Mentorship Experiences of Early-Career Academic Radiation Oncologists in North America

Nafisha Lalani, MD, FRCPC, * Kent A. Griffith, MS,† Rochelle D. Jones, MS,† Daniel E. Spratt, MD,‡ Jennifer Croke, MD, FRCPC,* and Reshma Jagsi, MD, DPhil†,‡

*Princess Margaret Cancer Centre, University of Toronto, Toronto, Ontario, Canada; †Center for Bioethics and Social Science in Medicine, University of Michigan, Ann Arbor, Michigan; and ‡Department of Radiation Oncology, University of Michigan, Ann Arbor, Michigan

Received Dec 1, 2017. Accepted for publication Mar 11, 2018.

Summary
Given concerns about gender equity and career outcomes of academic radiation oncologists, we sought to gather evidence regarding mentorship experiences. We surveyed early-career academic radiation oncologists within 5 years of board certification, using a pretested questionnaire. Our results suggest a need for increased facilitation of mentorship of all junior faculty through deliberate, structured programs, and further study is required to elucidate the mechanism driving gender imbalance in laboratory and translational research participation.

Purpose: Given concerns about attrition and career outcomes of academic radiation oncologists, we sought to gather empirical evidence regarding mentorship experiences.

Methods and Materials: We surveyed academic radiation oncologists in the United States and Canada who were within 5 years of board certification, using a pretested questionnaire that included 14 questions evaluating the following aspects of mentorship: relationship development, peer mentorship, satisfaction with mentorship, sponsorship, relationship nature, informal interactions, mentoring roles, presence of a primary mentor, and primary mentor characteristics. We described responses and evaluated associations with gender in separate multivariable regression models that adjusted for years in practice, nature of research, possession of higher degrees, and race.

Results: Of 347 faculty surveyed, 221 responded (64% response rate); 66% of respondents were men. Over half of respondents indicated difficulty in identifying role models (56%, n = 124); just under half reported ease in developing mentoring relationships (49%, n = 108). Peer-mentor use was commonly reported (62%, n = 138). Most respondents (66%, n = 145) spent ≤1 hour per month meeting with mentors. Only 51% (n = 112) reported having a primary mentor. Just under half of all respondents reported being very or somewhat satisfied with their mentorship experiences (49%, n = 108).

Conclusions: These findings suggest a need for academic radiation oncology departments to facilitate mentorship of all junior faculty through deliberate, structured programs, with training of mentors and mentees alike. It is heartening that substantial rates of sponsorship and peer-mentorship use were reported, which may serve as the grounding for further initiatives. © 2018 Elsevier Inc. All rights reserved.

Reprint requests to: Reshma Jagsi, MD, DPhil, Department of Radiation Oncology, University of Michigan, 1500 E Medical Center Dr, Ann Arbor, MI 48109-5010. Tel: (734) 936-7810; E-mail: rjagsi@med.umich.edu

Conflict of interest: none.

0360-3016/$ - see front matter © 2018 Elsevier Inc. All rights reserved.
https://doi.org/10.1016/j.ijrobp.2018.03.035
Introduction

Prior studies have suggested a disquieting attrition of physicians from the academic medical workforce (1, 2). Understanding mentorship experiences of junior academic faculty may be important to help design interventions to mitigate this issue, as there is a growing body of evidence suggesting an association between mentorship, career satisfaction, and attrition (3, 4). A more thorough understanding of mentorship experiences is also important to allow for facilitation and optimization of mentoring relationships.

Despite growing awareness of this issue, there is a paucity of data regarding the mentoring experiences of academic physicians. Radiation oncology (RO) serves as an optimal field for study because this specialty currently attracts many aspiring physician-researchers; it was recently identified as the medical specialty with the highest proportion of MD or PhD candidates in the US residency match.

Currently, little is known about the nature of mentoring experiences of junior RO faculty as they enter academic RO or their experiences therein. Therefore, we sought to gather empirical evidence regarding mentoring experiences, both to serve as benchmarks and to help target potential interventions. In addition, given the continuing dearth of women at all levels in the field of RO (5-7), we conducted gender comparisons to provide additional insights on the role of gender in mentorship experiences.

Methods and Materials

Participants

In February 2016, we conducted a postal survey of junior RO faculty of the member institutions of the Society of Chairs of Academic Radiation Oncology Programs and all university-affiliated Canadian institutions. Institutional websites were reviewed to identify faculty physicians who had received national board certification within 5 years from initiation of the study. After ethical approval by the University of Michigan institutional review board, we conducted comprehensive Internet searches and telephone calls to determine current mailing addresses. A cover letter, survey with unique tracking identifier, and $20 cash incentive were mailed to potential study participants in February 2016. Individuals who did not respond within 4 months received a mail reminder. A subsequent E-mail reminder was sent to individuals who did not respond after 6 months from the date of the initial survey mailing.

Questionnaire development and measures

The study questionnaire was developed using a standard iterative design process after review of the relevant literature and consideration of other instruments used to assess mentor relationships (8, 9). We included a number of measures previously subjected to intensive cognitive pretesting in our prior work; cognitive pretesting serves to identify problems with the survey questions that could compromise the validity of the results (eg, complicated instructions, vague wording, or inappropriate assumptions). We also piloted the entire instrument with a small number of RO faculty and modified the survey questions based on their feedback.

The final instrument included 7 sections: job and education information, time allocation, career satisfaction and work environment, mentoring, family composition, professional activity, and demographic characteristics. Gender was self-reported. The mentoring section consisted of 14 questions and was the focus of the present analysis.

Development of mentoring relationships

Two questions addressed the ease with which respondents identified role models and developed mentoring relationships: (1) “How easy has it been for you to identify someone whose career could serve as a model for your own?” and (2) “How easy has it been for you to develop a relationship with a mentor?” We dichotomized the response categories (“easy” or “very easy” vs “difficult” or “very difficult”) for analysis.

Peer mentorship

Peer-mentorship use was assessed using a 4-point scale, dichotomized for analysis (“not at all” or “a little bit” vs “quite a bit” or “very much”).

Satisfaction

We measured satisfaction with mentoring with 5-point responses, dichotomized for analysis (“very dissatisfied” or “somewhat dissatisfied” vs “neutral,” “somewhat satisfied,” or “very satisfied”).

Sponsorship

As in prior work (10), we asked respondents to indicate whether interactions with their mentors had led to invitations to (1) serve as an oral discussant or panelist at a national meeting, (2) write an editorial, (3) serve on an editorial board, or (4) serve on a national committee. We created a single composite binary measure of sponsorship defined as reporting at least 1 of these experiences.

Communication patterns and nature of mentoring relationships

The questionnaire asked respondents to describe who usually initiated mentor-mentee meetings using a 5-point scale analyzed as 3 categories (“always me” or “mostly me”; “half and half”; and “mostly mentor” or “always mentor”). Time spent in one-on-one meetings with mentors was assessed as hours per month (analyzed as a continuous variable). We also asked how often the respondents communicated in person, via telephone, or via E-mail with
their mentors (dichotomized for analysis as “at least once weekly” vs “less often”).

**Socialization outside of work**

Respondents were asked to agree if they frequently (1) “socialized with their mentors outside of work” or (2) “got together informally after work by themselves” using a 7-point scale based on prior work (9). This was dichotomized for analysis by gender (disagreeing versus neutral or agreeing).

**Mentoring roles**

We measured the extent to which respondents received certain types of mentoring using items developed in prior work (8), using the question stem “Thinking about all of your mentors, how much have your mentors...,” followed by a table listing the following behaviors: (1) served as role models; (2) promoted your career through networking; (3) advised about preparation for advancement (e.g., promotion or leadership positions); (4) advised about getting your work published; (5) advised about department or division politics; (6) advised about obtaining the resources you need; (7) advocated for you; (8) advised about balancing work and family; (9) taught you knowledge and skills; and (10) modeled professional and ethical behavior. We dichotomized the 4-point response scale (“not at all” or “a little bit” vs “quite a bit” or “a lot”).

**Primary mentor**

The presence of a primary mentor was assessed (binary), as was the duration of the primary mentor relationship (in years) (continuous). By use of items from prior research (8), respondents rated the extent to which their primary mentor was (1) faultfinding or judgmental, (2) committed to mentoring, (3) exploitative, (4) patient, (5) overprotective, (6) controlling, (7) available and accessible, (8) manipulative, (9) an important contributor to research in the field, and (10) well connected to others of importance in the field. We dichotomized the responses to each item (“some,” “quite a bit,” or “a lot” vs “a little” or “not at all”) and created 2 scales, mentor behavior (from the first 8 characteristics) and mentor prestige (from the final 2 characteristics) to summarize the 2 latent constructs present (8).

We asked respondents to indicate whether their primary mentor was (1) employed at their home institution, (2) a radiation oncologist, (3) an expert in their area of interest, (4) the same gender as the respondent, and (5) the same race or ethnicity as the respondent.

**Data analysis**

Descriptive statistics were used to characterize the study population, with comparisons by gender using either the χ² or Fisher exact test for categorical variables and the t test for continuous variables. We then described mentorship experiences and compared by gender in separate multivariable regression models with gender as the primary independent variable of interest and each of the following as the dependent variable: ease of finding a mentor, ease of developing a mentor relationship, use of peer mentorship, mentorship satisfaction, sponsorship, initiation of mentor interactions, frequency of communication, time spent meeting with mentors, informal interactions, extent of mentoring in various roles, presence of a primary mentor, duration of primary mentoring relationship, and characteristics of the primary mentor. Model covariates were years in practice, nature of research, possession of higher degrees, and race. Linear regression was used for continuous dependent variables (time spent meeting, duration of relationship, and behavior and prestige scales); logistic regression was used for the other dependent variables.

For statistical inference, we considered test statistics with $P \leq .05$ to be significant. We performed all analyses using the SAS System (version 9.4; SAS Institute, Cary, NC).

**Results**

**Respondent characteristics**

We identified and surveyed 347 potential participants, of whom 221 responded (64% response rate). The mean practice length within the cohort was 3.3 years (range, 0.4-6.0 years). Most respondents (n = 189, 86%) held the academic rank of assistant professor. In 56% of respondents (n = 123), an MD (or equivalent) was held without an additional degree, while 29% (n = 63) held an MD (or equivalent) and PhD with or without any additional degrees and 16% (n = 35) held an MD (or equivalent) plus another non-PhD advanced degree (or degrees). Prior faculty positions were held by 9% of respondents (n = 20). RO fellowship training had been pursued by 18% of respondents (n = 40). Areas of practice (which total >100% because some individuals focused on >1 area), in decreasing order of frequency, were breast (n = 67, 30%), lung (n = 58, 26%), head and neck (n = 50, 23%), gastrointestinal (n = 49, 22%), genitourinary (n = 47, 21%), central nervous system (n = 46, 21%), cutaneous (n = 34, 15%), gynecologic (n = 31, 14%), lymphoma (n = 29, 13%), palliative care (n = 29, 13%), general RO (n = 24, 11%), sarcoma (n = 21, 10%), and pediatrics (n = 17, 8%). Most respondents were involved in clinical research (n = 191, 86%).

Characteristics of respondents by gender are shown in Table 1; 34% of respondents were women. Female respondents were significantly more likely to treat breast cancer ($P < .001$), less likely to treat genitourinary cancer ($P < .001$), and less likely to participate in laboratory ($P = .032$) or translational research ($P = .003$) than men.

**Development of mentoring relationships**

When asked about the ease with which respondents identified role models (Fig. 1), the most common response
was “difficult” or “very difficult” (n = 124, 56%; no significant difference by gender, P = .99). When asked about the ease with which respondents developed mentoring relationships, about half of the cohort answered “easy” or “very easy” (n = 108, 49%), with no significant difference by gender (P = .89).

**Frequency of peer-mentorship use**

The majority of respondents reported “quite a bit” or “very much” when asked to rate the frequency of peer-mentor use (n = 138, 62%). Women reported higher use of peer mentors, but the difference was not statistically significant (women: n = 52, 69%; men: n = 86, 59%; P = .12).

**Sponsorship**

We measured the potential impact of mentor interactions on receipt of invitations for academic opportunities. As shown in Figure 2, the majority of respondents indicated having received 1 or more invitations (overall: n = 135, 61%; no significant gender difference, P = .67).

**Communication patterns and nature of mentoring relationships**

When asked who usually initiated mentor-mentee meetings, the majority of respondents reported “always me” or “mostly me” (n = 114, 52%), followed by “half and half”
(n = 68, 31%), with no difference by gender (P = .45). The time spent in one-on-one meetings with mentors was ≤1 hour per month for the majority (n = 145, 66%), and 22% reported no one-on-one meeting time. The majority indicated that they communicated in person, via telephone, or via E-mail with their mentors less than once a week (n = 130, 59%), again with no difference by gender (P = .58).

**Informal interactions**

Most respondents reported that they did not frequently socialize with mentors outside of work (overall: n = 147, 67%; women: n = 48, 64%; men: n = 99, 68%; P = .91). Most respondents also reported that they did not get together informally after work by themselves with their mentors (overall: n = 156, 71%; women: n = 53, 71%; men: n = 102, 71%; P = .61).

**Extent to which mentees perceived their mentors to have performed potential roles**

Figure 3 shows the roles performed by mentors by respondent gender. Most respondents reported that their mentors had served as role models (n = 159, 72%), promoted their careers through networking (n = 108, 49%), advised about getting work published (n = 112, 51%), advocated for them (n = 145, 66%), and taught them knowledge and skills (n = 147, 67%); none of these varied significantly by gender. Female respondents were more likely to report that their mentors modeled professional and ethical behavior (overall: n = 159, 72%; women: n = 61, 81%; men: n = 98, 67%; P = .007).

Less than half of respondents reported that their mentors had advised about preparation for advancement (n = 99, 45%), department or division politics (n = 102, 46%), obtaining resources (n = 91, 41%), or balancing work and

---

**Fig. 1.** Comparison of development of mentoring relationship by gender. The proportion of respondents who reported difficulty in finding a mentor and building a mentor relationship is illustrated by gender. P values are given for differences by gender in multivariable models that adjusted for years in practice, nature of research, possession of higher degrees, and race. The top line in each category represents male respondents, while the bottom line represents female respondents.

**Fig. 2.** Comparison of sponsorship opportunities by gender. The extent to which respondents felt that they had received invitations for academic opportunities based on interactions with their mentors is illustrated. The top line in each category represents male respondents, while the bottom line represents female respondents.
family (n = 62, 28%), with no significant differences by gender.

Primary mentor characteristics

Just over half of all respondents indicated the presence of a primary mentor (n = 112, 51%), which did not differ significantly by gender (P = .70). The mean length of the primary mentoring relationship was 4.9 years overall (and again did not differ by gender).

Figure 4 shows respondents’ ratings of primary mentors’ negative and positive mentoring behaviors. When these behaviors were scaled together, there were no significant differences by gender of respondent (mentor behavior scale, 0.55 [SD, 2.97; range, −9 to 7] for women and 0.03 [SD, 3.19; range, −9 to 6] for men; P = .45). However, for the mentor prestige scale, there was a trend for women to perceive higher prestige for their primary mentors (2.5 [SD, 2.28; range, 0-8] for women and 1.38 [SD, 1.94; range, 0-8] for men; P = .059).

As shown in Figure 5, about half of all respondents with primary mentors indicated that the mentor was of the same race (overall: 51%, n = 57; women: 53%, n = 20; men: 50%, n = 37; P = .35). Men were more likely to report that the mentor was the same gender (overall: 73%, n = 82; women: 34%, n = 13; men: 93%, n = 69; P < .001). Most respondents reported that the mentor was an expert in their area of interest (overall: 73%, n = 82; women: 61%, n = 23; men: 80%, n = 59; P = .14), a radiation oncologist (overall: 75%, n = 84; women: 84%, n = 32; men: 70%, n = 52; P = .94), and employed at their home institution (overall: 86%, n = 96; women: 89%, n = 34; men: 84%, n = 62; P = .78).

Satisfaction

Slightly less than half of respondents reported that they were “somewhat satisfied” or “very satisfied” (n = 108, 49%) with mentorship overall and for each gender separately (P = .99).

Discussion

To our knowledge, this study constitutes the most comprehensive evaluation of the mentoring experiences of junior RO faculty to date. In this cross-sectional analysis, we found that a substantial proportion of respondents faced challenges in finding and developing relationships with mentors, and nearly half of this academic junior faculty cohort who responded did not have a primary mentor. Frequency of communication with mentors was limited, with the majority communicating less than once a week with mentors in any form, and most spending ≤1 hour per month meeting with mentors. Furthermore, less than half of respondents reported satisfaction with their mentoring experiences. These findings suggest that dedicated attention to improving the development of mentoring relationships and standardizing expectations regarding communication may be useful within the field of academic RO, specifically targeting junior faculty.

These findings complement the Radiation Oncology Academic Development and Mentorship Assessment Project,

Fig. 3. Comparison of mentoring roles by gender. The extent to which respondents felt that they had received various forms of mentoring is illustrated by gender. P values are given for differences by gender in multivariable models that adjusted for years in practice, nature of research, possession of higher degrees, and race. The top line in each category represents male respondents, while the bottom line represents female respondents.
which evaluated mentorship experiences of RO faculty at various levels of seniority (11). That study found that approximately 60% of faculty had mentors. Our finding of lower rates of mentorship in a cohort of junior faculty suggests the particular importance of designing interventions to improve the mentorship of junior RO faculty.

Heartening findings in this study include the observation of high rates of peer mentorship. Peer-mentor relationships often occur between individuals of similar academic rank or position and have been found to improve collaboration and team building (12). A previously conducted intervention involving 104 junior academic faculty found that the development of a peer-mentorship program led to an increase in self-reported knowledge, skills, and attitudes in the areas of professional development and scholarship (12). In addition, this previously conducted initiative resulted in increased interconnectedness among study participants. A separate initiative designed by individuals at East Carolina University described a collaborative mentorship program using a self-directed, self-empowering, experiential approach to the process of faculty development (13). The success of this program was thought to be augmented by initial group sessions that focused on value clarification, goal setting, self-empowerment, and team building, which then facilitated collaborative learning processes that characterized the remainder of the program. Participants in the initiative found this to be a valuable means of personal growth and professional development (13). The results of our analysis suggest that peer-mentor relationships already exist frequently within RO, and they might be a natural target for more structured programming and support.

**Fig. 4.** Comparison of primary mentor characteristics by mentee gender among the 112 respondents (51%) who reported having a primary mentor. The top line in each category represents male respondents, while the bottom line represents female respondents.

**Fig. 5.** Comparison of primary mentor demographic characteristics by gender among the 112 respondents (51%) who reported having a primary mentor. The top line in each category represents male respondents, while the bottom line represents female respondents.
Also heartening is that the majority of these early-career faculty had already benefited from sponsorship in their careers. The small size of the field and the structure of training with close apprenticeship-type pairings of attending physicians may foster this critically important activity, in which a more seasoned faculty member makes opportunities available to promising young individuals.

Together, these findings provide important insights regarding the experiences of junior academic radiation oncologists and should have considerable relevance to those seeking to optimize mentorship to promote the retention and success of faculty in the field of RO. DeCastro et al (14) have previously articulated the value of moving away from hierarchical, dyadic mentor relationships toward mentor networks in academic medicine. This expanded approach to mentorship has been found to be beneficial, specifically in academic medicine (15). One example of this approach is the peer-onsite-distance model described by Lewellen-Williams et al (15), which provides a multilevel mentorship structure involving peer mentors, onsite mentors, and distance mentors working together to facilitate a series of content and interaction skills that have been previously defined in the literature as valuable for career development. By extrapolation from these studies, a useful approach to improve mentorship in RO might include interventions that facilitate similarly structured mentor networks. Such initiatives should include consolidation and support of existing relationships, identification of at least some same-gender role models, standardization of expectations, and facilitation of regular communication between mentors and mentees.

It is reassuring that we observed few gender differences in mentoring experiences, but women were far less likely to have a same-gender mentor than men. This finding is in keeping with the known paucity of senior female academic faculty in RO, which may lead to a lack of availability of female mentors. In a survey of 558 female academic faculty, Levinson et al (16) described the value of female mentors in providing personal guidance and support, in addition to professional advice, to women pursuing academic careers. They also found that the presence of a female role model was significantly associated with career satisfaction. Our findings underscore the need to actively increase the number of female faculty to act as role models and mentors to junior faculty.

We find it noteworthy that there were certain strong gender differences in our sample both in disease sites treated and in type of research. Women in our study were far less likely to participate in translational or laboratory-based research than men. Women also reported lower rates of mentor relationships with specialties outside of RO, which may be particularly important to facilitate success in the realm of basic science research. Further study is required to better understand how this gender imbalance in the setting of RO faculty may affect the few women who are pursuing such careers. Effort is required to identify avenues of support to retain existing female laboratory and translational research investigators while also encouraging the entry of more women into these positions.

We observed strong gender differences not only in the pursuit of laboratory or translational research but also in disease sites treated. For example, remarkably few women in our sample reported treating genitourinary cancers, and women were also less likely than men to treat lung cancer. The nearly all-male composition of academic physicians focused on certain disease sites may pose particular challenges for the few women who do pursue these areas, as women are unlikely to have visible role models, even among their peers, and they may feel excluded by all-male networking outings in venues such as professional society meetings. These social activities have been shown to be important in building trust and gaining sponsorship opportunities; thus exclusion from such events may have negative career impacts (17). It is reassuring that our study did not demonstrate gender differences in the likelihood of getting together informally with one’s mentor outside of work. Furthermore, the rates of socialization outside of work were low, regardless of gender, suggesting a potential movement away from this avenue of networking that may reflect a generational shift in priorities or behavior. Nevertheless, senior investigators in our field should consider whether it is appropriate for them to encourage single-gender socializing in settings such as national conferences, which may have an adverse impact on those who are not part of the majority gender in that particular field.

The strengths of this analysis include the diverse sample of junior RO faculty, high response rate, and detailed assessment of experiences. One limitation of our study is that we focused specifically on the field of RO, which may limit generalizability of these experiences to other medical specialties. Furthermore, as in any survey study, those who did respond may differ meaningfully from the overall pool of junior faculty in RO; although this concern is alleviated to some extent by the substantial response rate, it is important to exercise caution when generalizing the results to faculty whose pursuits differ substantially from the distribution described in Table 1, reporting the characteristics of our responding sample. Our findings may be influenced by recall or reporting bias, although care was taken to draw on previously validated questions and to pretest the instrument used. Finally, this cross-sectional analysis provides only a snapshot in time of current perceptions regarding dynamic mentorship experiences. We plan subsequent surveys to allow for longitudinal assessments within this cohort, in an attempt to provide a more accurate assessment of overall experiences, as well as the relationship between specific experiences documented in this survey and longer-term career outcomes.

In summary, this study illuminates the need for the facilitation of mentor relationships in academic RO. Attention to emerging insights about the utility of mentor
networks and other ways to leverage support may be important to improve the experiences of junior RO faculty. Although it is heartening to observe a lack of major gender differences in mentorship experiences at the level of junior faculty, the observation of lower rates of participation of female radiation oncologists in the realms of laboratory and translational research, as well as in certain disease sites, suggests that attention to gender in the mentorship of more junior trainees in these areas may be particularly important. Further study is required to continue to promote the success of all promising young physicians entering our field. Understanding the patterns of mentorship within our specialty is important to allow those charged with faculty development to benchmark practices and experiences at their own institutions and identify areas for improvement.

References