ORIGINAL ARTICLE

Radiology Mentoring Program for Early Career Faculty—Implementation and Outcomes

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Abstract

Objective: To implement a mentoring program for early career faculty in an academic radiology department and to assess its impact on career development.

Methods: A formal departmental mentoring program for early career faculty (instructors) who were paired with senior radiologists outside of their division was implemented. The program provided structured one-on-one mentoring, creation of a mentoring network, and opportunities for peer mentoring. A survey was conducted before and 1 year after initiation of the program. Historical data on promotion over 5 years before the implementation of the program was used to determine the impact on the rate of promotion. The study was exempt from institutional review board approval.

Results: Before and 1 year after implementation of the mentoring program, 57% versus 86% of instructors were satisfied with their mentor ($P = .04$); 43% versus 90% felt that by encouraging mentorship, the department valued their professional development ($P = .001$); 38% versus 86% felt that the department created an environment that promoted feedback and sharing of information ($P = .002$); and 43% versus 76% felt that faculty strove to support each other ($P = .03$). Since implementation of the program, 43% of instructors received grant funding, 50% received other awards, and 10 instructors were promoted to assistant professor, compared with an average of 4.2/y over the past 5 years. Of those, three were underrepresented minorities in medicine versus none in the previous 5 years.

Conclusions: A mentoring program helped to advance the careers of early career and minority radiology faculty and helped create an atmosphere of more openness and support in the department.

Key Words: Academic promotion, academic radiology, burnout, career development, mentoring

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INTRODUCTION

Mentorship plays a critical role in the success of academic radiologists. Studies have shown that faculty with mentors have better career opportunities, are promoted quicker, publish more papers, receive more research grants, and have lower rates of burnout and greater career satisfaction [1-4].

Although most departments have incorporated formal mentoring programs for radiology residents [4-8], fewer have instituted mentoring programs for early career faculty [9,10]. Early career faculty in academic radiology face specific challenges including new clinical, educational, and research responsibilities, often paired with growing family demands, leaving little time for career development [10,11]. In fact, the majority of faculty members who leave academia do so within the first years [12], highlighting the importance of mentorship of early career faculty.

Several studies have examined components of a successful mentoring program in academic radiology [3,9,13-15], emphasizing the importance that it be rewarding for both the mentor and mentee. A central concept of mentoring is that one mentor is often insufficient and a personal

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mentoring team including people of different backgrounds, expertise, and diversity of opinions is necessary for success [16]. In addition, peer mentoring with colleagues at similar career and personal stages has been shown to improve support, collaboration, and access to resources [17,18]. Therefore, mentoring programs should include the traditional senior mentor-early career mentee dyads, a personal mentoring team, and opportunities for peer mentoring.

The purpose of our study was to implement a multifaceted mentoring program for early career faculty in an academic radiology department and to assess its impact on career development.

METHODS

A formal departmental mentoring program was implemented in a large (clinical faculty n = 126) academic radiology department in January 2019. The program was designed and overseen by the vice chair for faculty affairs with the help of a program director who dedicated 25% effort to the program.

Mentor-Mentee Pairing

Mentors at the professor or associate professor level were selected based on recommendations and prior successful mentoring experience (eg, receipt of mentoring awards). We also included an alumnus as mentor. All mentors were asked whether they would be interested in participating in the program.

Early career faculty members at the instructor level were included as mentees. At our institution, faculty start at the instructor level and usually stay several years in this academic rank before being promoted to assistant professor.

Instructors received a list with potential mentors and were asked to fill out a brief survey about their interests, professional goals, current barriers, and expectations of the program. Each mentee met with the mentoring director one-on-one to identify one to two mentors based on the right "chemistry" and needs. The focus of the matching process was personality, and mentees were asked whether they would feel comfortable sharing personal or work-related challenges with the assigned mentor (if they knew the mentor). If the mentee did not know the mentor, we performed the matching based on whether we thought that the mentee would feel comfortable bringing challenges to the mentor's attention. The mentors received the list with their proposed mentees and had the opportunity to accept or decline the suggested mentee.

We paired mentees with mentors from a different division of the radiology department. The reasons behind this cross-divisional mentorship were to allow the mentor and mentee to gain an outside perspective, to increase the openness within the department and across divisions, and to avoid conflicts of interest between faculty members in the same division. Also, mentees often already received mentorship within their own division.

Training of Mentors and Mentees

Mentors and mentees attended two orientation sessions at the beginning of the program, during which the expectations of the program were outlined. During these sessions, strategies on what makes a good mentor and mentee and how to create a productive mentorship relationship were provided, along with guidelines on how to best use the mentoring meeting time. In addition, didactic materials were distributed and made available electronically on a shared drive. Yearly mentoring grand rounds were implemented with outside experts on mentoring. These speakers also provided dedicated training of mentors and mentees.

Additional Resources

Mentors and mentees were also enrolled in the radiology faculty development program, a program with didactic seminars on topics like difficult conversations, giving feedback, leading without authority, negotiation, and unconscious bias in the workplace. Moreover, regular mentorship meetings were held to discuss mentorship-specific topics, such as mentorship challenges, time management, networking, academic promotion, or how to prepare for the annual career conference. These meetings also provided the opportunity for peer mentoring and group mentoring.

We collaborated with other programs in our department, such as the Women in Science program and the Radiology Diversity, Equity and Inclusion program, to support female faculty and faculty underrepresented in medicine.

Other resources available to mentees included curriculum vitae and promotion consultation within and outside of the department and access to software to automatically schedule meetings. We also implemented a new departmental grant mechanism for small grants ($1,000) to involve medical or college students in research and scholarly projects, and mentees were encouraged to apply for these grants.

An annual mentoring award to recognize faculty who provided exceptional mentoring was established.

Mentorship Agreement and Career Development Plan

During their first meeting, the mentor and mentee were expected to sign a mentoring partnership agreement, in which they lay down the ground rules for their mentorship

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relation. In addition, the mentee, with the help of the mentor, was asked to create a career development plan with short-term and long-term SMART (specific, measurable, action-oriented, realistic, timely) goals. These goals were reviewed at each meeting. The program was designed to provide structured one-on-one mentoring at a minimum of twice per year with the assigned mentor.

Mentorship Board of Directors

An important concept of the mentorship program is that one mentor cannot fulfill every need and the mentees were encouraged to create a mentorship board of directors. With the help of the mentor, the mentee created a list of advisors and mentors with varied expertise. The mentorship board of directors was tailored to the unique needs of each faculty member. Mentees were also encouraged to reach out to mentors from different departments and institutions, also outside of medicine. For this purpose, the department provided funds for mentees ($200 per mentee) to take potential mentors out to lunch or dinner.

Regular opportunities for the mentees to gather for peer mentoring and group mentoring, important parts of the mentorship program, were incorporated.

An anonymous survey of the mentees was conducted before and 1 year after initiation of the program to determine professional and programmatic success (e-only Appendix 1). Mentors were surveyed about their experience with the program (e-only Appendix 2). Historical data on promotions over 5 years before the implementation of the program was used to determine the impact on the rate of promotion of instructors. The study was exempt from institutional review board approval.

Statistical Analysis

Statistical analysis was performed using MedCalc (version 9.2.1.0; Mariakerke, Belgium). Percentages of responses were calculated and values before and after initiation of the program were compared using the χ^2 test. $P \leq .05$ was used to denote significance. The number of promotions (primary outcome measure) was compared to the number of promotions over the prior 5 years. Number of grants, awards, and leadership positions received during the mentoring program as well as number of publications (secondary outcome measures) were recorded.

RESULTS

We matched 28 instructors (10 women, 18 men, 3 of which were underrepresented in medicine) with 11 associate or 5 full professors (5 women, 11 men, 1 of which was underrepresented in medicine). All mentors and mentees were able to participate in the training sessions and were able to meet at least twice per year.

Of the 28 mentees, 21 (75%) answered the survey. Before implementation of the mentorship program 18 of 21 (86%) of early career faculty had a mentor versus 100% 1 year after the program ($P = .08$). Before and 1 year after the mentoring program, 12 of 21 (57%) versus 18 of 21 (86%) of instructors were very satisfied or extremely satisfied with their mentor ($P = .04$).

There were significant differences in responses of mentees who agreed or strongly agreed with the following statements about the work environment before versus 1 year after implementation of the program: environment promotes a culture of mentorship (16 of 21 [76%] versus 21 of 21 [100%], $P = .02$), environment promotes feedback and sharing of information (8 of 21 [38%] versus 18 of 21 [86%], $P = .002$), environment provides actionable advice and guidance (12 of 21 [57%] versus 18 of 21 [86%], $P = .04$). There were no significant differences in the following responses: environment promotes visibility (12 of 21 [57%] versus 16 of 21 [76%], $P = .2$), knowledge of available departmental information (6 of 21 [28%] versus 11 of 21 [52%], $P = .1$), and someone to turn to in case of difficulty (13 of 21 [62%] versus 16 of 21 [76%], $P = .3$).

Before and 1 year after implementation of the mentoring program, 9 of 21 (43%) versus 19 of 21 (90%) of mentees felt that by encouraging mentorship and the department valued their professional development ($P = .001$), and 11 of 21 (52%) versus 17 of 21 (81%) felt supported by the department ($P = .05$).

There was a significant difference in responses of mentees who agreed or strongly agreed that faculty in the department strive to support each other (9 of 21 [43%] versus 16 of 21 [76%], $P = .03$). There were no significant differences in the following responses: faculty in the department feel they are part of a close-knit team (12 of 21 [57%] versus 13 of 21 [62%], $P = .9$); in the department, your work is consistent with your expectations (14 of 21 [67%] versus 15 of 21 [71%], $P = .8$); the department is open to change (10 of 21 [48%] versus 12 of 21 [57%], $P =$ 0 6).

There was a significant difference in the following areas deemed very important or extremely important before versus 1 year after implementation of the program: academic promotion (16 of 21 [76%] versus 21 of 21 [100%], $P = .02$), balancing work and family life (5 of 21 [24%] versus 16 of 21 [76%], $P = .0009$), and networking (6 of 21 [29%] versus 18 of 21 [86%], $P = .0002$).

There was no significant difference in the following areas deemed very important or extremely important before versus 1 year after implementation of the program: career planning and advice (19 of 21 [90%] versus 21 of 21 [100%], $P =$

.1), career success (20 of 21 [95%] versus 21 of 21 [100%], $P = .3$), communication skills (7 of 21 [33%] versus 10 of 21 [48%], $P = .3$), integrating research and clinical activities (19 of 21 [90%] versus 18 of 21 [86%], $P = .3$), job satisfaction (14 of 21 [67%] versus 16 of 21 [76%], $P = .2$), knowledge about the institution's organizational system and culture (16 of 21 [76%] versus 18 of 21 [86%], $P = .9$), leadership skills (14 of 21 [67%] versus 18 of 21 [86%], $P = .2$), scientific research of grant writing (10 of 21 [48%] versus 15 of 21 [71%], $P = .1$), and time management (13 of 21 [62%] versus 11 of 21 [52%], $P = .5$).

Since implementation of the program, 12 of 28 (43%) instructors received grant funding (internal pilot grants $\leq$ \$1,000 n = 6; national pilot grant \$15,000 n = 1; local or national career development grants >\$50,000 of year n = 5) The career development grants allowed for 1 to 2 days protected time. Of the 28 instructors, 14 (50%) received awards or honors (11 national awards and 3 local awards), and 9 of 28 (32%) received local leadership positions. Instructors published a mean of 9 $\pm$ 6 manuscripts (range 1-23) since implementation of the program. No historical information on the number of awards, grant funding, leadership position, or publications was available for comparison. Since the implementation of the program, 10 instructors were promoted to assistant professor, compared with an average of 4.2/y over the 5 years before implementation of the program. Of those three were underrepresented in medicine versus zero over the prior 5 years.

Of the 16 mentors, 14 (88%) responded to the survey. Of those 14, 12 (86%) described their experience as a mentor in the program as excellent or very good, 1 (7%) as good, and 1 (7%) as poor. The relationship with the mentee was rated as excellent or very good by 13 of 14 (93%) mentors and good by 1 mentor (7%). Of the 14 mentors, 13 (93%) deemed time spent with their mentee helpful or somewhat helpful for their mentee, 12 (86%) gained personally from the relationship with their mentee, and 2 (14%) did not gain personally from the relationship.

DISCUSSION

Our study showed that the implementation of a formal mentoring program for radiologists helped to advance the careers of early career and minority faculty and created an atmosphere of openness and support in the department.

Benefits of mentorship in academic medicine include better career opportunities, greater career satisfaction, and better work-life integration of faculty with mentors [1-4].

Mentoring of early career radiology faculty is more important than ever given the major changes in academic radiology over the past decades [19]. The increasing focus on clinical productivity, pressure on turnaround times, growing demands on noninterpretative tasks, and the difficult funding climate present challenges to faculty and place academic radiologists at an increased risk of burnout [20,21]. Our finding of a significant increase in perceived work and family life balance supports the view that mentoring can help address these challenges.

Mentoring is particularly important for the success and retention of faculty underrepresented in medicine [22,23] who often face additional challenges, such as bias, prejudice, lack of confidence and the feeling of isolation, which can lead to attrition from academic careers [24]. We therefore collaborated with our Radiology Diversity, Equity and Inclusion program to support faculty underrepresented in medicine. Our success in promoting three instructors during the first year of the program (versus none over the prior 5 years) supports the importance of a formal mentoring program that supports faculty underrepresented in medicine.

For a mentoring program to be effective, the needs of both the mentees and mentors have to be addressed [9]. The selection and training of mentors is crucial for the success of such a program [25,26]. Several studies have described characteristics of good mentors [3,27,28]. Hence, we selected mentors based on recommendations and prior successful mentoring experience. A main barrier to becoming a mentor is lack of time, and we therefore limited the number of mentees per mentor to two. We also included alumni as mentors who do not face the pressures of internal faculty. For a mentoring program to be successful, the experience needs to be rewarding for the mentor. In our study, 86% of mentors described their experience with the program as excellent or very good, and 93% rated the relationship with their mentee as excellent or very good. Importantly, 86% of mentors gained personally from their relationship with their mentee.

Formal recognition of mentors for their time and effort helps to motivate potential mentors to participate in mentoring programs. We therefore established an annual mentoring award to recognize faculty who provide exceptional mentoring.

We found that setting clear expectations for mentors and mentees contributed to the success of our program. During our orientation sessions, we discussed the expectations of the program and how to create a productive mentoring relationship and how to best use the meeting time. Signing a mentorship agreement that states the ground rules of the mentoring relationship and creating a career development plan with short- and long-term goals were important components of setting expectations for our program. The fact that all mentees met with their mentors and 87% of mentees in our program were very satisfied or extremely

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satisfied with their mentor supports the concept of setting mutual expectations.

We carefully matched mentees with mentors who were from different divisions based on the right "chemistry," focusing only on personal compatibility and whether the mentee would feel comfortable to share personal challenges with the mentor. We aimed to increase the openness within the department and across divisions and to allow the mentor and mentee to gain an outside perspective. Our survey showed that mentees felt that the mentoring program created an environment that promotes feedback and sharing of information and that faculty within the department strove to support each other. Faculty also felt that by encouraging mentorship, the department valued their professional development.

An important concept of our mentoring program is that one mentor cannot do it all, and mentees were encouraged to assemble a mentoring team of diverse mentors, within and outside the department and institution. For the purpose of supporting mentees in recruiting people for their boards, the department provided funds for mentees to take potential mentors out to lunch or dinner. This support eliminated a financial barrier to less formal, more social mentor-mentee interactions. Informal feedback from both mentors and mentees found this support unique bringing people together for social interactions in the desired way.

We implemented regular meetings among the mentees of the program designed to exchange ideas and allow for peer mentoring. We also provided financial support in the form of small grants for early career faculty to involve medical or college students in research and scholarly projects. These "microgrants" not only provided support for the mentee to be more productive, but also gave the mentees the chance to become mentors themselves. We therefore recommend that mentoring programs should include the traditional senior mentor–early career mentee dyad, a personal mentoring team, and opportunities for peer mentoring and for becoming a mentor to early career trainees.

A major goal of the program was career development and academic promotion. One year after implementation of the program, more than twice as many instructors were promoted to assistant professor, compared with the average of the prior 5 years, with a higher percentage of promotion of faculty underrepresented in medicine (3 versus 0 over the past 5 years). Moreover, instructors deemed academic promotion, balancing work and family life, and networking as very important or extremely important 1 year after implementation of the program. Mentees in the program were able to secure grant funding (43%) and received other awards (50%) or leadership positions (32%) during the first year of the program. Mentees were also productive, publishing an average of 9 ± 6 manuscripts since the implementation of the program. Unfortunately, we do not have historical data on the number of awards, grants, leadership positions, or publications obtained per year by instructors in our department before the implementation of the program.

Limitations of our study include the relatively small size of the program, which only included faculty at the instructor level. Of note, at our institution, faculty start at the academic rank of instructor, which is equivalent to assistant professor at many other institutions. Although mentees were promoted at a higher rate compared with prior years, longer follow-up is needed to determine the impact of the program on faculty attrition. Another limitation is that we did not have historical information on the number of awards and grants obtained per year by instructors in our department. We also did not compare the outcome of our program with other programs. Moreover, our mentor and mentee surveys were not validated previously.

In conclusion, a formal mentoring program for radiologists helped to advance the careers of early career and minority faculty and helped create an atmosphere of more openness and support in the department.

TAKE-HOME POINTS

- Mentorship plays a critical role in the success of academic radiologists.
- Mentoring programs can include a senior mentor, a personal mentoring team, and opportunities for peer mentoring and for becoming a mentor to junior trainees.
- Formal mentorship makes faculty feel valued by their department.
- Pairing mentors and mentees from different divisions enhances openness and sharing of information.
- A formal mentoring program benefited early career and minority faculty in terms of career advancement while also creating an atmosphere of more openness and support.

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ADDITIONAL RESOURCES

Additional resources can be found online at: https://doi.org/10.1016/j.jacr.2020.09.025.

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