Interventional cardiology requires extensive training, has unpredictable and long work hours, is physically and mentally demanding, and requires cognitive, technical, and leadership skills. For those that follow the calling, the rewards are immeasurable, improving and saving lives. I do not often think of myself as a minority, but as a female interventional cardiologist, and one of the few women in a leadership position within the field, I am a minority. This position comes with great responsibility—to broadcast the female workforce short-age and highlight the positive impact that women have on our profession and patients.

The truth is in the numbers. Little progress has been made with respect to increasing representation of women in interventional cardiology in the past decade. The American Board of Internal Medicine tracks board certification and fellow workforce data annually. Although women still comprise about half of residents completing internal medicine, <40% pursue fellowship training. The number of women pursuing cardiology fellowship, the applicant pool for interventional, has been stagnant at 22% since 2007. During this time, however, several fields have had a marked increase in female fellows. In endocrinology, for example, 75% of fellows are women, and >50% of trainees in rheumatology, infectious disease, palliative care, and geriatrics are women. Among cardiology specialties, heart failure has the highest percentage of women at 35%.

At a glance, it appears that women are choosing specialties with more predictable schedules or that require more compassion, but this may also reflect the mindset of individuals that choose internal medicine. The primary message from these statistics is that we need to reach women at an earlier stage in life, as young as high school but no later than medical school, to expose them to cardiology. My story is similar to many I have heard from my interventional colleagues. I was destined for a surgical residency until one of my medical school, to expose them to cardiology. My story is similar to many I have heard from my interventional colleagues. I was destined for a surgical residency until one of my medical attendings directed me toward interventional cardiology.

So what are the statistics for interventional cardiology? The number of accredited positions for training in interventional cardiology has steadily increased from 169 in 2006 to 292 in 2014. Women have comprised 4% to 10% of fellows in that time period with no increase in the proportion of women since 2009. Doing the math, in 2014, there were 26 female trainees among the 143 US training programs. I am 1 of 6 female program directors and have first-hand experience with the difficulty in recruiting female fellows. At my own institution, I have served as a positive role model and repeatedly encouraged talented women to pursue interventional training to no avail. Every year I receive >130 applications for our 4 positions and, most years, the number of female applicants can be counted on one hand. Despite an effort to interview qualified female candidates, we have only trained 2 women in the past 5 years, or 10%. Most fellows, even those who derive great satisfaction from the cath laboratory, cite the night hours and work–life balance as reasons for not choosing intervention. A study of sex, role models, and specialty choices among graduates of US medical school found that in residencies where women were substantially under-represented, such as neurosurgery, orthopedics, and general surgery, there was no association between exposure to a female department chair or with the proportion of female full-time faculty and specialty choice. Rather, female students were more likely to enter programs with a higher proportion of female residents. This suggests that role models close in age are more relatable and that current female trainees and recent graduates should be engaged in the effort to attract more women into the field.

After interventional fellowship, differences exist in the practice patterns of women and men. As a high-volume operator at an academic medical center, I was initially surprised by the findings of an analysis from the National Cardiovascular Data Registry of percutaneous coronary intervention. Among =2.5 million percutaneous coronary interventions performed at 1431 hospitals between 2009 and 2013, only 4.5% of operators were women and they performed 3% of procedures. Reflecting back to the statistics in fellowship, the fact that only 36% of hospitals had at least 1 female operator is really not surprising. The study also found that female operators performed a lower median number of percutaneous coronary interventions per year, 48 compared with 69. This difference and the overall low procedural numbers for all operators require further assessment. Perhaps, the difference is because of the younger age of female operators influencing scheduled laboratory time or referrals, the type of practices women chose, less than full-time employment status or career interruptions, or the potential that percutaneous coronary interventions are being performed at Veterans Administration hospitals that are not captured in NCDR. Equally disturbing as the low procedural numbers is the fact that after adjustment for the amount and type of work performed, women in cardiology are compensated significantly less than men. Although...
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the lower pay may be indicative of unmeasured variables, we need to have transparency in the way in which individuals are compensated.

Although small numbers put women in cardiology at risk of isolation, there is strong comradery present. The American Heart Association and the American College of Cardiology have Women in Cardiology Sections that provide mentorship, networking, and leadership development for trainees and members with a broad range of clinical interests. They also have programs to encourage young women to consider a career in cardiology through mentoring programs. The American College of Cardiology Women in Cardiology professional life surveys, done in 1996 and again in 2006, have made important contributions to understanding the different factors affecting the careers of women and men in cardiology. The most recent survey underscores many issues facing women and that may decrease interest in our field (Table). On a positive note, the survey found that the majority of women and men were highly satisfied with their work and would recommend cardiology as a career choice.

The Women in Innovations (WIN) Committee of the Society of Coronary Angiography and Intervention has, in my opinion, been the greatest asset to female interventionalists and patients. The founding chair and co-chair, Drs Mehran and Chieffo, fostered a sense of belonging and collaboration that continues today. One of the great strengths of WIN is that it is a global community with involvement of interventional cardiologists from numerous countries. The group goes well beyond providing a forum for education and professional developed and tackles larger issues facing women, including the lack of sex-specific cardiovascular research. Several publications emphasize the commitment Society of Coronary Angiography and Intervention WIN has to raising awareness of sex issues affecting both cardiologists and women with cardiovascular disease. Through the leadership of WIN, a Gender Data Forum was held and an individual patient-level pooled data set from women in 26 randomized drug-eluting stent trials created, which has provided needed information on the safety and efficacy in women. Society of Coronary Angiography and Intervention also collaborated on WIN TAVI, a multicenter international registry investigating the safety and performance of contemporary transcatheter aortic valve implantation that seeks to explore female sex-specific factors not previously assessed in this population.

Table. Professional Life in Cardiology Survey Findings

<table>
<thead>
<tr>
<th>Women were less likely to be married or have children</th>
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<tr>
<td>Women rarely had spouses providing all the childcare</td>
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<tr>
<td>Women were more likely to state that parenting and family responsibilities had a negative impact on career advancement</td>
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<tr>
<td>Women were more likely to alter training or practice focus to reduce occupational radiation</td>
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<tr>
<td>Women were less satisfied with their financial compensation</td>
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<tr>
<td>Women were &gt;3 times as likely to experience discrimination because of sex or parenting responsibilities</td>
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</table>

Data derived from Poppas et al.

A recent article discussed strategies and methods for clinical scientists to study sex-specific cardiovascular health and disease in women. The authors voiced that underrepresentation of women in trials and registries and lack of adequately powered sex-specific analysis has resulted in disparities in all realms of cardiovascular care and outcomes. In addition, studies are lacking collection of female-specific variables such as reproductive history and psychosocial variables, which may be more important in women more than in men. Several solutions to the problem were proposed including incentivizing research in women and changing the drug and device development process. I believe that another key to reducing the knowledge gap in cardiovascular disease in women is to encourage more women to enter the field of cardiology and advocate for research in women by becoming an investigator or supporting investigation by encouraging female patients to participate in trials. I am proud of the efforts of individuals and the numerous societies that have introduced the Research for All Act to the House of Representatives. The bill, if passed, will ensure that research from the basic laboratory to clinical trials is sufficiently robust to inform results in both women and men.

In the 14 years since my interventional cardiology fellowship, I have been on a tremendously rewarding journey; one that I would do all over again if I had to choose. I have come to see that there is no stereotypical female interventional cardiologist. We are as skilled, committed, and diverse in interests as our male colleagues. Although there are still barriers to women choosing interventional cardiology, I am hopeful that changing times will bring more women into the field. Until then, I am certain that the small number of us currently practicing will continue to make a big impact.

Disclosures

None.

References


KEY WORDS: career choice ■ percutaneous coronary intervention ■ reward ■ women
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