Trends in the Gender Ratio of Authorship at the Robert Graham Center

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ABSTRACT

Gender disparities in medical publication have been demonstrated in several specialties. This descriptive bibliometric analysis aims to determine the gender ratio of scholarly authorship at the Robert Graham Center (RGC) over an 11-year period. We examined publications by RGC researchers and assessed first, second, and last author gender. Of 229 publications, 65.5% had a male first author and 34.5% had a female first author. Of the 217 publications with a last author, 13.4% had a female last author. This study aims to inform the broader discussion about authorship gender parity in academic medicine using a one-site case-study approach.

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INTRODUCTION

Authorship of scholarly publications is relevant for advancement in academic medicine. Primary care and subspecialty disciplines have evaluated their bibliometric output by first and last author gender,[1-9] but there is limited comprehensive data on the authorship opportunities by gender in family medicine research.[10]

To encourage transparency, we examined the scholarly output of our own institution, the Robert Graham Center for Policy Studies in Family Medicine and Primary Care (RGC). Established in 1999, the RGC aims to contribute to the evidence base for primary care and family medicine service delivery. We assessed the publications from our center from 2008-2018, examining first, second, and last author gender. We compared trends in employment and authorship by gender for research personnel.

METHODS

The RGC has full-time research staff, 1-year research fellows, and monthly visiting research scholars. We examined the publications by these researchers between January 1, 2008 and December 31, 2018. An official staff, fellow, or scholar of the RGC must be a named author for a publication's inclusion in this study. The work must have been initiated while the author was at the RGC. We verified our internal archives using PubMed and Google Scholar searches of each staff and fellow.

For each publication, we assessed the ordered list of authors, publication year, journal, and publication type as labeled by each journal. Reports, white papers, blog posts, editorials, or commentaries were excluded. We included original articles, policy briefs, clinical review articles, and other peer-reviewed–journal published work.

We designated "male" or "female" gender for first, second, and last author by author first name. We conducted Google searches for gendered pronouns for uncertain cases.[4] We designated sole authors as first authors, consistent with previous methods.[4] For publications with 2 authors, we designated the authors as first and second author.

We used internal lists of RGC staff, fellows, and scholars to assess research personnel gender, excluding non-research administrative staff.

Conflict of interest: authors report none.

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Table 1. Robert Graham Center Authorship and Researchers by Gender, 2008-2018

Year	Total	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	*P* Value
No. of Publications													
First author													<0.01
Female, No.	79	3	4	5	1	6	8	7	9	22	7	7	
Total	229	16	14	17	17	17	23	30	24	31	21	19	
Female, %	34.5	18.8	28.6	29.4	5.9	35.3	34.8	23.3	37.5	71.0	33.3	36.8	
Second author													<0.01
Female, No.	71	3	3	5	4	4	4	8	11	12	8	9	
Total	228	16	14	17	17	17	22	30	24	31	21	19	
Female, %	31.1	18.8	21.4	29.4	23.5	23.5	18.2	26.7	45.8	38.7	38.1	47.4	
Last author													<0.01
Female, No.	29	1	2	5	3	1	1	2	6	5	2	1	
Total	217	16	13	14	17	16	22	29	21	31	19	19	
Female, %	13.4	6.3	15.4	35.7	17.6	6.3	4.5	6.9	28.6	16.1	10.5	5.3	
Any author													<0.01
Female, No.	136	6	7	12	7	11	11	15	19	25	12	11	
Total[a]	229	22	20	28	24	28	34	44	41	55	32	29	
Female, %	59.4												
Unique authors													0.637
First author													
Female, No.	53	3	3	4	1	6	5	5	5	17	2	2	
Total	111	11	4	11	8	7	10	13	10	22	8	7	
Female, %	47.7	27.3	75.0	36.4	12.5	85.7	50.0	38.5	50.0	77.3	25.0	28.6	
Second author													0.915
Female, No.	43	3	3	4	4	2	4	5	5	7	1	5	
Total	87	6	9	7	9	9	9	6	7	11	7	7	
Female, %	49.4	50.0	33.3	57.1	44.4	22.2	44.4	83.3	71.4	63.6	14.3	71.4	
Last author													<0.01
Female, No.	18	0	2	2	1	1	1	1	5	2	2	1	
Total	64	3	7	7	6	5	5	5	7	8	5	6	
Female, %	28.1	0.0	28.6	28.6	16.7	20.0	20.0	20.0	71.4	25.0	40.0	16.7	
Any author													0.529
Female, No.	97	5	6	10	6	7	8	11	13	20	5	6	
Total	203	16	13	21	20	16	17	20	20	29	16	15	
Female, %	47.8	31.3	46.2	47.6	30.0	43.8	47.1	55.0	65.0	69.0	31.3	40.0	
Researchers (weighted by month)													0.419
Female, No.	55.33	2.67	1.83	1.75	3.25	4.75	5.17	7.50	7.08	6.75	6.75	7.83	
Total	127.0	7.75	8.17	8.67	8.75	9.25	9.00	14.50	14.50	15.25	15.75	15.42	
Female, %	43.6	34.4	22.4	20.2	37.1	51.4	57.4	51.7	48.9	44.3	42.9	50.8	

[a]Publications are counted multiple times for the category "Number of Publications - Any Author" as some have both male and female authors as first, second, or last author.

We recorded employment tenure by month January 1, 2008 through December 31, 2018. We assigned gender by first name for all research personnel. Yearly researcher counts are weighted by the proportion of months present at the RGC.

We used 2 independent samples *t* tests to assess rates of first, second, and last authorship by gender at the publication and unique-author levels. We used X^2 tests to assess differences in first author gender by last author gender. Statistical analysis was conducted using Stata 14.2 (StataCorp, LLC).

This study was determined exempt by the American Academy of Family Physicians Institutional Review Board.

RESULTS

The final sample included 229 unique publications. Of these, 96.5% had any male authorship in the first, second, or last author roles, and 59.4% had any female authorship in the first, second, or last author roles (P <.01) (Table 1). Of all 229 publications, 65.5% had

a male first author and 34.5% had a female first author (P <.01). Of the 228 publications with a second author, 31.1% had a female second author (P <.01). Of the 217 publications with a last author, 13.4% had a female last author (P <.01).

Over the study period, the rates of publications with female first, second, or last authors did not surpass 50%, apart from first authorship in 2016 (Figure 1). Female last author rates were below those of female first and second author rates throughout the study period, except in 2010.

There was no statistical difference in the rate of female first authorship by last author gender over the study period (P = .992). Publications with male last authors had female first authors at a rate of 34.6%, and those with female last authors had female first authors at a rate of 34.5%.

We examined the publications at the unique author level for each author type. The only significant difference between author gender was found for the last author role. There were 203 unique first, second, or last authors; 52.2% were male and 47.8% were female. For the 111 unique first authors, 52.3% were male and 47.7% were female (P = 0.637). Among the 87 unique second authors, 50.6% were male and 49.4% were female (P = .915). For the 64 unique last authors, 71.9% were male and 28.1% were female (P <.01).

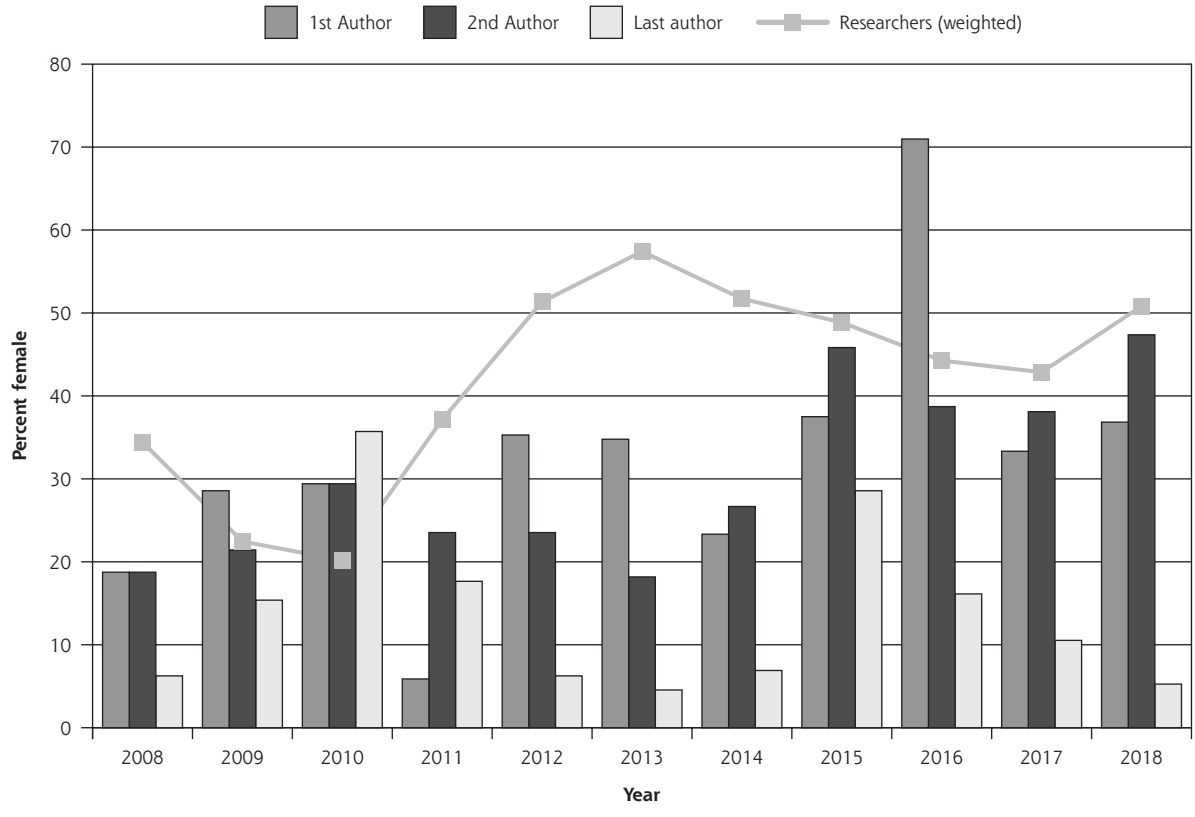
Across the study period, there were a total of 55.33 (43.6%) female researchers and 71.67 (56.4%) male researchers, weighted by month. We observed an increase in the proportion of female researchers from 34.4% in 2008 to 50.8% in 2018 (Figure 1).

DISCUSSION

The rate of female publications by year does not follow the anticipated female work output based upon ratio of female-to-male researchers by year. This gender gap does appear to be narrowing for first and second authorship, but it persists for the last authorship role, demonstrated by a 43.8 percentage point difference between unique male and female last authors. This follows trends found in other specialties in studies of journal publications.[1,9]

Our findings are limited by the potential for missing publications or personnel and gender misidentification due to use of binary gender and first name for classification. Furthermore, we do not assess experience or role of authors. Finally, the study captures published works and does not include manuscripts.

Figure 1. Percent female authorship and researchers (weighted), 2008-2018.



To our knowledge, no other primary care organization has published data on gender differences in publication within their organization. While we are a single research center and these findings may have limited generalizability, this methodology can be replicated in other settings to examine the opportunities for female researchers.

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