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Author gender bias in paediatric journals and FOAM

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Women are disproportionately underrepresented within medical academia.¹ This gender bias has wide-reaching consequences, negatively impacting employment, promotion, and pay. Paediatric academia is an important area to investigate publication gender bias as women account for the greatest proportion of the clinical workforce in the United Kingdom.²

Free Open Access Meducation (FOAM) is a novel and expanding method of communicating best practice and research findings. FOAM refers to blogs, podcasts, websites, applications and other freely available resources used for medical education. Given its accessibility for potential authors, removal of funding needs and independence from large institutions, FOAM may be less subject to gender bias than traditional publishing methods. We, as a group of medical students who frequently use FOAM, collaborated with two paediatricians who develop FOAM resources, in order to assess and discuss the extent of gender bias in paediatric FOAM. Our team is actively working towards gender equality in medicine, most notably through Dr Knight's work as co-founder of Women Speakers in Healthcare and founder of www.paediatricfoam.com.

To our knowledge, there is no previously published work investigating gender bias within FOAM. FOAM's novel nature provides a unique opportunity to recognise, assess and tackle potential gender bias before FOAM becomes more institutionalised. To this end, we conducted a study collecting data on author gender within paediatric peer-reviewed and FOAM sources.

FOAM's novel nature provides a unique opportunity to recognise, assess and tackle potential gender bias.

Throughout this article, 'women' refers to those self-identifying as women. This may include cisgender, transgender or other gender identities. Gender identification was first approached by accessing the author's institutional webpage for self-chosen gendered pronouns. If this was unsuccessful, gender was identified from the author's name with guidance from 'www.babynames.com', as used in previous studies.³ Articles where an author's gender could not be established were excluded.

Paediatric FOAM sources were selected based on their ranking in the ALiEM Social Media Index.⁴ The top-ranking sites included were: Don't Forget the Bubbles, PEMBlog, Pediatric EM Morsels, Pediatric EM and PaediatricFOAM.

Paediatric peer-reviewed journals were selected based on the highest impact factor using Web of Science journal citation reports tool.⁵ The selected journals were *JAMA Pediatrics*, *Journal of Child Psychology and Psychiatry and Applied Disciplines*, *Pediatrics*, *Pediatric Allergy and Immunology*, and *Journal of Adolescent Health*. Publications that were either randomised controlled trials, systematic reviews, meta-analyses or observational studies were included.

We analysed 806 peer-reviewed journal articles with 5637 authors and 260 FOAM articles with 277 authors published in 2019 (Table 1). We found that women represented 56% of total authors within paediatric peer-reviewed publications, but only 33% within FOAM. There was relative homogeneity within the five paediatric journals (52%, 53%, 54%, 55% and 68%, respectively) however wide variation between the five FOAM resources (59% DFTB, 10% PEMBlog, 0% Pediatric EM Morsels, 56% Pediatric EM and 50% Paediatric FOAM).

While the slight predominance of women as the authors within paediatric peer-reviewed publications was expected as

	Peer-Reviewed Journal Publications	Free Open Access Meducation (FOAM) articles
Total number of articles	806	260
Total women as authors (%)	3181/5637 (56.43)	90/277 (32.50)
Total men as authors (%)	2456/5637 (43.57)	187/277 (67.50)
Women as first authors (%)	507/806 (62.90)	83/260 (31.92)
Men as first authors (%)	299/806 (37.10)	177/260 (68.07)
Women as last authors (%)	389/806 (48.26)	N/A
Men as last authors (%)	417/806 (51.74)	N/A

TABLE 1 Authorship of paediatric peer-reviewed journal publications and FOAM articles by gender.

similar progress has been observed elsewhere,⁶ the overall predominance of men as authors in paediatric FOAM was unexpected. We had thought that FOAM may be less subject to factors limiting gender equality in publishing elsewhere. Grant funding is not needed, and the time required to develop material is often less than generating peer-reviewed output and can be arranged more flexibly. In place of editorial boards are individual FOAM site curators or founders, which may make publication more accessible with less potential for structural bias.

The overall predominance of men as authors in paediatric FOAM was unexpected.

In the light of these findings, we reassessed the potential causes for gender bias observed within paediatric FOAM. Rather than formally structured editorial boards, FOAM sites typically have looser structures with founding members that write, commission and edit submissions. While this may seem more accessible, the disadvantage of this structure is that FOAM may be vulnerable to the Founder effect—perpetuating the conscious and unconscious intentions of the instigator.

Furthermore, FOAM is almost exclusively unfunded and non-institutional. Those seeking to write FOAM articles will need to do this outside of their contracted work, penalising authors with less time or less financial stability. FOAM is more difficult to cite and less well recognised for job applications.

Solutions must be considered to mitigate this gender bias while FOAM is still a new and growing structure. FOAM community awareness of this issue and conscious planning will be key. FOAM publishing of yearly author gender reports could be helpful to this end. Other top-down approaches, such as that promoted by Athena Swan—a charter established in the U.K. to recognise and promote gender equality within higher education and research—could be helpful. This could involve encouragement of women holding editorial board positions, mentor support for potential authors, and awards for FOAM sources promoting gender equality.

Solutions must be considered to mitigate this gender bias while FOAM is still a new and growing structure.

This is an important and emerging issue of equality within medical education. It is hoped that our observation and discussion will promote recognition of gender equality within FOAM and the work needed to achieve this for FOAM creators.

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