ORIGINAL ARTICLE

Association between woman authorship and woman editorship in infectious diseases journals: a cross-sectional study

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Research in context

Evidence before this study

Gender disparities are still pervasive in academic medicine. Among the many domains affected, the differential publication output of women is one of the best-documented aspects across medical disciplines. Recently, the underrepresentation of women in editorial boards has come to renewed attention emphasizing the powerful and strategic role editors embody. To our knowledge, the association between women editorship and women authorship has been under-investigated in infectious diseases thus far.

We searched PubMed/Medline for articles using the keywords “gender AND (equit* OR disparit* OR inequit* OR parit* OR gap) AND (academic OR publish* OR publication* OR authorship OR editor*) AND (medicine OR medical)” until May 20, 2022, without language restrictions.

Added value of this study

We investigate the complex interrelations between first and last authorship each with editorship, while taking a journal’s impact factor into account. In our analyses, we show a positive association between woman editorship and woman first and last authorship in infectious diseases journals. Interestingly, the woman-to-man ratio in first authors in infectious diseases journals is nearly equal. In contrast, woman last authors in infectious disease journals are underrepresented. Surprisingly, the proportion of woman editors in infectious diseases journals was comparable to obstetrics/gynaecology journals, despite the higher proportion of women clinicians in obstetrics/gynaecology.

Implications of all the available evidence

Differences in woman editorship partially explained gender disparities in first and last authorship in this study. Our data may support the notion that woman editorship potentially serves as a possible lever to increase woman authorship proportions in academic medicine journals.

ABSTRACT

Background:

Gender inequity is still pervasive in academic medicine, including publishing in scientific journals. We aimed to (i) ascertain the proportion of women among first and last authors and editors in infectious diseases (ID) journals and (ii) assess the association between woman editors and both woman first and last authors while controlling for a journal's impact factor (IF).

Methods:

In this observational cross-sectional study, we randomly selected 40 ID journals (ten from each IF quartile) and 20 journals (five from each IF quartile) in each "obstetrics/gynaecology" (OB/GYN) and "cardiac/cardiovascular systems" (CARDIO) as a comparator. First and last authors' names of all citable articles published during 2018/2019, and names of each journals' editors (including editors-in-chief, EiC) were retrieved; genders were predicted with genderize.io.

Findings:

A total of 11,027 ID articles were analysed, yielding a women-to-men ratio of 49·3% (5,350/10,853) *vs* 50·7% (5,503/10,853) among first authors (first author gender indeterminate in 1·5% [167/11,027] of the cases), and 34·9% (3,788/10,865) *vs* 65·1% (7,077/10,865) among last authors (last author gender indeterminate in 1·4% [155/11,027] of the cases), whereas seven articles had no author indexed. Of 495 ID journal editors, 32·3% (160/495) were women, and 37·5% (15/40) of EiC were women. Quasi-Poisson regression estimated a significant effect of woman editors on woman last authors (incidence rate ratio, IRR, 1·92; 95% CI 1·45–2·55; p<0·001) and on woman first authors (IRR, 1·32; 95% CI 1·06–1·63; p=0·012) in ID journals. The journal's IF exerted no effect in these analyses.

Interpretation:

The proportion of woman editors appears to influence the proportion of both woman last and first authors in the analysed ID journals. These findings may contribute to explain the gender disparities observed in women publishing activities in academic medicine and suggest a need for revised policies towards increased woman editorial representation.

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Key words:

Gender disparity, gender inequity, gender inequality, academic medicine, publishing, authorship, editorship, infectious diseases

INTRODUCTION

It is a sobering reality that women still suffer from gender disparity within academic medicine despite representing more than half of the health workforce.[1] Women publish less than men[2,3] and in less influential journals,[4,5] are less likely to be subsequently cited[6] and to hold an influential editorial position in medical journals.[7] There are many more domains where underrepresentation of women is evident, e.g., disparities among conference speakers and chairs, and guideline group leads,[8,9] leading to self-perpetuating hurdles that aggravate these disparities.[10] Ultimately, women have been shown to be less likely to reach seniority in academic positions, *i.e.*, full professorship, than their man counterparts, also in the field of infectious diseases (ID).[3,11]

As a surrogate, publishing output exemplifies academic productivity and career advancement like no other metric.[2,12] A high publication output is critical for promotions to professorship and leadership positions, and for receiving grants, awards, and speaker invitations.[13] Vice versa, progression on the ladder of academic hierarchy is crucial for further research output, possibilities for collaborations, and visibility in the scientific community. Of note, hierarchy levels within the publishing system also influence academic advancement,[12] rendering senior research positions even more susceptible to power-based gender disparities.

Gender disparity is not only found in authorship. Women continue to be underrepresented among editorial positions of medical journals and especially in ID journals, despite a continuous increase during the past decades.[7,14] Furthermore, women are underrepresented during the peer-review process as they are less likely to be invited to review articles.[15] Scientific gatekeeping by men in their strategic decision-making roles as editors and reviewers may contribute to the finding that women are less likely to publish in high-impact journals.[5,7] The gender of a journal's editors and/or chief editor may partly influence how likely a manuscript is considered for peer-review and publication. Factors which may directly or indirectly influence the editors' decisions include possible same-gender preference by editors,[16] as well as differences between man and woman authors regarding rhetorical style, self-assuredness of reportage, and preference for certain research methods or topics.[17] Overall, the complex relationship between women underrepresentation among editors as well as gender disparity among authors remains disputed, with causal mechanisms at play between those two domains not yet fully untangled.[18] There is a strong need within the scientific community to diagnose the underlying causes of these gender-based disparities in order to identify barriers and possible mechanisms and to alleviate gender gaps in publication output and representation in research. In our study focusing on ID journals, we hypothesized that a high proportion of woman editors would be associated with a high proportion of woman first authors and last authors. We aimed to (i) ascertain the proportion of women among first and last authors and editors in ID journals and (ii) assess the association between woman editors and both woman first and last authors while controlling for a journal's impact factor (IF).

METHODS

Study design and data sources

Due to the lack of a basis for meaningful sample-size calculations, we assumed that an association would be detectable by selecting at least 40 out of the 93 journals publishing human clinical ID research data with an IF indexed in the Journal Citation Reports (Clarivate Analytics) category of “Infectious Diseases” (ID). To confer an even distribution among IF quartiles, we randomly selected ten journals from each 2020 IF quartile as provided by the Journal Citation Reports and Web of Science (both Clarivate Analytics), using an R code to generate random numbers. Journals were included when they had an IF and when all first and last author given names were retrievable. Journals were excluded when the first and last author given names were systematically not provided via Clarivate and/or when they had only one editor listed. As comparator groups, we chose obstetrics/gynaecology (OB/GYN) as a speciality with a known high share of women workforce, and cardiology (‘cardiac and cardiovascular systems’ [CARDIO]), a specialty with a low women workforce (appendix p 3). For both comparator groups, we selected 20 journals each (out of 83 OB/GYN journals and 142 CARDIO journals), five from every IF quartile. We then retrieved all citable articles published during 2018 and 2019 for each of these journals via Journal Citation Reports and Clarivate Web of Science (Clarivate, 2021, all rights reserved). All citable articles refer to the total number of articles retrievable via Clarivate Web of Science for the years 2018 and 2019 that were counted towards the 2020 impact factor.

We then extracted all given and family names of the first and last authors of every article in downloading the excel files and manually curating the data. We utilized the genderize.io interface for Google Sheets and a self-programmed Python algorithm to estimate gender of each first and last author. Genderize.io is a tool utilized for binary gender prediction in previous studies with high accuracy rates for both man and woman first names.[19] In addition, we collected names of all editors-in-chief (EiC), deputy editors, section editors, and associate editors, for the years 2018 and 2019, and performed gender determination as described above (appendix p 3). The reporting of this study adhered to the STROBE statement (appendix pp 6-7).

Data quality and integrity

Data extraction was performed by two members of the study team in parallel, who performed cross-checks on 20% of each other's collected data. When genderize.io could not determine a gender, two members of the study team independently performed an additional internet search (appendix, p 3). To account for potential inaccuracies of genderize.io for predicted gender probabilities below 80%, we performed a subgroup analysis ("conservative cohort") with all articles for which a gender probability of ≥80% could be attained. For this conservative cohort, all genders predicted with a probability at the cut-off of 80% were additionally searched as described above.

Outcomes

The variables of interest were woman first authors and woman last authors. Factors with potential influence on the gender of authors included woman editor proportion, woman EiC status, and journal IF, all of which were included in the analyses as control variables. Additionally, we included the variable women workforce share for supplementary analyses which was operationalized as percentage of woman clinicians in the workforce of selected countries (appendix p 3). We calculated the proportion of woman first authors as the number of articles with a woman first author divided by the sum of articles with both woman and man first authors in a given journal. Articles without any authors or cases in which gender could not be determined were not included in this calculation.

Likewise, the proportion of woman editors was calculated as the number of woman editors (including EiC, deputy editors, section editors, associate editors) divided by the sum of both woman and man editors in a given journal. The variable woman EiC was determined as a binary outcome per journal.

Statistical analysis

Differences in the number of woman EiC (including Co-editors-in-chief) between high-impact journals and low-impact journals were compared using Fisher's exact test. We used Spearman rank correlation to test associations between woman editorship and woman authorship as well as between journal IF and woman authorship. We assessed the association between woman editorship and woman first and last authorship by fitting a quasi-Poisson regression model and including IF as a control variable. Logarithmic transformation was used for non-normally distributed predictor variables. R Studio (Version 1.3.1093), Python (3.9.6), and Prism 9.0.0 (GraphPad) were used for statistical analyses. The statistical significance level was set at 0·05.

Role of the funding source

The funding source had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

RESULTS

We analysed 11,027 articles from 40 indexed ID journals alongside 6,450 and 7,157 articles from 20 OB/GYN and 20 CARDIO journals, respectively (table 1).

Of the 11,027 ID articles, 167 (1·5%) had an indeterminable first author gender, and 155 (1·4%) had an indeterminable last author gender, and 7 (0·1%) no authors indexed (Table 2). Among first authors, 5,350 (49·3%) were predicted to be women and 5,503 (50·7%) were men. Among last authors, women and men accounted for 3,788 (34·9%) and 7,077 (65·1%), respectively.

Pertaining to ID journals, we identified 577 editors; of these, 190 (32·9%) were identified as women and 387 (67·1%) as men (table 1).

In comparison, the proportion of woman first authors was higher in OB/GYN journals (58.2%; 3,696/6,347; first author gender indeterminate in 51 cases; no authors indexed in 52 cases) and lower in CARDIO journals (28·6%; 2,015/7,056; first author gender indeterminate in 86 cases; no authors indexed in 15 cases), while the proportion of woman last authors were 43·6% (2,924/6,303; last author gender indeterminate in 95 cases) in OB/GYN journals and 16·9% (1,186/7,027; last author gender indeterminate in 115 cases) in CARDIO journals (table 1). Woman editor proportions were similar in OB/GYN journals (34·1%; 103/302), and lower in CARDIO journals (16·8%; 93/553), compared to ID (32·9%, 190/577).

When comparing the number of woman EiCs between specialties, there was a non-significantly lower number of woman EiCs in ID journals than OB/GYN (13/40 *vs* 12/20; p=0·055), and a significantly higher number compared to CARDIO journals (0/20; p=0·003) (table 1; appendix p 5).

In a first step, a bivariate association was estimated to approximate crude effects. There was a significant positive association between the proportion of woman editors and a) woman first authors (R_s 0·62, 95% CI 0·38–0·79; p<0·0001) and b) woman last authors in ID journals (R_s 0·63, 95% CI 0·38–0·79; p<0·0001) (figure 1). Additional bivariate associations are shown in the appendix (p 4).

For the aggregated dataset, *i.e.*, combined data of ID, OB/GYN, and CARDIO, we observed an association between woman last author proportion and woman first author proportion (figure 2).

We performed a quasi-Poisson regression analysis on an aggregated model for all three specialties (ID, OB/GYN, CARDIO). We found that for the dependent variable woman first authorship, the factor with the strongest impact was the proportion of woman editors (incidence rate ratio, IRR 1·80, 95% CI 1·32 – 2·44, p<0·001), alongside woman last authorship (IRR 1·26, 95% CI 1·09 – 1·45, p=0·002) and woman EiC (IRR 1·22, 95% CI 1·08 – 1·39, p=0·002). Journal IF was not significantly associated with woman first authorship (IRR 0·92, 95% CI 0·78 – 1·09, p=0·346). Woman last authorship as dependant variable was significantly associated with woman editorship (IRR 2·56, 95% CI 1·70 – 3·85, p<0·001), woman EiC (IRR 1·29, 95% CI 1·09 – 1·52, p=0·003), and woman first authorship (IRR 1·28, 95% CI 1·05 – 1·58, p=0·017). Again, journal IF showed no significant association (IRR 0·90, 95% CI 0·72 – 1·14, p=0·395) (table 3).

Quasi-Poisson regression analyses specifically for ID journals yielded that woman first authorship as dependant variable was significantly associated with the proportion of woman editors (IRR 1·32, CI 1·06 - 1·63, p=0·012), while women EiC, woman last authorship or journal IF had no significant effect (table 4).

When woman last author was used as a dependent variable, we observed again that the proportion of woman editors was significantly associated with woman last authorship (IRR 1·92, 95%CI 1·45–2·55, p<0·001), with again woman EiC, journal IF, and woman first author reaching no significant effect (table 4).

Supplementary regression analyses included the control variable woman “workforce share”, which was a significant predictor of the proportion of woman in first and last authorship. Of note, woman editorship was also a significant predictor of both woman first and last authorship in these analyses, independently from the woman workforce share (appendix p 8, table S2).

Regression analyses on the conservative ID cohort (*i.e*. predictive gender probability above 80%) yielded comparable results (appendix p 8, table S3) compared to the main analyses. Results of the specific regression analyses regarding the OB/GYN and CARDIO journals are shown in the appendix (p 9), alongside the journal characteristics (p 10).

DISCUSSION

We found that the woman-to-man ratio in first authorship in 40 selected ID journals was nearly equal (49·3% *vs* 50·7%), a laudable finding which demonstrates near gender equity for the years under consideration. As this partially contradicts previous research regarding gender differences in first authorship in the field of ID,[3] this differential finding may be due to reasons such as sample size differences or sampling of the journals, also exemplified by the large range of woman first author proportions observed in our dataset. An additional factor for explanation may have been recent efforts by ID journals and societies to increase women representation at all levels of the publication submission and review process.[11,20]

In contrast, the woman-to-man ratio in last authorship was considerably lower in ID journals (34·9% *vs* 65·1%) in our analyses, which is in line with previous research in other medical specialties.[4] More rigorous efforts seem to be warranted to increase research output by women in senior author positions, since first authorship appears to not automatically translate into last authorship later in the career ("senior author gender gap")[4] due to, e.g., gender-based task specialization and contributorship in research teams, besides other reasons.[21] In general, last authorship necessitates more seniority in research experience, international recognition, and expertise, which accumulates over the course of a career, but depends on additional factors within the publication process and academic medicine's structural setup as well.[22]

Furthermore, we found that the proportion of woman editors in ID journals (32·9%) was similar to OB/GYN (34·1%) and higher as in CARDIO journals (16·8%). Overall, gender parity among editors clearly remains elusive in all three journal categories. The nearly similar proportion of woman editors in ID as in OB/GYN journals is a surprising finding given the substantially higher proportion of women clinicians working in OB/GYN and publishing as first and last authors. For ID and academic medicine in general, unequal gender representation in editorial positions has been demonstrated before.[3,14,23] Our results complement this finding.

In our regression models, woman editorship was significantly associated with woman first and last authorship: the higher the proportion of woman editors across ID journals, the higher the proportion of woman first and last authors in the analysed time period. This effect was also observed in the aggregated data model across all ID, OB/GYN, and CARDIO journals, albeit additional factors showing significance in this model as well, *i.e.*, EiC. Journal IF was not associated with first or last authorship in any of the ID or the aggregated model which contradicts previous reports on first authorship, but complements data on last authorship.[4]

The reciprocal association between woman first and last author observed in the aggregated model is suggestive of endogeneity that we did not analyse further, and which would necessitate a more complex statistical approach. Likewise, as our supplementary analyses show, the impact of the proportion of women in the healthcare workforce of ID, OB/GYN and CARDIO on authorship is unsurprising. However, woman editorship was still independently predictive for woman authorship despite including workforce share as control variable in the model.

Overall, our findings indicate a potential effect of woman editorship on woman authorship. Among other reasons, one possible explanation for this is unconscious and implicit gender bias among editors when judging a submitted article.[24] This has been demonstrated in a recent study within gastroenterology, in which editorial boards dominated by men were correlated positively with man first and last authorship.[16] The same seem to apply to grant funding assessments,[25] in which women were rated less favourably than their man counterparts despite similar intellectual content. On the contrary, in a pilot study on one ID journal, articles submitted by women were more likely to be accepted by both woman and man editors than those submitted by man authors.[26] A more recent analysis across several disciplines, including biomedicine and health, seems to support this finding.[18] However, both studies have limitations such as excluding desk-rejections as unit of analysis.

Certainly, other factors in the peer-review process may be at play and may aggravate this gender bias. This includes differences between men and women authors regarding rhetorical style, self-assuredness of reportage, or questioning editorial decisions of rejection.[17,27] Furthermore, the editors' and reviewers' preference for authors from prestigious institutions or with previous reputation in the field under consideration as well as preference for certain research methods may create implicit and indirect gender bias.[28]

Many decisions in the publishing and especially the peer-review process are not yet transparent enough to prevent all-men and authoritative circles to dominate and influence decision-making.[5] In competitive research and academic settings, many roles, gender norms, and rules are often aligned with bold and self-assertive behaviour, disproportionately privileging men.[19,27] Ultimately, woman authors may feel discouraged to submit their research work to an all-men editorial board or to a man EiC; and more senior woman researchers may refrain from applying to man-dominated editorial positions or a man EiC.

Our study has strengths which contribute to the robustness of the findings. Firstly, we included a large share of indexed ID journals, *i.e.*, 40 out of 93 with an IF indexed in the Journal Citation Reports, thereby reaching meaningful statistical results with a high point estimate and minimizing the risk of chance findings. Secondly, we aimed to represent all journal ranks by including ten journals per IF quartile. Furthermore, we enriched the gender prediction process with manual screening, which contributed to the overall very low rate of indeterminate author names. In addition, we conducted supplementary analyses on a subgroup with very high genderize.io prediction probability (*i.e.*, ≥80%). These results were comparable to our main results.

There are limitations to our study. One limitation is the lack of information on the number and gender distribution of submitted manuscripts as a denominator for the published papers. Furthermore, in a minor proportion of authors, gender could be estimated neither by genderize.io nor by individual internet research, especially in journals with a high share of authors with gender-neutral names. However, this indeterminate rate was ultimately very low (<2%), due to our aforementioned approach. Our methods were unable to account especially for self-perceived gender identities that diverge from the binary gender their first names suggest. This individual gender conceptualization would only have been ascertainable with an accompanying survey complementing the genderize.io analysis. Given the large dataset, individual author consultation was not manageable, and we surmise that resulting inaccuracies are overall rather minor. Another limitation is that we analysed all citable articles without sub-categorising, e.g., in original research articles or reviews. Similarly, we did not analyse time trends, an endeavour beyond the scope of this work, but desirable to conduct in the future, nevertheless. Lastly, we did not take into account the country of origin of authors; the number of total authors and their gender composition; and/or corresponding author gender, all of which may have independent effects on publishing outcome but also influence the gender of the first and last author.[27]

Gender parity in academic medicine remains a yet to be achieved multi-stage ideal and a challenge at the same time. Our findings show near gender parity in first authorship in ID journals, while equal gender representation is far from achieved regarding last authorship and editorship.

This partial success should be lauded, but also framed as call for action to extend gender equity to the remaining domains such as last authorship and editorial representation. Sustained efforts are needed over time to translate gender equity in first authorship into increased woman last authorship representation, especially in light of the setbacks for woman researchers' output caused by the Coronavirus disease 2019 pandemic.[19] Efforts to increase the number of women among EiCs and editors may positively influence gender representation among first and last authors, as indicated by our aggregated analyses across all three journal categories.

Among the actions taken within the past years, the composition of editorial teams may have been undervalued as potential mechanism to increase woman authorship. Likewise, increasing the number of woman EiCs may serve as a valuable tool to increase the overall proportion of woman editors.[14] Based on our analyses, gender balance among editors and EiC positions may be a promising policy tool to help counteract disparity in academic publishing especially regarding last authorship publications.

The effects of such numeric gender parity may extend well beyond the mere concept of checks and balances. In analogy to the observations made during scientific conferences,[9] it may create visibility of women and generate political momentum, potentially contributing to gender equity on other levels as well.[29] Gender disparities at all levels in medicine also have profound implications for society, as diversity in leadership positions is needed to reach balanced decisions and produce more representative health science.[19] Gender equity is therefore, besides being a matter of justice and rights for all, decisive for diversifying science to produce more rigorous research[30] and provide the best possible care to patients. Furthermore, gender inequities in academic publishing should not be framed as a personal shortcoming at an individual level, but as a systemic problem affecting half of medicine's workforce.

Further quantitative and qualitative studies are needed to better illuminate the intrinsic mechanisms and modalities of editorial decision-making processes, especially with regards to the share and success of submissions authored by women.

Contributors

KL and CP conceived of and conceptualized the study. KL, LH, SEM, and CP collected the data. KL and CP accessed and verified all the data. KL, CP and MW conducted the statistical analyses. All authors interpreted the data. KL and CP wrote the first draft of the manuscript. All authors critically revised the manuscript and approved the final version for submission.

Data sharing

Data obtained during this study are subject to copyright regulations and thus cannot be shared.

Declaration of interests

We declare that we have no conflicts of interest.

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TABLES

Table 1. Number of screened articles, journals, respective impact factors, and gender distribution among first authors, last authors, and editors, for journals from the different fields of infectious diseases (ID), obstetrics and gynaecology (OB/GYN), and cardiac and cardiovascular systems (CARDIO); IQR: interquartile range.

	ID	OB/GYN	CARDIO
Citable articles from 2018 and 2019 analysed	11,027	6,450	7,157
Number of journals analysed	40	20	20
Median impact factor (IQR)	3·625 (2·632–5·571)	2·839 (2·004–3·981)	3·067 (2·550–5·550)
Articles with woman first author, total	5,350	3,696	2,015
Articles with man first author, total	5,503	2,651	5,041
Articles with indeterminate first author gender, total	167	51	86
Articles without author, total	7	52	15
Woman:man first author ratio	49·3% : 50·7%	58·2% : 41·8%	28·6% : 71·4%
Articles with woman last author, total	3,788	2,747	1,186
Articles with man last author, total	7,077	3,556	5,841
Articles with indeterminate last author, total	155	95	115
Woman:man last author ratio	34·9% : 65·1%	43·6% : 56·4%	16·9% : 93·1%
Number of woman editors, total	190	103	93
Number of man editors, total	387	199	460
Number of woman chief editors (%)	13 (32·5%)	12 (60·0%)	0 (0·0%)
Woman:man editor ratio	32·9% : 77·1%	34·1% : 65·9%	16·8% : 83·2%

Table 2. Characteristics of 40 ID journals analysed within this study. Number of first authors with indeterminate gender: 167; number of last authors with indeterminate gender: 167; number of articles without author: 10. EiC: editor-in-chief; IF: impact factor.

	2020 IF	citable articles	first authors woman	first authors man	First authors woman proportion	Last authors woman	Last authors man	Last authors woman proportion	editors woman	editors man	editors woman proportion	EiC woman
Lancet ID	25·071	283	119	164	**42·0%**	88	195	**31·1%**	1	4	**20·0%**	no
Lancet HIV	12·767	133	57	76	**42·9%**	55	78	**41·4%**	2	2	**50·0%**	no
Clin Infect Dis	9·079	1,146	531	609	**46·6%**	381	753	**33·6%**	7	10	**41·2%**	no
J Travel Med	8·490	102	53	48	**52·5%**	22	78	**22·0%**	12	24	**33·3%**	yes
Emerg Infect Dis	6·883	667	325	342	**48·7%**	206	451	**31·4%**	5	26	**16·1%**	no
Eurosurveillance	6·307	384	219	164	**57·2%**	175	205	**46·1%**	15	11	**57·7%**	yes
Travel Med Infect Dis	6·211	133	60	71	**45·8%**	42	89	**32·1%**	3	6	**33·3%**	yes
J Infect	6·072	237	103	126	**45·0%**	73	161	**31·2%**	3	12	**20·0%**	no
Int J Hyg Envir Heal	5·840	243	136	103	**56·9%**	94	146	**39·2%**	6	7	**46·2%**	yes
J Antimicrob Chemother	5·790	980	474	482	**49·6%**	305	650	**31·9%**	2	9	**18·2%**	no
Curr Opin Infect Dis	4·915	165	75	90	**45·5%**	52	113	**31·5%**	5	15	**25·0%**	no
Epidemics	4·396	101	45	56	**44·6%**	29	72	**28·7%**	8	19	**29·6%**	no
Influenza Other Respir Viruses	4·380	158	72	81	**47·1%**	63	91	**40·9%**	2	4	**33·3%**	no
Medical Mycology	4·076	314	172	134	**56·2%**	115	195	**37·1%**	7	18	**28·0%**	no
J Glob Antimicrob Resist	4·035	343	174	157	**52·6%**	103	232	**30·7%**	15	44	**25·4%**	yes
Open Forum Infect Dis	3·835	823	382	431	**47·0%**	291	529	**35·5%**	4	9	**30·8%**	no
One Health	3·800	50	31	19	**62·0%**	20	29	**40·8%**	1	1	**50·0%**	yes
Curr Infect Dis Rep	3·725	102	57	45	**55·9%**	42	59	**41·6%**	10	9	**52·6%**	no
J Virus Erad	3·696	79	43	33	**56·6%**	28	49	**36·4%**	3	0	**100·0%**	yes
Infection	3·553	226	83	141	**37·1%**	52	170	**23·4%**	1	15	**6·3%**	no
Sexually Transm Infect	3·519	210	114	92	**55·3%**	106	102	**51·0%**	18	13	**58·1%**	yes
Infect Dis (London)	3·404	161	67	90	**42·7%**	60	98	**38·0%**	1	4	**20·0%**	no
Eur J Clin Microbiol Infect Dis	3·267	555	279	260	**51·8%**	173	366	**32·1%**	2	17	**10·5%**	no
Infect Control Hosp Epidemiol	3·254	449	224	223	**50·1%**	174	272	**39·0%**	4	5	**44·4%**	yes
Pathogens and Disease	3·166	163	80	77	**51·0%**	62	98	**38·8%**	2	14	**12·5%**	no
J Pediatric Infect Dis Soc	3·164	195	98	96	**50·5%**	88	106	**45·4%**	5	9	**35·7%**	no
Am J Infect Control	2·918	576	325	242	**57·3%**	261	307	**46·0%**	9	3	**75·0%**	yes
Diagn Microbiol Infect Dis	2·803	451	205	237	**46·4%**	148	293	**33·6%**	1	6	**14·3%**	no
Med J Hematol Infect Dis	2·576	125	59	65	**47·6%**	36	89	**28·8%**	1	7	**12·5%**	no
AIDS Reviews	2·500	40	9	31	**22·5%**	8	32	**20·0%**	3	3	**50·0%**	no
Transpl Infect Dis	2·228	337	169	163	**50·9%**	106	230	**31·5%**	2	6	**25·0%**	no
Surgical Infections	2·150	227	68	150	**31·2%**	61	164	**27·1%**	0	2	**0·0%**	no
Braz J Infect Dis	1·949	137	78	57	**57·8%**	48	86	**35·8%**	3	2	**60·0%**	no
Rev Inst Med Trop Sao Paulo	1·846	130	84	44	**65·6%**	60	70	**46·2%**	9	5	**64·3%**	yes
J Chemother	1·714	112	58	51	**53·2%**	28	83	**25·2%**	1	2	**33·3%**	yes
J Vec Borne Dis	1·688	109	45	58	**43·7%**	25	74	**25·3%**	3	8	**27·3%**	no
Jpn J Infect Dis	1·362	185	63	119	**34·6%**	31	149	**17·2%**	1	21	**4·5%**	no
HIV Res Clin Pract	1·200	15	8	7	**53·3%**	7	8	**46·7%**	1	2	**33·3%**	yes
Leprosy Review	0·537	82	49	31	**61·3%**	30	47	**39·0%**	3	5	**37·5%**	no
J Pediatr Infect Dis - Ger	0·293	99	57	38	**60·0%**	40	58	**40·8%**	9	8	**52·9%**	no
TOTAL		11,027	5,350	5,503	**49·3%**	3,788	7,077	**34·9%**	190	387	**32·9%**	13

Table 3. Quasi-Poisson regression model for aggregated data (ID, OB/GYN, CARDIO); EiC: editor-in-chief; IF: impact factor. Statistically significant p-values are indicated in bold. R^2 Nagelkerke 0·998 (women first author) and 1·000 (women last author).

Variable	Incidence rate ratio	95% confidence interval	p-value
Outcome: woman first author			
Woman EiC	1·22	1·08 – 1·39	**0·002**
Woman editor proportion	1·80	1·32 – 2·44	**<0·001**
Woman last author	1·26	1·09 – 1·45	**0·002**
Journal IF	0·92	0·78 – 1·09	0·346
Outcome: woman last author			
Woman EiC	1·29	1·09 – 1·52	**0·003**
Woman editor proportion	2·56	1·70 – 3·85	**<0·001**
Woman first author	1·28	1·05 – 1·58	**0·017**
Journal IF	0·90	0·72 – 1·14	0·395

Table 4. Quasi-Poisson regression model for ID journals with women first author or women last author as dependent variable; EiC: editor-in-chief; IF: impact factor. Statistically significant p-values are indicated in bold. R^2 Nagelkerke 0·700 (women first author) and 0·855 (women last author).

Variable	Incidence rate ratio	95% confidence interval	p-value
Outcome: woman first author			
Woman EiC	1·08	0·98 – 1·18	0·123
Woman editor proportion	1·32	1·06 – 1·63	**0·012**
Woman last author	1·08	1·08 – 1·19	0·120
Journal IF	0·91	0·81 – 1·04	0·164
Outcome: woman last author			
Woman EiC	1·02	0·90 – 1·15	0·792
Woman editor proportion	1·92	1·45 – 2·55	**<0·001**
Woman first author	1·07	0·93 – 1·22	0·350
Journal IF	0·97	0·82 – 1·15	0·724

FIGURES

Figure 1. Correlation between woman editor proportion and woman author proportion, journal impact factor and woman author proportion, and journal impact factor and woman editor proportion for each specialty category.

Figure 2. Scatter plot of journals of each specialty, each dot represents one journal. X-axis shows woman last authors per analysed articles, y-axis shows woman first authors per analysed articles.