

## EDITORIAL

# Consequences of the COVID-19 Pandemic on Manuscript Submissions by Women

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**The coronavirus disease 2019 (COVID-19)** pandemic has had far-reaching consequences for many people and has amplified disparities that existed before the pandemic. One area that has received attention pertains to women, especially female parents, in academic environments. Before the pandemic, women already assumed more of the household and child-care duties than their male counterparts.<sup>1-3</sup> With the pandemic, this disparity has likely been amplified and may now be adversely affecting the careers of women in academia in an unfortunate and lasting manner. With the shutdown of day-care centers and schools, women have assumed nearly twice as much of responsibility for caring for their children at home compared with men.<sup>4,5</sup> As such, women's ability to successfully work from home may be hampered, negatively influencing their academic productivity. It has been reported that during the COVID-19 pandemic, the percentage of men uploading manuscripts to the preprint servers arXiv.org and bioRxiv.org from March 15 to April 15, 2020, increased more than the percentage of women compared with the same period in 2019.<sup>6</sup> Authorship gender among 15 839 COVID-19 articles published between January 1 and June 5, 2020, was compared with 85 373 articles published in the same journals during 2019, with both samples being based on first and/or last authors with US affiliations.<sup>7</sup> The study found that women represented 5% less of first and last authorship positions in 2020 compared with men.

Given these 2 reports, we wanted to determine if a similar decrease in female authorship representation was present in manuscript submissions to *JAMA Surgery*. All manuscripts submitted to *JAMA Surgery* during April and May of 2019 and 2020 were examined. Gender of the first and last author was confirmed using <https://gender-api.com/>, and the country of

the author was abstracted. A total of 366 manuscripts were submitted to *JAMA Surgery* in April to May 2019, and 702 manuscripts were submitted in April to May 2020. Comparing 2020 with 2019, there was a 4% reduction in the percentage of women first authors, a 6% reduction of women last authors, and a 7% reduction in women as corresponding author (Table). While an assessment of the association between the COVID-19 pandemic and manuscripts submissions from different countries is not possible owing to the low numbers of submissions from some countries, *JAMA Surgery* is an international journal. During the first 6 months of 2020, 49.6% of manuscripts submitted to *JAMA Surgery* were from outside of the United States, with Asia and Europe representing the regions with the highest number of submissions after North America. Thus, the consequences of the COVID-19 pandemic on female authorship is likely not limited to North America but spans the world.

The implications of these data demonstrating that fewer women are submitting manuscripts to *JAMA Surgery* during the pandemic are potentially far reaching. First and foremost, the adverse effect of the pandemic on the academic career progression of women may be significant. As publications are the currency of academia and one of the main metrics assessed for promotion and tenure, women may face future challenges in this arena. The reduction of manuscript submissions by women likely represents only 1 aspect of the spectrum of problems women are facing in academic medicine. Women with children may be conducting less research, participating in the management of fewer clinical trials, and engaging in fewer local, regional, or national committees and societies. The challenges female parents are facing to deliver clinical care are also great. As more of clinical care has shifted toward telemedicine, women may face additional challenges

**Table. Manuscripts With Male or Female First, Last, or Corresponding Authorship Submitted to *JAMA Surgery* in April and May of 2019 and 2020<sup>a</sup>**

Characteristic	No. (%)		Absolute change, %
	2019	2020	
Manuscripts, No.	366	702	NA
First author			
Female	119 (33)	205 (29)	-4
Male	247 (67)	494 (70)	3
Last author			
Female	98 (27)	148 (21)	-6
Male	267 (73)	551 (78)	5
Corresponding author			
Female	105 (29)	156 (22)	-7
Male	260 (71)	542 (77)	6

Abbreviation: NA, not applicable.

<sup>a</sup> Authorship sex was not able to be identified in 0% to 0.57% of authorship sex categories.

with conducting professional sessions from their home, as their children may interrupt the telehealth sessions with patients. For the same reasons, women may also have challenges delivering educational talks to students and trainees via videoconference as well as performing virtual academic talks and virtual outreach visits. I have personally witnessed this challenge, although I recognize that my experience does not generalize to all specialties or professions. However, to date, I have yet to encounter a work-related videoconference with a male colleague during which their child has interrupted the meeting, but I have experienced many work-related videoconference meetings with female colleagues during which such interruptions occurred. Regardless of the etiology, the assumption of the bulk of childcare responsibilities at home can negatively affect the academic career progression of women with children.

Increased responsibility of childcare on female parents may also lead to greater work-related burnout among women. Burnout has been identified as higher among female surgeons compared with males surgeons.<sup>8</sup> Increased burnout has been associated with a disproportionate share of home and childcare

responsibilities assumed by women.<sup>2,8</sup> With the pandemic increasing this burden, women may be at a greater risk of leaving their academic medical careers.

While an immediate solution to this problem is not available, it would behoove academic institutions, funding agencies, and societies to recognize this increased burden on female parents and develop processes to try to alleviate these pressures. Creative and out-of-the box solutions require diverse and innovative thinking. Establishing different shifts that include night and weekend hours may help some female parents to deliver clinical care while their partners can care for their children. Extending the tenure clock most certainly should be done at academic institutions. Funding agencies should extend grant end dates and allow for increased funding carry-over from year to year. Allowances for part-time work should be provided, if needed. Relaxing other requirements as long as the work is completed in a timely manner is critical. All of these solutions and many more may help to prevent burnout and enable female parents to accomplish the goals they set out for their academic careers before the COVID-19 pandemic. It is our responsibility to assist in this endeavor.

#### ARTICLE INFORMATION

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