

Female authorship in major academic gastroenterology journals: a look over 20 years

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Background: Authorship in peer-reviewed medical journals is a marker for success in academic medicine.

Objective: To determine the representation of female physicians among authors of original research in U.S. gastroenterology journals.

Design: Retrospective.

Subjects: All first and senior U.S. authors of original research published in the years 1992, 1997, 2002, 2007, and 2012 in the following journals: *Gastroenterology*, *Hepatology*, *American Journal of Gastroenterology*, *Clinical Gastroenterology and Hepatology (CGH)*, and *Gastrointestinal Endoscopy (GIE)*.

Main Outcome Measurements: The percentage of female first and senior authors compared with the percentage of women practicing in academic gastroenterology.

Results: We evaluated 6490 articles, of which 2275 original research articles and 455 editorials were eligible for inclusion. Author gender was determined for 98.5% of the 3792 authors. Overall, female first authors increased from $9.1 \pm 2.9\%$ in 1992 to $29.3 \pm 4.9\%$ in 2012 ($P < .0001$), and female senior authors increased from $4.8 \pm 2.3\%$ in 1992 to $14.5 \pm 3.6\%$ in 2012 ($P < .0001$). Female first and senior authors increased significantly in all journals (P for trend $< .05$), except for *CGH*, and *CGH* and *GIE*, respectively. For each of the years examined with the exception of 1997, the proportion of women in the senior author position was less than expected based on the proportion of women among academic gastroenterologists ($P < .004$; $P = .18$ for 1997).

Limitations: Descriptive study.

Conclusions: The percentage of U.S. female physician authors of original research in major gastroenterology journals has increased over time, yet the percentage of women in the senior author position remains lower than expected. Further research should explore potential reasons for this gender gap. (*Gastrointest Endosc* 2015;81:1440-7.)

Abbreviations: *AJG*, *American Journal of Gastroenterology*; *AMA*, *American Medical Association*; *aOR*, *adjusted odds ratio*; *CGH*, *Clinical Gastroenterology and Hepatology*; *GIE*, *Gastrointestinal Endoscopy*; *OR*, *odds ratio*.

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Over the past 4 decades, there has been a dramatic increase in the number of women entering medicine, with women now comprising nearly half of medical school graduates and internal medicine residents.^{1,2} Since 2000, an increasing number of women have entered gastroenterology fellowship training programs, and women have comprised more than 30% of first-year fellowship positions since 2009.³⁻⁷ Although more women are entering the medical profession, women still face a number of barriers in academic medicine.^{8,9} Previous work has suggested that women gastroenterologists preferentially work in academic compared with private practices, but are less likely to hold the most advanced academic positions compared with men.¹⁰ Additionally, in a survey of American Gastroenterological Association members, significantly more female gastroenterologists perceived that their gender has affected their career advancement, and female academic gastroenterologists reported lower overall career satisfaction and promotion than their male colleagues.¹¹ Despite these data, it is not clear why these differences exist and how they might be changing over time.

Publication in medical journals is an important measure of academic productivity and is also highly emphasized in the promotion process at academic institutions. Over time, the rates of women first and senior authorship in academic general medical, surgical, pediatric, and obstetric journals has increased; however, the rates may be plateauing.¹² No previous studies have described the gender distribution of authors of published research in gastroenterology.

Thus, in this study, we sought to determine the distribution of women first and senior authors of original research articles and editorials in 5 U.S. gastroenterology journals. We compared the distribution of women authorship with the expected distribution based on the proportion of academic gastroenterologists who are women and examined the differences among journals over 20 years.

METHODS

This study was considered nonhuman subjects research by the Boston University Medical Center institutional review board and was therefore exempt from review.

Data collection

We selected 5 gastroenterology and hepatology journals published in the United States that have the greatest readership among gastroenterology trainees and academic physicians based on impact factor and expert opinion: *Gastroenterology*, *Hepatology*, *American Journal of Gastroenterology (AJG)*, *Clinical Gastroenterology and Hepatology (CGH)*, and *Gastrointestinal Endoscopy (GIE)*. To understand trends over time, we chose a priori 5-year intervals between 1992 and 2012. Therefore, all original research articles published in these journals during the

years 1992, 1997, 2002, 2007, and 2012 were included in the dataset. We also evaluated editorials published during the same years separately. For *CGH*, which began in 2003, we included articles from the years 2003, 2007, and 2012. All case reports, clinical vignettes, society guidelines, and review articles were excluded. We excluded authors from non-U.S. affiliated institutions or those without an MD or equivalent degree.

For every original article and editorial, we determined both the first and senior (last listed) authors' gender, graduate degree(s), institutional affiliation, institutional region within the United States (Northeast, South, Midwest, or West), type of research (basic or clinical), and research topic (stomach/esophagus, colon/small bowel, pancreaticobiliary, liver, endoscopy, or other). An author's gender was determined by initial inspection of his or her first name. For cases in which the author's gender was uncertain, gender was determined by visiting the institutional Web site, reviewing social media Web sites, performing Internet searches with the use of the Google search engine or by directly contacting the corresponding author. For the journals *Gastroenterology* and *Hepatology*, which do not publish the author's degree(s), we used a similar strategy in order to identify the author's degree(s).

We used published data from the American Medical Association (AMA) Physician Masterfile to determine the proportion of women among active academic gastroenterologists during the years 1992, 1997, 2002, 2007 and 2012.¹³⁻¹⁷ The AMA Physician Masterfile contains current and historical data on all physicians who are in the United States. The major source of information in the AMA Physician Masterfile is from a questionnaire in which approximately one-fourth of all physicians are surveyed on a yearly basis. Other primary sources of data to the Masterfile include medical schools, hospitals, medical societies, state licensing agencies, the American Board of Medical Specialties, the Surgeon General of the U.S. government, and the Educational Commission for Foreign Medical Graduates.¹³⁻¹⁷ An academic gastroenterologist was defined as any gastroenterologist whose patient care activities take place in hospital-based (rather than office-based) practices.

Statistical analysis

We quantified the percentage of U.S. female physicians in first and senior authors of original research and editorials in the journals of interest by calculating proportions. Because we are counting the total number of female authors in the 5 journals of interest, we report frequencies and not means. We calculated 95% confidence intervals (CIs) for the proportions. The Cochran-Armitage trend test was used to test the trend over time, and the reported *P* values relate to the significance of the trends.

For the analysis of original research articles, we compared the proportion of female first or senior authors at each year with the expected proportion at each year by using the χ^2 test. The expected proportion of female

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