Association of Women Surgeons: Clinical Science

Barriers to advancement in academic surgery: views of senior residents and early career faculty

Amalia Cochran, M.D.,*, William B. Elder, M.A., Marie Crandall, M.D., Karen Brasel, M.D., Tricia Hauschild, M.D., Leigh Neumayer, M.D.

aDepartment of Surgery, University of Utah, 30 North 1900 East, SOM 3B313, Salt Lake City, UT 84132, USA; bDepartment of Surgery, Northwestern University Feinberg School of Medicine, Chicago, IL, USA; cDepartment of Surgery, Medical College of Wisconsin, Milwaukee, WI, USA

KEYWORDS:
Career development; Academic surgery; Early career

Abstract

BACKGROUND: A significant faculty attrition rate exists in academic surgery. The authors hypothesized that senior residents and early-career faculty members have different perceptions of advancement barriers in academic surgery.

METHODS: A modified version of the Career Barriers Inventory–Revised was administered electronically to surgical residents and early-career surgical faculty members at 8 academic medical centers.

RESULTS: Residents identified a lack of mentorship as a career barrier about half as often as faculty members. Residents were twice as likely as faculty members to view childbearing as a career barrier.

CONCLUSIONS: Many early-career faculty members cite a lack of mentors as a limitation to their career development in academic surgery. Childbearing remains a complex perceived influence for female faculty members in particular. Female faculty members commonly perceive differential treatment and barriers on the basis of their sex. Faculty development programs should address both systemic and sex-specific obstacles if academic surgery is to remain a vibrant field.

The American Journal of Surgery (2013) 206, 661-666

© 2013 Elsevier Inc. All rights reserved.

The looming shortage of practicing surgeons places academic surgery under a greater threat than at any time in the past 100 years.1 Although many young surgeons embark upon careers in academic surgery, the attrition rate during any given 5-year period is nearly 35%, and younger faculty members are at higher risk for departure from academia because of dissatisfaction.2,3 Previous work has demonstrated that women at the assistant professor level were almost 6 times more likely than their male colleagues to intend to leave academia within 2 years.4,5 Those invested in the survival of academic surgery have the important task of identifying how to reconstruct systems and alter culture to overcome the issues that result in low entry rates and poor retention.

Barriers obviously exist that discourage residents from considering or entering careers in academic surgery.6 Among those who do choose to enter academic surgery, their barriers to retention have not been clearly identified. Therefore, the hypothesis of this study was that senior residents and early-career faculty members have different perceptions of barriers to careers in academic surgery.

The authors declare no conflicts of interest.

Portions of this work were presented at the 100th Clinical Congress of the American College of Surgeons, October 2, 2012, Chicago, Illinois.

* Corresponding author. Tel.: +1-801-581-7508; fax: +1-801-585-6005.

E-mail address: amalia.cochran@hsc.utah.edu

Manuscript received June 1, 2013; revised manuscript July 10, 2013

0002-9610/$ - see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.amjsurg.2013.07.003
Methods

Research design and participant selection

A single questionnaire was administered to study participants in this quantitative study. Eight academic medical centers were selected to maximize geographic and institutional diversity, and institutional review board approval or exemption was obtained at each participating site. Study subjects were contacted via e-mail at each site by a local site investigator (see Acknowledgments). This e-mail included a link inviting subjects to complete an online modified version of the Career Barriers Inventory–Revised (CBI-R) using SurveyMonkey. Data collected on other potential confounders included individual demographic factors (geographic region of employment, age, sex, self-identified ethnicity, marital and parenting status), academic track (for faculty members), and amount of medical school debt. The survey in total had the 58 questions from the CBI along with 6 demographic questions for residents and 7 demographic questions for faculty members.

Perception of barriers to entry or advancement is believed to impede career choice and career development. The CBI is a validated self-reporting instrument that examines perceived career barriers for high school students. The original CBI was modified to the CBI-R to reduce the tool’s length and improve the clarity of many items. The Appendix describes the 13 dimensions thought to affect career development as captured by the CBI-R, including examples of each type of barrier and sample questions for each. Three of the investigators (T.H., W.B.E., and A.C.) adapted CBI-R questions to make them semantically appropriate for senior residents or early-career surgical faculty members; for example, rather than beginning a series of questions with the stem, “In my future career, I will probably,” the revised stem was “In my career in academic surgery, I will probably” for residents and “In my career in academic surgery, I have” for faculty members. Responses on the CBI-R are scored using a 5-point, Likert-type scale to measure level of agreement with each item, with 1 indicating “strongly disagree” and 5 indicating “strongly agree.” The scoring system was not altered for this study, and the wording modifications did not alter the established CBI-R dimensions.

This study had two cohorts of participants at each of the 8 institutions. Fourth-year and 5th-year general surgery residents of both sexes constituted cohort 1. Cohort 2 consisted of early-career male and female junior faculty members. All 4th-year and 5th-year residents at each participating institution were invited to participate. Early-career faculty members included associate professors within 1 year of promotion to the associate professor rank, assistant professors, lecturers, and instructors. All female faculty members who met early-career criteria were invited to participate. Male faculty members were sampled using rank matching with their female colleagues and were invited in a 2:1 ratio of male to female faculty members to maximize variation. Purposive sampling of early-career faculty members, rather than faculty members at all levels, was intended to demonstrate the immediate relevance of perceived barriers early in academic surgical careers. A 2:1 ratio of male to female residents could not be achieved without excluding female residents; therefore, all senior residents of both genders at each participating site were included. Invitations to complete the survey were initially sent by each site coordinator, who were also asked by the investigators to reissue invitations to senior residents and participating faculty members approximately 2 weeks after the initial invitation. Participants were required to complete >50% of the CBI-R portion of the survey for inclusion in the analysis.

Data analysis

Stata version 11.1 (StataCorp LP, College Station, TX) was used for all data analysis. Fisher’s exact test was used for comparisons of proportions.

Results

Demographic data of participants

In total, 81 faculty members and 94 residents responded to the survey request. Respondents who completed >50% of the CBI-R questions and were included in the analysis consisted of 85 residents (44 women, 41 men) and 69 faculty members (26 women, 43 men). The usable response rate of invited participants was 53%, with a 74% response rate for residents and 37% for faculty members. The mean age of respondent residents was 35.6 years, and the mean age of faculty respondents was 44.1 ± 5.9 years. Distribution on the basis of geography and ethnicity is presented in Table 1. At the faculty level, 26 assistant professors and 17 associate professors were men, and 14 assistant professors and 11 associate professors were women. Faculty respondents self-identified as 41 clinical-track faculty members (29 men, 12 women), 23 tenure-track faculty members (12 men, 11 women), and 5 faculty members with “other” status (2 men, 3 women).

Marital status did not differ significantly between residents and faculty members (P = .22, chi-square test). Residents had significantly fewer children than did faculty members (median, 0 vs 2; P < .001, Wilcoxon’s rank-sum test), largely due to 50 residents’ (60%) reporting that they had no children. Of note, residents reported notably higher educational debt loads than did faculty surgeons (median, $100,000 to $149,999 vs <$50,000; P ≤ .001, Fisher’s exact test).

Career Barriers Inventory–Revised results

Comparison of faculty members’ and residents’ responses demonstrated disparities in the CBI-R dimensions
of conflict between children and career, difficulties with networking and socialization, and racial discrimination. Residents were more likely than faculty members to indicate that their desire to have children would represent a barrier to their advancement in academic surgery (28% vs 12%; \( P \leq .001 \), Fisher’s exact test). Networking difficulties as career barriers, specifically a lack of support from superiors (46% vs 22%; \( P = .03 \), Fisher’s exact test) and a lack of role models or mentors (46% vs 19%; \( P = .01 \), Fisher’s exact test), were identified by faculty members more often than residents. Finally, residents had significantly more confidence in their ability to overcome their ethnic backgrounds (83% vs 63%; \( P = .05 \), Fisher’s exact test) or people’s attitudes about their ethnic backgrounds (79% vs 55%; \( P = .03 \), Fisher’s exact test) as potential career barriers.

Several significant differences between female faculty members and residents were identified by gender subgroup analysis. Female faculty members and residents differed significantly on 3 of the 7 CBI-R items clustered with sex discrimination. Fewer than half of the female resident respondents (40.9%) expected to be treated differently in an academic surgical practice because of their sex, while more than two-thirds (76.9%) of early-career female faculty members indicated that they had experienced differential treatment on the basis of their sex (\( P < .05 \)). When asked more specifically about sex discrimination, only 18.2% of female residents expected this as an experience in academic surgery, while 50% of female early-career faculty members agreed or strongly agreed that they have experienced sex discrimination (\( P < .05 \)). Similarly, 13.6% of female residents believed that their gender would limit their career advancement, but 38.5% of female faculty members stated that gender is currently a barrier to their career advancement (\( P < .05 \)). Female faculty members and residents differed significantly on 1 of the 7 items on the “conflict between children and career” dimension, with female faculty members being significantly less likely than female residents to agree that their desire to have children represents a barrier to career advancement (31.2% vs 47.4%, \( P < .005 \)). Finally, far fewer female residents (15.9%) indicated that a lack of role models would be a barrier to their career advancement, as opposed to the 53.8% of female faculty members who indicated that this difficulty in networking is a barrier to their career advancement. This finding is consistent with our findings when all faculty members and residents are analyzed without gender subgrouping.

Male residents and faculty members differed on 1 of the 8 items designed to capture multiple role conflict. Although 39% of male residents strongly agreed or agreed that money problems would be a barrier to career advancement, only 14% of male faculty members believed that money problems are a barrier to their career advancement (\( P < .005 \)). The dramatic increase in agreement among male respondents that lack of role models would be or is a barrier to career advancement from training to early-career shows that this is an area of concern, although this item failed to achieve statistical significance (22% vs 41.9%, residents vs faculty members; \( P = \text{NS} \)). Male faculty members demonstrated a remarkable lack of self-efficacy compared with their male resident counterparts in response to an item stating, “In general, I think that I will be able to overcome any barriers that stand in the way of achieving my career goals.” Although 88.6% of male residents strongly agreed or agreed with this statement, only 65% of male faculty members strongly agreed or agreed with it (\( P < .05 \)). This stands in stark contrast to the female respondents to this statement, who showed only an incremental difference between residents (63.4%) and faculty members (62.5%) (\( P = \text{NS} \)).

### Comments

Our data suggest that absence of role models to guide one’s career may affect early-career faculty members more significantly than residents. Mentoring does take on a greater role with those in the age demographic of the respondents than it has historically, representative of a shift in generational priorities. Lack of role models appears to affect faculty members of both genders, though it achieved statistical significance only among female faculty respondents. For men, this lack of role models may be a consequence of changing social roles for men (priorities of baby boomers vs those of generation X), whereas for women, it is likely a result of the paucity of women in senior and leadership roles. Women tend to believe that advancement opportunities are less available to them in academic surgery, which has previously been attributed to inadequate mentoring. Schroen et al also showed that 75% of women in their survey sample were considering leaving academia described a lack of mentoring as a major impetus toward their intended attrition. Early-career women in academic surgery often describe a great sense of isolation that may interact with climate and culture issues within a department of surgery. Finally, it is unclear

### Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Residents</th>
<th></th>
<th>Faculty members</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Region</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Central</td>
<td>13</td>
<td>12</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>West</td>
<td>24</td>
<td>25</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian/White</td>
<td>37</td>
<td>33</td>
<td>18</td>
<td>31</td>
</tr>
<tr>
<td>African American</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Asian</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
if senior residents and faculty members have the same understanding of the importance of sponsors and mentors in career advancement, resulting in a question about the conceptual basis for comparing residents’ and faculty members’ perceptions of the availability of mentors.

Networking is an important component of navigating the retention, promotion, and tenure process as junior faculty members learn the importance of norms and expectations within their departments and institutions; the CBI-R categorizes a lack of role models as “difficulty in networking,” demonstrating the centrality of this concern in faculty attrition. Although most residents have assigned faculty mentors in addition to informal mentors and role models whom they acquire during their training, structured programs for junior faculty members that provide them with mentors remain a rare phenomenon, and the nature of academic practice limits access to senior faculty members who may provide role models. Our findings reconfirm that targeted career development programs that include information about retention, promotion, and tenure are profoundly needed for both genders in academic surgery.5,12,13 Furthermore, deliberate development of both horizontal and vertical networking opportunities for those in early stages of academic surgical careers would benefit junior faculty members.

The findings of this study highlight the increased perception of sex discrimination by female early-career faculty members versus female residents. This difference is unlikely a result of generational change, as there was only a 9-year age difference between residents and faculty members. Residents represented in this study may not yet have encountered professional experiences that facilitate increased awareness of gender-based discrimination. Events in academia may also shift the attention of female faculty members toward unspoken norms surrounding gender barriers in academic surgical culture. Or, perhaps to consider these differences more optimistically, the reported differences in sex discrimination experiences may be reflective of actual cultural improvement that has lessened those sorts of experiences for residents.

Bearing and raising children remain complex topics. As residents, women may be concerned that their desire to have children represents a barrier to career advancement, which may explain why more female surgeons are only now having children during training, and the majority of women delay childbearing until they are in clinical practice.4,14,15 After residency, women who decide to go into academic surgery may become less interested in having children or forgo these plans because of the challenges of academic surgical work life or advanced maternal age.14 However, after their entrance into academic surgery, not all female faculty members see having and raising children as a barrier to their career progress. Although our data demonstrate this paradigm shift for female faculty members vis-à-vis expectations of childbearing, our data do not provide an explanation for this change.

Although this study’s findings point to a number of challenges women face in academic surgery, the results also suggest that male faculty members may have unique difficulties of their own. Nearly two-thirds of women in both residency and early-career faculty positions responded similarly regarding their confidence to overcome barriers that stand in the way of achieving career goals. However, there was a notable gap between male residents’ and male faculty members’ confidence in their ability to overcome all barriers, with a decline from 88.6% of residents to 65% of faculty members. This suggests that men transitioning into academic positions may enter a period during which they lose self-efficacy. Academic surgery may present new challenges inherent in the promotion and tenure process that men did not face in training and were not adequately prepared for, causing heightened awareness of conflict and strain. Struggles faced by junior faculty members may include identification of appropriate mentorship, the development of a viable clinical practice, achievement in publication and funding, and compartmentalization of work and home lives. During training, women may have already developed skills for managing major competing priorities dictated by their professional and personal responsibilities and do not experience notable change in the struggles they face in their academic careers. It is also possible that the increasingly active roles some men play at home may be tolerated during residency but viewed negatively once they have achieved faculty positions in academic medicine.16 There may be a lack of opportunity for men to express their struggles balancing professional and family roles with colleagues because of a paucity of mentors willing to provide insight in these areas. Future studies might consider how male surgery faculty members balance clinical, academic, and personal responsibilities, how this may differ from their time in residency, and if and how balancing differs from that of their female colleagues. In addition, any confounding role played by racial and ethnic identity cannot be elucidated with the limited number of minority respondents to our survey. However, it must be recognized that minority status may also play a role in professional identity development, self-efficacy, and perceived career barriers, particularly in light of the notable number of both residents and faculty members who believed their ethnicity and perceptions thereof to be potential barriers to their career advancement in academic surgery.

This project did have limitations. The greatest methodologic limitation lies in the use of a modified version of the CBI-R; while the CBI-R was designed to capture perceived career barriers in high school students, no analogous tool has been developed or validated for those enrolled in professional studies or already in their careers. The relatively low response rate from early-career faculty members provides another limitation and may represent a response bias. This poor response rate is further complicated by only one-third of early-career faculty members’ reporting that they were on the tenure track. The matching of male and female faculty members solely on the basis of academic rank may have resulted in an unanticipated selection bias. The 8 institutions selected as a convenience
sample for participation may also result in a selection bias, although they were selected with consideration of maximizing diversity. However, climate and culture at these institutions were not considered as a selection criterion, and this may prove to be a hidden source of response bias. Exclusion of those who left academia during their early careers also represents a source of selection bias, as those individuals may have encountered the most pronounced obstacles that simply could not be overcome. Study of the population that left academic surgery represents an important future direction for research, as does the use of qualitative research to better describe the barriers to academic surgical careers.

Perceptions of sex discrimination can be subjective and may result in a reporting bias by respondents; the CBI-R is not designed to capture statutory harassment or discrimination. Another issue relates to the subjective nature of defining success, as this is something that is quite personal in nature and will vary widely among respondents. Finally, our findings may not generalize to other medical specialties, or even other areas of surgery, because we deliberately chose to limit the survey to those either training or trained through the general surgery pathway.

Our findings demonstrate that a core change toward improving recruitment and retention in academic surgery would include implementation of faculty development programs to overcome difficulties in networking and the acknowledged dearth of role models. For example, assistant and associate faculty members would benefit from both protected sabbatical time to write grants and applications, combined with mentorship programs to assist with grant and publication preparation. The recommendations generated by the Association of American Medical Colleges Increasing Women Leaders Project, although targeted at increasing gender diversity in academic medicine, are recommendations that remain relevant a decade later. Although some of the barriers to career advancement in academic surgery are sex specific, many of the interventions that would improve climate and culture would provide systemic benefit. In addition, the development of more robust descriptions of barriers and their impacts, as well as how they have been overcome, would help in the design of support programs for early-career faculty members. Maintenance of academic surgery as a vital, vibrant field mandates that we identify and address the challenges to entry and retention of early-career faculty members of both sexes, allowing closure of the attrition gap in academic surgery.

Acknowledgments

We thank the following collaborators, who helped with local institutional review board approval and participant recruitment at their institutions: P. J. Schenarts (East Carolina University at the time of the study), Rachel Danczyk and Susan Orloff (Oregon Health Sciences University), Hilary Sanfey (Southern Illinois University), Wendy Grant (University of Nebraska), and Colleen Brophy and Kevin Sexton (Vanderbilt University).

References

## Appendix

### Dimensions of the career barriers inventory–revised with examples

<table>
<thead>
<tr>
<th>Dimension (sample question)</th>
<th>Examples of barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex discrimination (&quot;In an academic surgical practice I expect to experience/have experienced discrimination based upon my sex&quot;)</td>
<td>Pay equity, Sexual harassment, Delays in promotion, Self-esteem issues</td>
</tr>
<tr>
<td>Lack of confidence</td>
<td>Not feeling confident in job ability</td>
</tr>
<tr>
<td>Multiple-role conflict (&quot;Relationship concerns will be/currently are a barrier to my career advancement&quot;)</td>
<td>Balancing work and nonwork responsibilities, Stress in one role affecting performance in another, Inadequate child care resources</td>
</tr>
<tr>
<td>Conflict between children and career demands (&quot;My desire to have children will be/currently is a barrier to my career advancement&quot;)</td>
<td>Inflexible training schedules, Scheduling meetings before and after “regular” hours</td>
</tr>
<tr>
<td>Racial discrimination (&quot;In an academic surgical practice, I have/I will have experienced negative comments about my ethnic/racial background&quot;)</td>
<td>Pay equity, Racial harassment, Delays in promotion, Sense of failed preparation for all aspects of a job</td>
</tr>
<tr>
<td>Inadequate preparation</td>
<td>Negative opinions of significant other and family, Uncertainty of individual and institutional goals and values, Poor decision-making skills</td>
</tr>
<tr>
<td>Disapproval by significant other</td>
<td></td>
</tr>
<tr>
<td>Decision-making difficulties</td>
<td></td>
</tr>
<tr>
<td>Dissatisfaction with career</td>
<td>Disappointed in personal progress or opportunities available, Boredom with career</td>
</tr>
<tr>
<td>Discouraged from choosing nontraditional careers</td>
<td>Negative opinions of peers, potential mentors, Limiting personal beliefs and ideas</td>
</tr>
<tr>
<td>Disability/health concerns</td>
<td>Disability or health condition limits career options, Disability or health condition affects job performance, Discrimination for disability or health condition</td>
</tr>
<tr>
<td>Job market constraints</td>
<td>Tight economy with few opportunities, Limited options within a specific field</td>
</tr>
<tr>
<td>Difficulties with networking/socialization (&quot;Lack of role models or mentors will be/is currently a barrier to my career advancement&quot;)</td>
<td>No role models or mentors available, No direct access to the right people</td>
</tr>
</tbody>
</table>