours per week on patient care and teaching (men spend 34.9 hours), and women engage in research for an average of 15 hours per week (men spend 20.4 hours weekly on research; $p < .001$; Kaplan et al., 1996).

Women are more likely than men to choose the clinician educator track (CET), where clinical interaction and teaching is emphasized, over the traditional tenure track, where frequent journal publication is expected (Mayer et al., 2014). When CET was offered, 77% of 83 participating schools saw a higher portion of female professors choose this option (Mayer et al., 2014). More female than male physicians cite a desire to teach as a primary reason for entering academic medicine. Although CET provides personal satisfaction and important opportunities for flexible promotion track scheduling, traditional tenure track faculty are twice as likely to be promoted as CET faculty (Wietsma, 2014).

In fact, one study of promotion rates and participant characteristics reported that increased time spent on research increases a physician's chance of promotion, whereas spending even 6% of a workday educating residents or medical students in clinic may be associated with decreased chance of promotion (Beasley et al., 2006). Another study found that physicians in the CET track have become busier with clinical responsibilities in recent years, leaving less time for academic pursuits and time to fulfill requirements, such as articles or lectures, for promotion (Bellini et al., 2001). This results in less measurable resume items that can be used to show productivity.

The study by Buckley et al. (2000) found that physicians who spend more time in clinical medicine are more likely to be dissatisfied with their career progression in academic medicine. Indeed, female CET faculty are at increased risk of career dissatisfaction due to lower rates of promotion associated with less external value given to their time spent in education and clinical encounters. An influential part of this decreased external value may be reflected in lower salaries. Salary has been listed as the greatest deciding factor for men or women leaving academic medicine (Sadeghpour et al., 2012). A cross-sectional survey of academic pediatricians found that higher salaries and titles were associated with more publications and grants regardless of sex and were positively associated with more working hours and greater overall satisfaction (Kaplan et al., 1996).

Work–family balance

Many men and women define success differently, and some women place a higher premium on flexibility and balance of family responsibilities. A survey found that work–life balance was a

significant concern for 91% of female physicians in the United States (Tracy et al., 2010). A study that examined why men and women consider but ultimately reject a medical specialty found that work–life balance was the determining factor for 28.2% of men and 47% of women ($p < .001$; Goldacre et al., 2012). Indeed, perceived work–family conflict was found in one multiple regression model to be negatively associated with seeking leadership positions in academic medicine for women but not for men ($p < .05$; Ellinas et al., 2018).

In addition, when a female physician makes the decision to have children, academic advancement may be delayed due to the coincidental timing of reproductive years with peak productivity years in academic medicine. Women on the CET track are more likely to leave academic careers, but extending the probationary period for tenure review has been found to be protective against attrition (hazard ratio: 0.36; confidence interval, 0.25–0.52; Speck et al., 2012). This extension gives more time to meet research and other work goals during their years of child bearing and early parenting, which may be more personally demanding. Generous parental leave opportunities and tenure clock extensions may help retain women in academics and lead to higher female representation in leadership (Valantine and Sandborg, 2013).

Work environment

Flexible work options may increase the representation of women in academic leadership roles, but work culture can also have a large impact. A recent survey published in *JAMA* found that 66.3% of physician mother respondents experienced sex discrimination and 35.8% experienced maternal discrimination, with 89.6% of those experiencing maternal discrimination attributing this to issues surrounding maternity leave and breastfeeding (Adesoye et al., 2017). In this study, sex discrimination manifested most commonly in the form of disrespectful treatment by nursing or other support staff (52.9%), not being included in administrative decision-making (39.2%), and pay and benefits not being equal to male peers at the same level (31.5%; Adesoye et al., 2017).

By contrast, mentorship by faculty members has been found to be a strong influential factor in keeping women in academic medicine (Farkas et al., 2019). For women versus men, having a collegial work environment is an influencing factor for staying in academic medicine (41.0% vs 29.6%; $p = .08$; Sadeghpour et al., 2012). Culture plays an understated role, and having colleagues who are understanding of the need to take time off from work for maternity leave or to pick up children on time from daycare can go a long way in preventing burnout.

Mentorship

Finally, positive role models of women as leaders in academic medicine are critical. Women have not traditionally had female role models in academic leadership. Women report high levels of satisfaction and motivation when meeting with mentors at least yearly to discuss progress on goals (Beasley et al., 2006). The presence of a female department chair has been correlated with a higher percentage of female residency program directors (50% vs 12%) and a higher percentage of female faculty represented in the department (Wietsma, 2014). In fact, having a female mentor in academic medicine doubles a female physician's chance at promotion (Wietsma, 2014). This may potentially be related to an encouraging work environment or the benefits of regularly scheduled meetings focused on career goals.

A systematic review found that mentorship programs designed for women regardless of model are met with high satisfaction by participants. One of the included studies implemented a Dyad mentorship model (one mentor, one mentee) that included regularly scheduled mentorship meetings and workshops and resulted in a retention rate of 84% of participating women 4 years after the study start, with participants reporting significantly increased confidence in their academic roles and skills (Farkas et al., 2019). Other successful mentorship structures are peer or peer-facilitated models.

In summary, these findings suggest that female physicians are more likely to work, be promoted, and stay at institutions with female department chairs and mentors. More women serving as editors of journals will also help to provide role models in academic medicine.

Conclusion

Women have experienced substantial achievements in academic medicine over the past century, but there is a greater gap than anticipated in leadership positions within academic medicine, including in journals focused on women's health. Women still have a way to go to gain equality in editorial positions, professorships, and higher roles within academic medicine. Differences in the way women interact with publishing processes, more time spent in education versus research, work–family balance, work culture, and the availability of mentorship may be large factors.

The number of women obtaining leadership roles in medicine may be impacted through mentoring and advocating for changes in institutions, such as flexible promotion timelines, and thoughtful appointment of women to journal editor positions. One way to increase early participation in academic medicine may be to encourage female residents to serve on journal editorial boards as a stepping stone to higher leadership positions.

Conflict of Interest

None.

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None.

Study Approval

The authors confirm that any aspect of the work covered in this manuscript that has involved human patients has been conducted with the ethical approval of all relevant bodies.

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References

Adesoye T, Mangurian C, Choo E. Perceived discrimination experienced by physician mothers and desired workplace changes: a cross-sectional survey. JAMA Intern Med 2017;177(7):1033–6.
Beasley BW, Simon SD, Wright SM. The prospective study of promotion in academia. J Gen Intern Med 2006;21(2):123–9.
Bellini L, Abbuhl S, Grisso J, Lavizzo-Mourey R, Shea J. Career choice: glass ceiling or glass slipper? Acad Med 2001;76(10):S62–4.
Broderick N, Casadevall A. Gender inequalities among authors who contributed equally. eLife 2019;8 e36399.
Buckley LM, Sanders K, Shih M, Hampton CL. Attitudes of clinical faculty about career progress, career success and recognition, and commitment to academic medicine: results of a survey. Arch Intern Med 2000;160:2625–9.
Budden A, Tregenza T, Aarssen L, Koricheva J, Leimu R, Lortie C. Double-blind review favours increased representation of female authors. Trends Ecol Evol 2008;23(1):4–6.
Darling ES. Use of double-blind peer review to increase author diversity. Conserv Biol 2014;29(1):297–9.

Ellinas E, Fouad N, Byars-Winston A. Women and the decision to leave, linger, or lean in: predictors of intent to leave and aspirations to leadership and advancement in academic medicine. J Womens Health 2018;27(3).
Erren T, GroB J, Shaw D, Selle B. Representation of women as authors, reviewers, editors in chief, and editorial board members at 6 general medical journals in 2010 and 2011. JAMA Intern Med 2014;174(4):633–5.
Farkas AH, Bonifacino E, Turner R, Tilstra SA, Corbelli JA. Mentorship of women in academic medicine: a systematic review. J Gen Intern Med 2019;34(7):1322–9.
Filardo G, Graca B, Sass D, Pollock B, Smith E, Martinez M. Trends and comparisons of female first authorship in high impact medical journals: observational study (1994–2014). BMJ 2016;352 i847.
Fowler JH, Aksnes DW. Does self-citation pay? Scientometrics 2007;72(3):427–37.
Goldacre Michael J, Goldacre Raph, Lambert Trevor W. Doctors who considered but did not pursue specific clinical specialties as careers: questionnaire surveys. J Roy Soc Med 2012;105(4):166–76.
Hechtman LA, Moore NP, Schulkey CE, Miklos AC, Calcagno AM, Aragon R, et al. NIH funding longevity by gender. Proc Natl Acad Sci U S A 2018;115(31):7943–8.
Heiser, S. More women than men enrolled in US medical schools in 2017. AAMC. (2017). Available from: https://news.aamc.org/press-releases/article/applicant-enrollment-2017/.
Holman L, Stuart-Fox D, Hauser CE. The gender gap in science: How long until women are equally represented? PLoS Biol 2018;16(4) e2004956.
Jagsi R, Guancial E, Worobey C, Henault LE, Chang Y, Starr R, et al. The "gender gap" in authorship of academic medical literature–A 35-year perspective. N Engl J Med 2006;355:281–7.
Jena A, Khullar D, Ho O, Olenski A, Blumenthal D. Sex differences in academic rank in U.S. medical schools in 2014. JAMA 2015;314(11):1149–58.
Jones RD, Griffith KA, Ubel PA, Stewart A, Jagsi R. A mixed-methods investigation of the motivations, goals, and aspirations of male and female academic faculty. Acad Med 2016;91(8):1089–97.
Kaplan S, Sullivan L, Dukes K, Phillips CF, Kelch RP, Schaller JG. Sex differences in academic advancement. Results of a national study of pediatricians. N Engl J Med 1996;335:1282–90.
Lobl MB, Grinnell M, Higgins S, Yost K, Grimes P, Wysong A. Representation of women as editors in dermatology journals: A comprehensive review. Int J Women Dermatol 2019.
Mayer A, Blair J, Ko MG, Hayes SN, Chang Y, Caubet S, et al. Gender distribution of U. S. medical school faculty by academic track type. Acad Med 2014;89(2):1–6.
Mishra S, Fegley BD, Diesner J, Torvik VI. Self-citation is the hallmark of productive authors, of any gender. PLoS One 2018;13(9) e0195773.
Monroe AK, Levine RB, Clark JM, Bickel J, MacDonald SM, Resar LM. Through a gender lens: a view of gender and leadership positions in a department of medicine. J Womens Health 2015;24(10):837–42.
Rayburn W. The obstetrician-gynecologist workforce in the United States: facts, figures, and implications. Am Coll Obstet Gynecol 2017.
Rynecki N, Krell E, Potter J, Ranpura A, Beebee K. How well represented are women orthopaedic residents on major orthopaedic editorial boards and publications? Clin Orthop Relat Res 2019 [Epub ahead of print].
Sadeghpour M, Bernstein I, Ko C, Jacobe H. Role of sex in academic dermatology: results from a national survey. JAMA Dermatol 2012;148(7):809–14.
Silver J, Poorman J, Reilly J. Assessment of women physicians among authors of perspective-type articles published in high-impact pediatric journals. JAMA Netw Open 2018;1(3) e180802.
Speck R, Sammel M, Toxel Cappola AR, Williams-Smith CT, Chittams J, et al. Factors impacting the departure rates of female and male junior medical school faculty: evidence from a longitudinal analysis. J Womens Health 2012;21(10):1059–65.
Tracy EE, Wiler JL, Holschen JC, Patel SS, Ligda KO. Topics to ponder: part-time practice and pay parity. Gend Med 2010;7:350–6.
Valantine H, Sandborg CI. Changing the culture of academic medicine to eliminate the gender leadership gap: 50/50 by 2020. Acad Med 2013;88(10):1411–3.
Walker LE, Sadosty AT, Colletti JE, Goyal DG, Sunga KL, Hayes SN. Gender distribution among American Board of Medical Specialties boards of directors. Mayo Clin Proc 2016;91(11):1590–3.
Wietsma AC. Barriers to success for female physicians in academic medicine. J Community Hosp Intern Med Perspect 2014;4(3):24665.