

Gender disparity in hepatobiliary endoscopy training and delivery: Results of a nationwide survey



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ABSTRACT

Background and study aims There are far fewer female, independent endoscopic retrograde cholangiopancreatography (ERCP) practitioners than men in the UK. This study aimed to explore what lies behind the disparity by examining the current state of training, attitudes, and other factors that may influence trainees' decision to pursue ERCP training, with a view to identifying modifiable factors.

Methods Anonymized responses to an electronic survey distributed to gastroenterology trainees and independent ERCP practitioners in the UK were collected and analyzed.

Results Of 214 respondents 45% were female. Whereas gender distribution in non-hepatobiliary therapeutic endoscopy was balanced, only 29% of ERCP trainees were female. Eighty percent of those who worked less than full time (LTFT) were female, but 32% felt that LTFT was incompatible with ERCP training. Concerningly, one-quarter of female respondents reported that they had been discouraged. It was noted that females are often treated differently within endoscopy units, including by patients. Fifty percent of females indicated that radiation exposure affected their decision to train in ERCP, compared with 22% of males. A question specific to trainers revealed that 95% felt that male gender was associated with increased confidence. In free-text responses, valuable insights into trainees' personal experiences were provided, and a selection is presented. Finally, strategies to redress the gender imbalance are proposed.

Conclusions Gender disparity in HPB endoscopy exists and is stark. Underlying this are attitudes, assumptions, and environmental factors that will require systemic and sustained correction. Ideas about how to address this challenge need to be explored.

Introduction

Despite steady growth in the number of women who have completed medical training since the first women were allowed to enroll in medical school about 150 years ago, there remains significant gender disparity across the profession. This is most visible in senior leadership, in academia, and in procedural specialities. Surveys of surgical specialities in the UK have shown that

only 35% of surgical trainees and 14% of surgical consultants are female [1]. Similar trends in female representation in medicine have been noted globally [2].

Interventional therapeutic endoscopy has evolved into a speciality that provides alternatives to traditional surgery. As it has evolved, gender disparities similar to those in surgery have been noted. Over the last 25 years, female medical students have outnumbered men and 55% are currently female, yet

women only account for 36% of the consultant body [3, 4]. The 2020 British Society of Gastroenterology (BSG) workforce survey reported that only 22% of the 1607 consultants were female [5]. Within gastroenterology, the disparity is glaring in hepatobiliary endoscopy i.e., endoscopic retrograde cholangiopancreatography (ERCP), where a recent Joint Advisory Group (JAG) survey into sedation practices demonstrated that 94% of ERCPists were male [6]. A freedom of information request to acute trusts in England in 2019 revealed that only 5% of the ERCP workforce in the UK is female [7].

Gender disparity in medicine is multifactorial and complex, with factors including attitudes extending across medical schools, hospitals, and society as a whole. It may also be influenced by the degree of physical demand, the likelihood of procedure complications, and psychological impact of complications. Endoscopy-related injuries are common in endoscopists and it is well documented that female endoscopists report more upper limb injuries and have a weaker grip and smaller glove sizes [8]. Despite this, endoscopes and equipment have remained one-size-fits-all, contributing to this issue. A recent survey in the United States demonstrated that 46.9% of female trainees and 60% of pregnant trainees felt equipment was not ergonomically optimized, and this included right-sized gloves, aprons, dial extenders, and lead protection [9].

It is important to explore and address these factors and reduce gender disparity because it has been shown that diversity improves patient care, innovation, performance, and financial aspects [10]. The importance of diversity has also been demonstrated in other fields such as finance, where a 2017 report by Morgan Stanley concluded that “more gender diversity, particularly in corporate settings, can translate to increased productivity, greater innovation, better decision-making.”

This study provided an opportunity to explore whether gender disparity exists in ERCP practice by examining the current state of training and practice from the perspective of gender, exploring underlying factors associated with poor engagement or commitment, and identifying where changes can be made to improve diversity and quality of service.

Methods

Population

An electronic survey was distributed via email to gastroenterology trainees and independent ERCP practitioners in the UK. The survey was advertised via the BSG trainee section, BSG Supporting Women in Gastroenterology (SWIG), and personal social media accounts between April and July 2023. Training program directors, ERCP networks leads, and trainee representatives were asked to assist in dissemination and regional engagement.

Survey design

A cross-sectional survey consisting of 20 questions in five sections was developed by the authors at St Thomas' Hospital using a web-based survey tool (Google). Non-identifiable demographic information was obtained including age, gender, and level of training. It included questions to assess training

levels, access to ERCP training, gender perceptions, and factors influencing gender bias.

Data collection

An introductory email describing the study and including a web link to the online survey instrument was sent. Multiple email reminders, social media advertisements, individual contacts, and BSG Trainees Section regional representatives were used to remind participants and enhance response rates.

Patient and public involvement

No patients were involved in study design.

Statistical analysis

Data were analyzed using Microsoft Excel. Categorical variables and ordinal data were summarized using counts and percentages and analyzed using χ^2 test. $P < 0.05$ was considered statistically significant.

Results

Demographic data

There were 214 respondents. Ninety-seven were female (45%) and 117 were male (55%). Forty-five percent were consultants. All UK training deaneries were represented. Overall, 83% of respondents worked on a full-time basis. Of the 17% respondents working on less than full time (LTFT) basis, 80% were female ($P < 0.001$). Demographic data are summarized in ► **Table 1**.

Scope of practice, access, and attitude toward training

Respondents were asked to confirm their involvement in upper and lower gastrointestinal therapeutic procedures, endoscopic ultrasound (EUS), and ERCP. The proportion of female trainees

► **Table 1** Demographic data.

	Total	Female	Male
	n (%)	n (%)	n (%)
Gender	214 (100)	97 (45)	117 (55)
Level	213 (100)		
Consultant	95 (45)	28 (29)	67 (71)
Clinical Fellow	20 (9)	10 (50)	10 (50)
ST4	21 (10)	12 (57)	9 (43)
ST5	24 (11)	15 (62)	9 (38)
ST6	27 (13)	15 (56)	12 (44)
ST7	26 (12)	16 (62)	10 (38)
Working pattern	208 (100)		
Full time	173 (83)	67 (39)	106 (61)
LTFT	35 (17)	28 (80)	7 (20)

LTFT, less than full time; ST, specialist trainee.

involved in upper and lower gastrointestinal therapeutic endoscopy was greater (58% and 53%) than in hepatobiliary (HPB) endoscopy (EUS 41% and ERCP 29%; $P = 0.014$). The lowest female representation was in ERCP, where most trainees were male (71%). Regarding independent practitioners in ERCP, the ratio was 17% female to 83% male.

Respondents were asked about access to training in ERCP, on a scale of 1 to 5 with 1 meaning no access. 53% said that there was no or poor access (score 1 or 2). Only 6.6% felt that there was very good access (score 5). Sixty-four percent of female respondents felt that access to ERCP training was affected by their gender, whereas 71% of males felt that this was not the case ($P < 0.001$). This perception was mirrored in a question on discouragement about commencing ERCP training. Twenty-five percent of females felt there had been active discouragement, whereas 95% of males felt that there had been no such discouragement ($P < 0.0005$).

Role modelling

Seventy-two percent of all respondents (male and female) could not identify female ERCP role models or mentors in the department or nationally. Sixty percent of female respondents felt that this negatively affected their attitude toward ERCP training, compared with 12% of male respondents ($P < 0.001$). Seventy-one percent of respondents overall felt that there was no visibility of female role models in ERCP at a national level (e.g. at conferences). More female respondents felt that this negatively affected career choices (59% female vs 23% male, $P < 0.0005$).

Gender-based attitudes

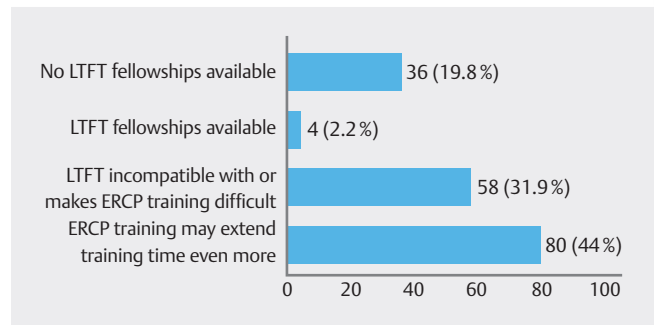
The vast majority of male respondents (approximately 90%) felt that they were treated similarly to female colleagues by endoscopy staff, fellow endoscopists, and patients. In contrast, a significant proportion of female respondents felt that they were treated differently by endoscopy staff (24%, $P = 0.0036$) and fellow endoscopists (37%, $P < 0.001$). Thirty-five percent of females felt that patients treated them with less respect than male colleagues ($P = 0.013$).

Perception around LTFT training

Respondents were asked if LTFT training affected training in ERCP and their perceptions about availability of fellowships during training. The majority felt that LTFT was incompatible with ERCP training. The results are shown in ► Fig. 1.

Environmental factors

When asked about the effect of radiation exposure on family planning, most of the male respondents felt that this made no impact on a decision to train in ERCP (78%), whereas 50% of females felt that it did ($P < 0.0005$). The majority of respondents, both male and female, did not have concerns about cancer risk (► Table 2). The same attitudes pertained to ergonomics of endoscopic equipment; however, a significant minority did have concerns about these two factors. Approximately 53% of female respondents found that wearing lead jackets and aprons



► Fig. 1 Perceptions around LTFT training

during long procedures had a negative impact, whereas only 30% of males thought this was the case ($P = 0.0012$).

Attitudes toward higher-risk procedures

Respondents were presented with a list of factors that could impact their perceptions of and attitudes toward ERCP training. Fewer people responded to this subsection. Of the 71 who felt that they had a lack of confidence with high-risk procedures, 66% were female. Regarding concern about the negative psychological consequences of being involved in serious complications, 56% were female. Thirty-eight respondents identified a lack of self-advocacy, of whom 68% were female. One hundred and four respondents felt that a lack of exposure to complex endoscopy in early training influenced their decision about ERCP training (54% female vs 46% male). Differences between genders on this topic were consistent but less notable than other factors (► Fig. 2).

► Table 2 Impact of environmental factors.

	Total	Female	Male
	n (%)	n (%)	n (%)
Impact of radiation on family planning	194 (100)	92 (100)	102 (100)
No impact	126 (65)	46 (50)	80 (78)
Negative impact	68 (35)	46 (50)	22 (22)
Impact of radiation on cancer risk	192 (100)	88 (100)	104 (100)
No impact	130 (68)	52 (59)	78 (75)
Negative impact	62 (32)	36 (41)	26 (25)
Ergonomics of equipment	187 (100)	84 (100)	103 (100)
No impact	144 (77)	58 (69)	86 (83)
Negative impact	43 (23)	26 (31)	17 (17)
Heavy lead and long procedure	192 (100)	90 (100)	102 (100)
No impact	113 (59)	42 (47)	71 (70)
Negative impact	79 (41)	48 (53)	31 (30)

Trainer attitudes

These questions were presented to trainers only. Eighty-nine responded and 22% of respondents were female. Fifty-eight of 89 (65%) had trained female trainees in ERCP. Thirty-nine trainers had experience with less than full-time trainees, and there was no significant difference in gender among these trainees. Fifty-seven percent of trainers felt that less than full-time working had a significant effect on training in ERCP. Twenty-five percent felt that it might have an effect and 18% felt that it had no effect.

Trainers were asked if trainee behavior was influenced by gender. Fifty percent of trainers felt that gender made no difference to trainee confidence; however, of those who felt that the gender did make a difference, over 95% felt that male gender was associated with increased confidence. The same pattern applied to self-advocacy. Regarding enthusiasm and resilience, the majority of trainers felt that gender did not make a difference. Approximately 50% of trainers felt that gender made no difference to the tendency for self-reflection or to beneficial interpersonal skills. However, of the other 50% who did think there was a gender difference, the vast majority associated female gender with more self-reflection and better interpersonal skills. Very few trainers admitted to discouraging a female trainee (3 of 88).

Personal experiences

Respondents were invited to describe personal experiences and to give opinions about the previously mentioned subject areas. Selected responses are provided in **Box Personal experience and comments**. **Box Factors to encourage female trainees in HPB endoscopy** contains selected responses on ideas to encourage more women to train in ERCP. The authors were not aware of the gender of individual respondents.

PERSONAL EXPERIENCE AND COMMENTS

ERCP experience and exposure

- Started ERCP training – I became pregnant twice hence training was stopped. Felt too much of a learning curve to make progress working less than full time
- As a trainee had to actively seek out ERCP training opportunities, often staying very late or starting early to ensure free to attend lists.
- If I had met one (female role model) earlier in my training I may have been encouraged to train in ERCP
- I have never seen a female ERCPist
- (As a woman) I attended an ERCP conference in the UK and was guided more than once to the nursing symposium....
- Was told I had “left it too late” to consider ERCP training by a male consultant at the beginning of ST5
- I have a young family and needed to CCT and get a consultant job straight away. Hence, I did not have the freedom to pursue a post-CCT fellowship

- The only way I got my training was to get extra lists between 2 hospitals and working post nights etc which was exhausting

Role models and mentors

- The only reason I knew I could do it is because my TPD during training [a female ERCPist] was living proof you can
- The lack of female representation at conferences/courses/social media can be isolating
- It would make me feel less able to contribute and silently question if I should be there
- Throughout my training majority of gastroenterologists are male and all ERCPists I have worked directly with have been male
- Very few visible female ERCPists. Those I have met are exceptional and great ambassadors

Gender bias in the endoscopy unit

- When I did my fellowship abroad I did not feel that I was treated better or worse than male colleagues
- Have encountered sexism among patients, however, I think patients often see women who are at more junior levels or training (ie registrars) as less experienced than male equivalent
- My experience was the nursing team would often warn me about the other ERCPists and how terribly tempered they could be. It was never my actual experience – my trainers were all lovely and excellent and patient
- I was discouraged from doing ERCP and was told that a male colleague would likely be better
- When I expressed interest in ERCP, I had to justify my aspirations with regard to if I was emotionally suited to deal with complications as a female and what would happen to training if I was pregnant
- [I am a female but] I have an overseas name and often I am referred to as Mr in emails. Despite addressing myself as Dr... in endoscopy, the patients ask after consenting etc, when will I see the doctor.
- I think this is subtle. In the room if you are a female who takes command of a room, there are comments raised of bossiness. If you are a male who does similar, you are simply assertive

LTFT challenges

- I had to come in on days off for opportunistic training lists as a full-time trainee. I can only imagine how difficult it would be for a less than full time trainee
- I asked to do my fellowship LTFT but have been told this is not possible. Have managed to negotiate 1 day of remote working as a compromise
- I asked to work LTFT during an ERCP/EUS fellowship to help more with childcare and this was actively discouraged

Physical and psychological challenges

- Some leads have very big armholes – might that increase risk of breast cancer? I do often wonder about this

- Heavy leads caused back ache and were awkward to take on and off and usually nowhere to sit so standing in them for 4–5 hours. The equipment could hurt my fingers, used to sometimes find the wire very stiff to pass
- Tendonitis in thumb and passing difficult stents or long procedures with repeated recannulation and bridge/wheel work causes discomfort during the procedure
- As someone with a disability I faced similar ergonomic and equipment challenges that initially were dismissed by employing organisation, especially when I was still a trainee and not a permanent member of staff
- The equipment is designed for men small size aprons are not available the aprons are heavy...
- Complications was a major factor [in discouraging me]
- The major cause of complaints or legal issues in my career have been related to complications of ERCP
- It's bloody hard! It takes a long time to master and requires considerable dedication. And ERCP takes a certain personality...

CCT: certificate of completion of training; ERCP: endoscopic retrograde cholangiopancreatography; EUS: endoscopic ultrasound; LTFT: less than full time; ST: specialist trainee; TPD: training program director.

FACTORS TO ENCOURAGE FEMALE TRAINEES IN HPB ENDOSCOPY

- Encouragement in first 2 years of training to **anyone** showing a passion for endoscopy in general and then nurturing interest in ERCP if technical competence in endoscopy shown might help encourage further training in HPB endoscopy
- More prominent female role models. More representation at Endolive events. Maybe an Endolive ERCP session carried out just by female physicians
- I think that seeing other women in the field is crucial – and not superhuman women, normal ones! Finding a way to provide child-friendly hours – both to women and men in training and removing the stigma of LTFT in ERCP training
- Active promotion by the excellent younger female colleagues who have come through training in recent years
- Make it the norm, set the expectation from ST4 day one and support them in those rotations to places that can offer that training. Set a high standard for equipment like leads, clear guidance on cancer prevention, scoping in pregnancy, sharing challenges and when things go wrong

ERCP: endoscopic retrograde cholangiopancreatography; ST: specialist trainee; CCT: certificate of completion of training; TPD: training programme director; LTFT: less than full time; EUS: endoscopic ultrasound.

Discussion

This large national survey has identified significant differences in access to training, uptake of training, and experience of training between female and male endoscopists who have an interest in hepatobiliary work. This is consistent with gender disparities seen in both the BSG workforce survey and the JAG survey [5, 6, 7]. According to the National Endoscopy Database (NED) analysis in 2023, there were 491 ERCP practitioners in the UK [6]. In the BSG workforce report of 2023, it is stated there were 660 endoscopy trainees in total [11], although what proportion aspired to train in ERCP is unknown. It is likely to be less than 25%. Therefore, the 214 respondents (which include trainees and independent practitioners) is likely to be a representative sample.

Most of the secondary questions in the survey were about ERCP practice specifically. There were concerning messages regarding role modelling, encouragement versus discouragement, and departmental attitude. In addition, there were significant differences in attitude toward environmental factors and the potential for involvement in complex cases with higher morbidity and mortality. The survey touched upon psychological factors, and respondents (who were self-selected) indicated that there are differences in the psychology of male and female trainees. The free-text responses give more vivid illustrations of the opinions and emotions associated with this topic, although it must be noted that they are not necessarily representative, being individual examples.

Workforce surveys indicate significant gaps in gastroenterology consultant posts in the next 5 to 10 years [12] and the recent BSG ERCP workforce survey demonstrates that one-fifth of the ERCP workforce is planning to retire in the next 5 years, potentially creating a large gap in workforce [13]. This survey also showed that over 10% of ERCP practitioners perform less than 75 procedures per year, which is concerning from the point of view of quality. The recent change in gastroenterology curriculum poses many challenges to endoscopy training and studies show that colonoscopy certification had fallen by two-thirds from 2018 to 2022 [14]. This leaves very little scope for training in complex HPB endoscopy and almost all training will need to be pursued in a post-Certificate of Completion of Training setting. Over half the respondents in a recent training survey indicated that they had no exposure to either ERCP or EUS during training, thus hindering informed career decisions [15]. According to a BSG statement, LTFT working is increasing. The reasons are broad, and include caring duties, academic interests, mental or physical illness, work-life balance, or other exceptional opportunities such as representing their country for sport or national leadership positions. Ninety percent of working LTFT are women, but a growing number of male trainees are requesting this pattern of working [16]. With LTFT training come fewer opportunities to practice, and if there are any adverse outcomes, they will tend to dominate the experience and possibly cause the trainee to reconsider before subsequent procedures reassure them that morbidity/mortality is infrequent. One approach to this would be to concentrate ERCP training during specific phases of LTFT training. This would re-

quire coordination with the rest of the gastroenterology service (and possibly general medicine).

In addition to this, we noted a small number of female trainees reported that they were discouraged from engaging in ERCP training. This needs further exploration. Previous studies have reported that various factors such as confidence, LTFT, reduced self-advocacy, and patriarchy play a role in low female representation in advanced endoscopy [17]. With regard to active discouragement, free-text comments in the survey refer to perceptions that females are less emotionally equipped to deal with higher complication rates in ERCP and that training would not be continuous due to career breaks due to pregnancy. The issue of self-confidence and self-advocacy is both difficult to measure and a sensitive topic. The survey appears to confirm that it is an important barrier; therefore, a supportive approach is required. We suggest that the relationship between trainer and trainee is crucial here, and an ongoing, trusting relationship will help. Trainees rotate frequently; therefore, a single-mentor arrangement may be the better solution.

A significant number of trainees were concerned about radiation exposure. Numerous surveys have demonstrated that concerns about radiation exposure may play a significant role in the discrepancy in numbers of female ERCP practitioners, especially of childbearing age [18, 19]. Studies show that this concern is shared by male students [20]. Despite the need to improve diversity, information around radiation exposure, safety during pregnancy, guidance, and education in practice during pregnancy is lacking or relatively inaccessible. Clearly presented information during training would help to improve this situation.

The limitations of the study relate to self-selection of respondents. Those with stronger opinions were more likely to respond, and therefore, there may be some bias. However, we know, objectively, that there are far fewer female independent and trainee ERCPists in the country; therefore, the messages communicated through the survey are likely to be accurate overall. Other studies have identified similar themes [6, 7].

Identification of these variations is the first stage in redressing the imbalance. Addressing the issues identified in this survey may reduce gender disparity over time. However, the solutions are not easy to implement, especially when related to long-held or outdated attitudes. Appreciation of the factors identified in the survey could be translated into more positive messaging earlier in training, together with a proactive attitude toward factors such as LTFT and better clarity around radiation risks. Change in this context may require more affirmative action, such as requirements for training centers to take on a minimum proportion of female trainees, clear mentor-mentee arrangements, and a proactive approach to discussing LTFT with appropriate accommodations made for hepatobiliary endoscopy.

Fear of psychological harm following involvement in complications or deaths is universal, but especially relevant to hepatobiliary work. This should be addressed for all trainees within the curriculum. Generational differences and traditional attitudes persist. It is for national bodies and local clinical leaders to address these issues where they are identified in departments.

This negative influence is likely to wane over time, but it is still being felt by individuals. A focus on individual competency and interest should be promoted, together with personalized mentoring such that hurdles, anxieties, and setbacks are managed as they occur over time. There are strong female role models in the UK, and an effort should be made to increase visibility and access. An overview of recommendations to achieve this is highlighted in **Box Recommendations to achieve gender equity in ERCP**.

RECOMMENDATIONS TO ACHIEVE GENDER EQUITY IN ERCP

- Streamline HPB endoscopy training
- Change in culture and inclusive behavior within endoscopy units
- Increase visibility of female mentors and role models
- Curriculum-based training on the psychological effects of complications
- Avoid describing ERCP as especially challenging, risky or “heroic”

ERCP: endoscopic retrograde cholangiopancreatography.

Conclusions

Gender disparity in HPB endoscopy exists and is stark. Although ERCP training is challenging for all trainees due to various factors such as lack of early exposure, poor access, and fear of complications, it seems to be particularly challenging for female trainees. With shortened training time and increasing general medicine commitments in the new curriculum, ERCP training may become less attractive or realistic. Underlying this disparity are attitudes, assumptions, and ergonomic/environmental factors that will require systemic and sustained correction. Ideas about how to address this challenge exist within the female cohort of endoscopy trainees, and engagement with them may lead to welcome changes over time. This is essential to preserve the future ERCP workforce.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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