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Gender disparities in advanced endoscopy fellowship

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ABSTRACT

Background and study aims Women remain underrepresented in gastroenterology, especially advanced endoscopy. Women represent 30% of general gastroenterology fellows; yet in 2019, only 12.8% of fellows who matched into advanced endoscopy fellowship (AEF) programs were women.

Methods We administered a web-based survey to the program directors (PDs) of AEF programs that participated in the 2018–2019 American Society for Gastrointestinal Endoscopy (ASGE) match. We assessed PD and program characteristics, in addition to perceived barriers and facilitators (scale 1–5, 5 = most important) influencing women pursuing AEF training.

Results We received 38 (59.3%) responses from 64 PDs. 15.8% (6/38) of AEF PDs and 13.2% (5/38) of endoscopy chiefs were women. By program, women represented 14.8% (mean) ± 17.0% (SD) of AEF faculty and 12.0% (mean) ± 11.1% (SD) of AEF trainees over the past 10 years. 47.4% (18/38) programs reported no female advanced endoscopy faculty and 31.6% (12/38) of programs have never had a female fellow. Percentage of female fellows was strongly associated with percentage of female AEF faculty (ß = 0.43, $P < 0.001$). Inflexible hours and call (mean rank 3.3 ± 1.1), exposure to fluoroscopy (2.9 ± 1.1), lack of women endoscopists at national conferences/courses (2.9 ± 1.1) and lack of female mentorship (2.9 ± 1.0) were cited as the most important barriers to recruitment.

Conclusion We utilized a survey of AEF PDs participating in the ASGE match to determine program characteristics and identify contributors to gender disparity. Women represent a minority of AEF PDs, endoscopy chiefs, advanced endoscopy faculty and AEF trainees. Our study highlights perceived barriers and facilitators to recruitment, and emphasizes the importance of having female representation in faculty, and leadership positions in endoscopy.

Introduction

Women are underrepresented throughout gastroenterology, making up only 30 % of all trainees in this field [1]. This gender disparity is even more extreme in advanced endoscopy, which encompasses procedures such as endoscopic retrograde cholangiopancreatography (ERCP), endoscopic ultrasound (EUS), and more recently, endoluminal surgeries and advanced tissue resection techniques. Formalized training in this field via an advanced endoscopy fellowship (AEF) can be achieved by an additional one or two year-long fellowship through the American Society for Gastrointestinal Endoscopy (ASGE) match program. For the 2018–2019 academic year, women only represented 12.8 % of the incoming fellows who matched to AEF programs through the ASGE match program.

A 2006 study found that the percentage of women gastroenterology trainees interested in AEF diminished as general gastroenterology training progressed [2]. Issues such as work-life balance, radiation exposure, and lack of mentorship have been speculated as potential contributors [2]. However, little is known about the current representation of women in AEF programs or the potential factors which may be contributing to these disparities. We aimed to survey program directors of AEF programs to determine program characteristics, in addition to perceived barriers and facilitators for women to pursue AEF training.

Methods

Survey and subjects

We developed and administered an anonymous 21-question web-based survey (**Appendix 1**) that was distributed to program directors of advanced endoscopy fellowships that participated in the 2018–2019 ASGE match, as identified through the ASGE. We assessed program director and program characteristics such as call structure and leave policies. In addition, we assessed the gender composition of faculty, current fellows and fellowship graduates over the past 10 years. We asked program directors to rank barriers and facilitators (Scale 1–5, 1 = least important, 5 = most important) that may influence women pursuing advanced endoscopy training. Participants received initial email invitation with follow-up invitation 1 week afterwards. Approval for this study was obtained from the Oregon Health and Science University Institutional Review Board on February 26, 2020.

Statistical methods

We report categorical variables as proportions and continuous variables as means with standard deviations. We assessed program characteristics associated with higher proportion of female advanced endoscopy fellowship program graduates. To test differences, student's *t*-test was used for continuous variables and chi-squared test was used for categorical variables. Linear regression was used to assess effect of continuous variables on proportion of female advanced endoscopy fellowship program graduates. All statistical analyses were performed using StataMP v14.1.412 (StataCorp LLC, College Station, Texas, United States). $P<0.05$ was considered statistically significant.

Results

Program characteristics: faculty

A total of 64 AEF programs participated in the 2018–2019 ASGE match. Of the 64 program directors, 38 (59.3 %) completed the survey. Program director characteristics are summarized in ▶ **Table 1**, and program characteristics are summarized in ▶ **Table 2**. Seven of the 64 program directors (11 %) were women. Six of seven female program directors (86 %) responded to the survey and represented 16 % (6/38) of all AEF program directors who responded. Women represented 13.2 % (5/38) of endoscopy chiefs, 39.5 % of general gastroenterology fellowship directors (15/38), 21.1 % of gastroenterology division chiefs (8/38) and 21.1 % of internal medicine department chairs (8/38). Women represented 18.1 % of the total number advanced endoscopy faculty amongst all programs (38/210). By program, the mean percentage (± SD) of advanced endoscopy faculty who were women was 14.8 % (± 17.0 %). Eighteen of 38 programs (47.4 %) reported no women advanced endoscopy faculty.

Program characteristics: Fellows

Women represented 14.0 % (6/43) of all current advanced endoscopy fellows. Over the past 10 years, women represented 13.6 % (48/352) of total fellows amongst all responding AEF programs. By program, the mean percentage of females interviewed was 25.9 % (± 18.6 %) and the mean percentage of female advanced endoscopy fellows currently in training was 18.2 % (± 39.2 %) (▶ **Table 2**). Historically, over the past 10 years, the mean percentage of female graduates by program was 12.0 % (± 11.1 %). Twelve (31.6 %) programs have never had a female advanced endoscopy fellow.

The majority of programs required fellows to be on-call one night per week (61.3 %, n = 19/31) and one weekend per month (76.9 %, n = 20/30). Twenty-two programs (77.1 %) had a parental leave policy.

Factors impacting women training in advanced endoscopy

Mean rank (± SD) of factors cited by program directors which discourage women from pursuing fellowship in advanced endoscopy were: difficult or inflexible hours and call (3.3 ± 1.1), exposure to fluoroscopy during childbearing age (2.9 ± 1.1), lack of women endoscopists at national conferences and courses (mean rank 2.9 ± 1.1) and lack of mentorship for female trainees (2.9 ± 1.0) as the most important barriers hindering recruitment of women to AEF programs. Mean rank (± SD) of factors cited by program directors identified as potentially facilitating women to pursuing a career in advanced endoscopy were: education on fluoroscopy safety (3.6 ± 1.8), increasing the visibility of women advanced endoscopists at national meetings and endoscopy courses (3.5 ± 1.1) and increasing the number of female mentors (3.5 ± 1.1) (▶ **Fig. 1**).

▶ **Table 1** Program director characteristics (N = 38).

Program director demographics (N = 38)	Variables
Female gender	6 (15.8 %)
Male gender	32 (84.2 %)
Years in practice	
< 5	3 (7.9 %)
5–9	8 (21.1 %)
> 10	27 (71.1 %)

The percentage of women pursuing advanced endoscopy fellowship was strongly associated with percentage of female advanced endoscopy faculty (ß = 0.43, $P < 0.001$) in the program (▶ **Fig. 2**). Percentage of women pursuing advanced endoscopy fellowship was higher in programs with female leadership, with the strongest association in programs with female endoscopy chiefs (19.6 % vs 10.6 %, $P = 0.09$). There was no significant association between percentage of female advanced endoscopy fellows and call structure ($P = 0.77$) or parental leave policy ($P = 0.85$).

Discussion

Diversity is important in the medical workforce and has proven to increase creativity and innovation, benefiting research, education and patient care in academic centers [3]. Several studies have demonstrated that women physicians promote improved teamwork and patient-centered communication [4]. Furthermore, a diverse faculty provides more opportunities for mentoring the next generation of advanced endoscopists who, in turn, can better support and serve a diverse patient population.

The current study provides further clarity on the significant gender disparity that currently exists within AEF programs. We found that women only represent 14 % of current AEF fellows, and only 14 % of all AEF program graduates in the past 10 years. Furthermore, 12 programs had never had a female advanced endoscopy fellow. Women are underrepresented in other interventional subspecialty fields such interventional radiology and interventional cardiology. Women accounted for only 12 % of first-year fellows in interventional cardiology 2018 [5] and 14 % of vascular and interventional fellows in 2017 [1]. Traditionally, surgery was another field where women are underrepresented. Encouragingly, recent studies have shown that with efforts such as establishing mentorship programs for early career women through the Association of Women Surgeons and the American College of surgeons, the rates of women in general surgery programs have increased from 14 % in 2001 to 40 % in 2017 [6, 7]. Thus, similar efforts should be made to improve the representation of women in AEF programs.

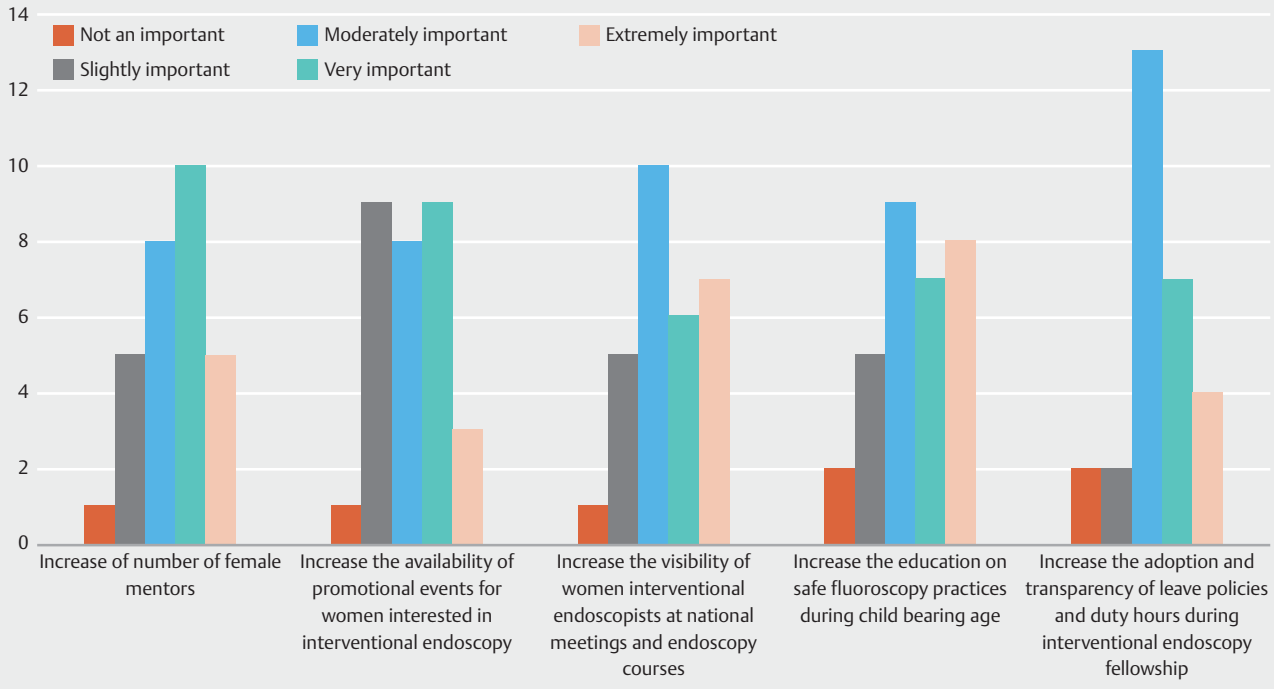
Our study also highlights the importance of having women in leadership roles in endoscopy. We found that AEF programs with more female faculty and endoscopy chiefs were more likely to have female advanced endoscopy fellows. Moreover, program directors similarly ranked increasing the number of female mentors and increasing the visibility of women advanced endoscopists at national conferences as two of the top three facilitators to improving gender balance within this subspecialty However, women only represented 13.2 % of endoscopy chiefs, 39.5 % of general gastroenterology fellowship PDs, 21.1 % of gastroenterology division chiefs, and 21.1 % of internal medicine department chairs. Addressing this disparity is of utmost importance. Beyond the importance of equity, studies have demonstrated that women in leadership also bring additional benefits to organizations, more often focusing on collaborative long-term goals, with improved organizational and financial performance [8].

Work-life balance has commonly been cited as a barrier to gender balance [9]. AEF program directors in the current study cited the perception of inflexible work hours as the most important barrier to women participating in AEF. Interestingly, we did not find any significant association with call structure or parental leave structure and the percentage of female advanced endoscopy fellows at each program. However, we acknowledge

▶ **Table 2** Program characteristics (N = 38).

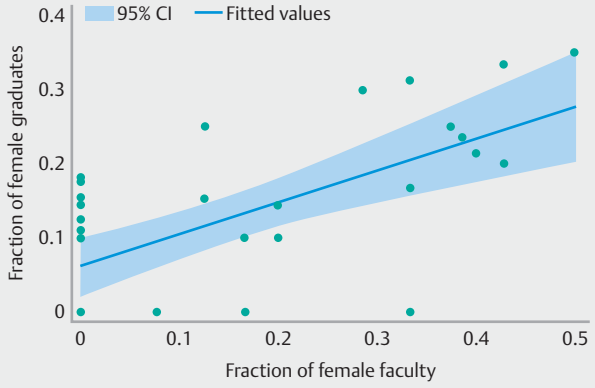
Program Details	Variables
Female internal medicine department chair	8 (21.1 %)
Female gastroenterology division chief	8 (21.1 %)
Female general gastroenterology program director	15 (39.5 %)
Female internal medicine department chair	5 (13.2 %)
Percentage of female advanced endoscopy faculty per program	Mean 14.8 % (SD 17.0 %)
Percentage of female fellows interviewed per program	Mean 25.9 % (SD 18.6 %)
Percentage of female fellows current per program (n = 33)[1]	Mean 18.2 % (SD 39.2 %)
Percentage of female fellow graduates over the past 10 years per program (n = 34)[1]	Mean 12.0 % (SD 11.1 %)
Night call schedule (N = 31)[1]	
1 ×/week	19 (61.3 %)
2 ×/week	3 (9.7 %)
3 ×/week	2 (6.5 %)
> 3 ×/week	7 (22.6 %)
Weekend call (N = 30)[1]	
1 ×/month	20 (76.9 %)
2 ×/month	5 (16.7 %)
3 ×/month	5 (16.7 %)
Parental leave policy	
No	2 (6.5 %)
Yes	27 (77.1 %)
Unsure	6 (17.1 %)

[1] Number of responses are less than total due to missing values.



Facilitator	Mean	SD
Increase of number of female mentors	3.45	1.07
Increase the availability of promotional events for women interested in advanced endoscopy	3.21	1
Increase the visibility of women advanced endoscopists at national meetings and endoscopy courses	3.54	1.05
Increase the education on safe fluoroscopy practices during child bearing age	3.61	1.18
Increase the adoption and transparency of leave policies and duty hours during interventional endoscopy fellowship	3.32	1.04

▶ **Fig. 1** Potential facilitators to women pursuing a career in advanced endoscopy.



▶ **Fig. 2** Fraction of female graduates over the past 10 years is positively associated with fraction of female advanced endoscopy faculty (ß = 0.43, P < 0.001).

that this study is small and therefore may be under-powered to detect this correlation.

Radiation exposure during childbearing age has also been raised as a concern for women pursuing AEF. Radiation exposure has been cited as a deterrent to women pursuing training in other fields including intervention cardiology and interventional radiology [10, 11]. Interestingly, a 2016 study found that this was the most commonly cited deterrent for female medical students considering intervention radiology [12]. That same study found that male students also shared this concerned at equally as high rates [12]. In response to this, comprehensive educational materials on radiation safety have been made available by professional societies such as the Society of Interventional Radiology [13]. Gastroenterology societies should consider making similar such materials widely available for gastroenterology fellows as well.

There are several limitations of this study. First, the response rate was 60 % which leads to the possibility that there may be sampling bias. However, recent literature has suggested that a response rate for survey studies approximating 60 % should be the goal of researchers and is acceptable in regard to non-response bias [14]. In addition, we acknowledge that we only included programs that participated in the ASGE match, and thus, did not capture information from AEF programs that are not part of the match. Furthermore, our survey was cross-sectional. While we queried fellow gender composition over the past 10 years, we do not present trends in gender composition over time as recall bias may influence these results. Systematically collecting and reporting such information will be helpful in

tracking future effects of improvement efforts. Our study results rely on a PD perspective and were not directly correlated with fellow responses, as those were not queried. Although these perceptions may be indirect, we believe they remain a surrogate for fellow perceptions. Finally, PD perceptions match with similar studies involving practicing gastroenterologists [15] and trainees in interventional radiology and interventional cardiology [10, 11]. Importantly, as PDs are in positions of power to address these barriers, understanding their perspective remains important. Additional PD and fellow demographics such as age were not obtained in the current survey, but will be the subject of future studies. Additional studies from a trainees' perspective would complement this study well.

To strive towards equity in medical subspecialties and leadership, academic medicine requires both individual and organizational action. We should actively seek to increase the number of women being recruited to AEF programs and faculty positions, in addition to implementing transparent structural changes and policies to help the advancement of these women during their careers.

Conclusion

We found that women are underrepresented in AEF training programs as well as among AEF faculty, AEF program directors, and endoscopy directors. While there are serious concerns regarding inflexible hours and fluoroscopy exposure, efforts to increase the representation of women in endoscopy as faculty and as endoscopy leaders may help improve the gender disparity seen in AEF programs.

Competing interests

Dr. Berzin is a consultant for Boston Scientific, Medtronic, and Wision AI. Dr. Anderson is a consultant for Boston Scientific and Olympus. Dr. Thompson is a consultant and receives institutional research grants from Apollo Endosurgery, receives an institutional research grant from Aspire Bariatrics, is a general partner in the Healthcare Venture Fund for BlueFlame, is a consultant for Boston Scientific, a consultant for Covidien/Medtronic, a consultant and advisory board member for Fractyl, a consultant and receives an institutional grant from GI Dynamics, has ownership interest in GI Windows, is a consultant for and has received equipment loans from Olympus/Spiration, receives an institutional research grant from Spatz, and is a consultant and advisory member for and receives a research grant from USGI Medical. Dr. Schulman is a consultant for Apollo Endosurgery, a consultant for Boston Scientific, a consultant for MicroTech, and has received grant support from GI Dynamics.

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