

Challenges for the female academic during the COVID-19 pandemic

Science and innovation benefit from diversity. However, as the global community fights COVID-19, the productivity and scientific output of female academics are disproportionately affected, leading to loss of women's scientific expertise from the public realm.

Women comprise 70% of the global health workforce and more than 50% of medical graduates in many countries. Despite this, women and gender minorities remain underrepresented in medical leadership. Only 22% of full professors in American medical schools¹ and 23% in Europe² are women. Women of colour are particularly underrepresented; only 0.5% of full professors in American medical schools are Black women.¹ Academic publishing is essential to career advancement. Women's first authorship in major medical journals has increased from 27% to 37% (1994–2014).³ Yet, COVID-19 is threatening progress by amplifying existing gender disparities.

Early data show that COVID-19 significantly affects women's publishing. Andersen and colleagues⁴ compared authorship of 1179 medical COVID-19 papers with 37531 papers from the same journals in 2019. At 30%, 28%, and 22%, women's shares of overall, first, and last authorship in COVID-19 papers decreased by 16%, 23%, and 16%, respectively. In a Github analysis of arXiv and bioRxiv submissions, Frederickson⁵ showed that, although preprint submissions are increasing overall, the number of male authors is growing faster than the number of female authors. Female authorship in other research fields shows similar trends.⁶ Our analysis of COVID-19 papers in *The Lancet* (n=159), excluding Editorials, World Reports, and Perspectives, indicates that overall, first, last, and corresponding female authorship was 30.8%, 24.4%, 25.8%,

and 22.9% respectively. Furthermore, most authorships (61.3%) were affiliated with institutions in high-income countries and with the European and central Asia region (40.2%; further methods and details are described in the appendix). Overall female authorship of COVID-19 research articles (32.9%) is similar to previously reported authorship (29%, 2016–17), but overall female authorship of COVID-19 comments (30.6%) is lower than previously reported (39%, 2018).⁷

Increasing the prominence of women and minorities in academia is crucial to the fight against COVID-19. Furthermore, ensuring that women's academic output is not disproportionately affected by COVID-19 might safeguard women's career trajectories. Challenges women in academia face are well documented in non-pandemic times. These challenges include male-dominated institutional cultures, lack of female mentors, competing family responsibilities due to gendered domestic labour, and implicit and subconscious biases in recruitment, research allocation, outcome of peer review, and number of citations.⁸ COVID-19 has led to unprecedented day care, school, and workplace closures exacerbating challenges. Recent data from the USA, the UK, and Germany suggest women spend more time on pandemic-era childcare and home schooling than men do.⁹ This is particularly difficult for single-parent households, the majority of which are female-headed.

The academic community, funders, and health professionals should support women in academia during this pandemic (and beyond). First, recognise that women are probably taking on more responsibilities than men are. Help families access safe childcare, and provide options for academics caring for family members, by considering the lockdown period as care leave so decreases in productivity do not hinder later career advancement. Second, recognise how gender bias

influences selection and evaluation of scientific experts and leaders during times of crisis. Women make up just 24% of COVID-19 experts quoted in the media and 24.3% of national task forces analysed (n=24).¹⁰ However, countries with female leaders have some of the best COVID-19 outcomes.¹¹ Amplify the voices of women with established records in infectious disease, pandemic response, global health, and health security. Third, collect and report institutional data on gender representation, including academic output and senior positions. Set clear, specific goals and guidelines and be proactive about identifying and addressing evidence on the impact of COVID-19. Give credit for ideas and ensure that first and last authorship is shared equitably and that contributions are acknowledged fairly among colleagues. Fourth, identify and address structural implicit and unconscious biases in research institutions (eg, hiring) and publication processes (eg, peer review outcome, number of citations). Consider offering training in bias or double-blinded peer review for scientific journals. Establish accountability mechanisms to ensure professionalism and report concerns. Finally, and most importantly, recognise that women from ethnic minority groups face additional challenges in academia, and take structural action to provide support and address these challenges.

Scientific expertise and knowledge from all genders are essential to build diverse, inclusive research organisations and improve rigour of medical research to tackle COVID-19. We can do better.

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See Online for appendix

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