Is There a Sex Bias in Choosing Editors?

Epidemiology Journals as an Example

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Context.—Editors, authors, and reviewers are influential in shaping science. The careers of women in public health have received less scrutiny than those of women in medicine and other branches of science. The performance of women as editors, authors, and reviewers in epidemiology has not been previously studied.

Objective.—To examine changes over time in the representation of women at the editorial level in US epidemiology journals compared with the proportion of women authors and reviewers.


Subjects.—Editors, authors, and reviewers for the selected years.

Main Outcome Measures.—Sex of editors, authors, and reviewers.

Results.—We identified 2415 reports associated with 8005 authors. One of 7 editors in chief was a woman, a position she shared with a man. For all journals, the proportion of editors who were women ranged from 5 (6.5%) of 77 in 1982 to 42 (16.3%) of 258 in 1994. Over all journals and all years, women comprised a higher proportion of authors (28.7% [2225/7743]) compared with reviewers (26.7% [796/2982]) or editors (12.8% [89/696]).

Conclusions.—Fewer women in public health hold editorial positions than are authors and reviewers. The reasons for this important discrepancy, including the possibility of a selection bias favoring men, should be further investigated.

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OVER THE YEARS, there has been a steady interest in the career paths of women in science.1,4,5 Perhaps the main reason for this is related to the generally low proportion of women who have chosen to pursue advanced degrees, and the even smaller proportion who have followed an academic path and been promoted.4,6 Several studies have examined why women tend not to choose a science career, and why, once a science career is chosen, women tend not to achieve (using traditional measures of achievement, such as promotions and number of publications) at the same level as men.5,7

Careers of women in public health have received less scrutiny than careers of women in the life and physical sciences and in medicine. Women have always played a major role in public health and in epidemiology, one of the major disciplines within public health. Women made up 35% of the membership of the epidemiology section of the American Public Health Association (APHA) in 1983, and 46% of the membership of the Society for Epidemiology Research in 1996 (S. Adams, oral communication, July 18, 1996). Women comprised 44% of graduate students enrolled in epidemiology programs in US schools of public health in 1974 to 1975, and 59% in 1984,8 the latest date for which information was available. The proportion of women faculty in epidemiology departments has also increased over the years: women comprised 23% of the epidemiology faculty at schools of public health in 1976 to 1977, 30% in 1981 to 1982,8 and 36% in 1991.9

Few data are available regarding women’s career experience after graduate school. However, several measures of productivity used by appointments and promotions committees are related to publishing: authoring reports of research findings, reviews, editorials, and book chapters; reviewing manuscripts submitted to journals; and holding key editorial positions in scientific journals. Thus, we became interested in the publishing activities of women in epidemiology.

The current study examined the representation of women at the editorial level in US epidemiology journals, in comparison with the proportion of women authors and reviewers. We were interested in whether, during the period that their participation in the field had increased, women had contributed proportionately as published authors and whether they also had been selected for leadership roles in their field’s journals. We examined 2 research questions: (1) Does the proportion of women editors in US epidemiology journals reflect the proportion of women authors and reviewers for each of the journals? (2) Has the proportion of women as editors, authors, and reviewers in the epidemiology journals increased over time?

METHODS

Our study was approved as exempt by the Committee on Human Volunteers at the University of Maryland School of Medicine, Baltimore. We chose to study 4 major epidemiology journals published in the United States: American Journal of Epidemiology (AJE), Annals of Epidemiology (Annals), Epidemiology, and the Journal of Clinical Epidemiology (JCE) (formerly the Journal of Chronic Diseases). Because the number of senior women and women overall in the field has increased over time, we elected to examine changes over a 12-year period.

In 1995, we identified every report in every issue for selected years in which these journals were published (Annals and Epidemiology began publication in 1990). We abstracted the following information for each article: names of the first 8 authors and rank in the authorship list (eg, first author, second author), country with which the corresponding author was affiliated, and the journal citation. We also abstracted the names of all editors for each volume of the journal during the selected years. We defined editors as those who appeared to have been appointed to an editorial position relating to peer review; we did not include managing or executive editors. Editors emeriti were only counted if they were listed as members of 1 of the editorial positions named and were not counted if they were listed separately as former editors. We assumed 3 editorial tiers. Tier 1 included only the position equivalent to “editor in chief,” tier 2 was not always present and comprised a smaller group of individuals than tier 1, and tier 3 included the “editorial board.” Two volumes of AJE were published annually each year; we merged the 2 editorial lists, removed duplicate names, and counted each editor only once for each year, at the highest position held. We classified articles as original full report, brief report, editorial, letter to the editor, proceedings, review article, or book review.

Initially, we reviewed the author and editor lists and, to the extent possible, attributed a sex to each author and editor (hereafter, referred to as author), based on either knowing the person in question or knowing that the author’s first name was one associated exclusively with 1 sex (eg, Mary for women and John for men). When the “author” was a group (eg, the Atherosclerosis Risk in Communities Study Investigators), the author was classified as “corporate,” not assigned a sex, and omitted from all but the initial analysis. When named authors were followed by a corporate author (eg, Dyer AR et al, for the INTERSALT Cooperative Research Group), the named authors were included, but the corporate author was not. In the remaining cases, we were unable to determine the sex of the author based on first name, most often because the authors used initials instead of a first name and sometimes because the author’s first name was not associated exclusively with 1 sex (eg, Lee). We asked colleagues in person, by fax, through postings on the Internet, and through e-mail to review a list of authors whose sex we had not determined; from their responses, we were able to assign the sex of some authors. We then sent letters to the corresponding authors of all articles with at least 1 author whose sex we had not yet determined asking for their assistance in identifying the sex of their coauthors.

We also examined the published reviewer lists for each journal and year and classified reviewers according to sex. For journals publishing 2 reviewer lists in a single year, we counted the total number of women and reviewers on each list and added the totals to derive an overall proportion. We did not attempt to remove duplicate names. We sent the lists of reviewers and editors of unknown sex to current and past editors of the 4 journals asking them to identify the sex of those on the list.

We took approximately a 10% sample of the database to check for errors in data entry and classification, prior to analysis. Data were entered into Dbase, version III + (Ashton-Tate, Inc, Torrance, Calif) and Epi Info, version 5 (Epi Info, Inc, Stone Mountain, Ga) and analyzed using a $\chi^2$ test for differences in proportions (PC SAS, version 6.2, SAS Institute, Inc, Cary, NC).

### RESULTS

We identified a total of 2415 reports associated with 8005 authors (Table 1). Our initial efforts to identify author sex resulted in classifying approximately 75% of the authors. This, plus subsequent correspondence with colleagues, resulted in our identifying the sex of 7771 authors (96.7%). Of these, the sex of 822 authors (10.9%) was identified by query. The final sample included 2.8% of authors, 0% of editors, and 2.0% of reviewers of unknown sex. Unknown author sex was more likely when articles were published in 1982 (6.2%) or 1987 (5.5%) compared with 1992 (1.0%) or 1994 (1.4%), were original or brief reports, and when authors were affiliated with corresponding authors from Africa, Asia, or Israel.

The numbers of editors, reviewers, and authors by sex, including corporate authors and those of unknown sex, are shown for all years and journals in Table 2. The 4 journals had a total of 7 editors at tier 1 (“editors in chief”) over the 12-year period (AJE changed editorship in 1989); only 1 “editor in chief” was a woman, a position she shared with a man (see Table 3). The percentage of women at individual journals at the next level of editorship—tier 2—ranged in 1994 from 1 (7.1%) of 14 to 2 (100%) of 2. The proportion of tier 3 editors in 1994 who were women ranged from 5 (8.2%) of 61 to 7 (26.9%) of 26. Combining 1994 data for all journals, 1 (16.7%) of the 6 editors at tier 1, 8 (21.6%) of the 37 editors at tier 2, and 33 (15.3%) of the 215 editors at tier 3 were women.

Grouping all editors from all journals, the proportion of editors who were women ranged from 5 (6.5%) of 77 in 1982 to 42 (16.3%) of 258 in 1994; newer journals had

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**Table 1.** Authors of Unknown Sex by Year, Journal, Type of Article, and Location

<table>
<thead>
<tr>
<th>Year</th>
<th>Articles, No.</th>
<th>Authors, No.</th>
<th>Author’s Sex Unknown, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>344</td>
<td>1114</td>
<td>6.19</td>
</tr>
<tr>
<td>1987</td>
<td>521</td>
<td>1648</td>
<td>5.52</td>
</tr>
<tr>
<td>1992</td>
<td>853</td>
<td>2729</td>
<td>1.03</td>
</tr>
<tr>
<td>1994</td>
<td>747</td>
<td>2475</td>
<td>1.45</td>
</tr>
</tbody>
</table>

**Table 2.** Sex of Editors, Reviewers, and Authors

<table>
<thead>
<tr>
<th>Role</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editor</td>
<td>607 (87.2)</td>
</tr>
<tr>
<td>Women</td>
<td>89 (12.8)</td>
</tr>
<tr>
<td>Unknown</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Total</td>
<td>696 (100.0)</td>
</tr>
<tr>
<td>Reviewer</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>2143 (71.3)</td>
</tr>
<tr>
<td>Women</td>
<td>796 (26.7)</td>
</tr>
<tr>
<td>Unknown</td>
<td>43 (1.4)</td>
</tr>
<tr>
<td>Total</td>
<td>2982 (100.0)</td>
</tr>
<tr>
<td>Author</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>5518 (68.9)</td>
</tr>
<tr>
<td>Women</td>
<td>2225 (27.8)</td>
</tr>
<tr>
<td>Corporate</td>
<td>38 (0.5)</td>
</tr>
<tr>
<td>Unknown</td>
<td>204 (2.8)</td>
</tr>
<tr>
<td>Total</td>
<td>8005 (100.0)</td>
</tr>
</tbody>
</table>
a higher proportion of editors who were women (Table 4). Overall, when authors and reviewers not assigned a sex were excluded, a higher proportion of authors were women (28.7%), compared with reviewers (26.7%) or editors (12.8%), and these proportions were significantly different from each other for each year studied. The proportion of authors who were women was generally consistent across journals and years. We also found a fairly consistent pattern for reviewers across journals for recent years, although the proportion of reviewers who were women over all years ranged from 14.3% to 31.6%. (JCE did not list the names of reviewers at any time and Annals did not list them in 1992.)

To examine a possible cohort effect, whereby the reason for low representation of women as editors may reflect the relatively small numbers of senior women, we estimated the proportion of all first authors and last authors who were women. These proportions were similar to the proportion of all authors who were women. The proportion of women first authors ranged from 21.8% to 42.1%, with proportions fairly evenly distributed over the years and journals.

Because the authors of original and brief reports are likely to represent best the population of productive scientists, we obtained the same estimates for authors and first authors of these 2 types of reports. If anything, there was a greater proportion of women authors (29.5%) than the proportion of editors who were women (28.7%) and first authors (31.4%) of original and brief reports compared with women authors (28.7%) and first authors (29.5%) of all types of reports combined.

**COMMENT**

We found that the proportion of editors of US epidemiology journals who were women was low, although the proportion has increased in recent years and for newer journals. Other studies have reported that the proportion of editors in chief in life sciences and medical journals is low.

There are several possible explanations for these results. Because we lacked the funds to collect new data that would directly confirm or refute these explanations, we used various surrogate measures of women’s representation and productivity.

The first possible explanation is that women may perform at a lower level than men and may not merit selection to positions of authority in the same proportions as they are represented in the field overall. Assuming that the proportion of women authors provides an estimate of productive women, it does not appear that lack of merit is the reason for women’s low representation. In this study of epidemiology journals, the proportion of authors who were women (28.7% overall) is considerably higher than the proportion of editors who were women (12.8% overall). Furthermore, the proportion of epidemiology faculty at schools of public health who are women should reflect productivity of women epidemiologists, and this proportion (35.6% in 1991) is more than twice the proportion of editors who were women in 1992. Our results also showed that the proportion of women who were first authors of all reports (28.7%), last authors for all reports with 8 or fewer authors (29%), authors of original and brief contributions (31.4%), and reviewers (26.7%) exceeded the proportion of editors who were women. Reviewers are selected by the editors for their knowledge of the field and their ability to appraise research reports critically, and the proportion of women reviewers has increased over time.
Another possible explanation is that the current representation of women in the field of epidemiology is larger than the proportion of women in senior positions who are eligible for editorships of epidemiology journals because of more recent entry of women into epidemiology. We do not have data on the proportions of women who are potentially eligible for editorships, for example, full professors. However, the turnover in women epidemiology faculty compared with men is not any higher, and women have been represented as authors, first authors, and last authors in proportions reflecting their participation as faculty members in general. While these proportions have increased over time, (eg, women were 22.8% of all authors in 1982 and 31.4% of all authors in 1984), the proportion of editors in 1994 who were women is considerably lower than the proportion of authors in 1982 who were women. In addition, it does not appear that substantially more women have been added as editors in recent years: 23 (14%) of 164 of those who were editors in 1994 but not in 1982 (AJE and JCE only) were women. Thus, we do not believe that a cohort effect can fully explain our findings.

A third possible explanation is that women may be asked to serve on editorial boards but refuse. We have no information to support or refute this hypothesis; however, the representation of women in leadership positions of professional societies provides some insight on their acceptance of similar extracurricular appointments. Data on the proportion of women serving as officers in the APHA increased from 10% in 1973 to 30% in 1983. Furthermore, the representation of women as epidemiology section council officers in the APHA similarly reflected this change: 1 of 9 officers in 1973 were women and 3 of 7 in 1983. These data reflect increases in the number and proportion of women serving in extracurricular leadership positions and suggest that women would accept editorial board positions. In addition, the newer journals we examined had higher proportions of women, suggesting they were able to recruit women editors. Finally, a relatively high proportion of reviewers were women, implying that women are willing to accept peer review tasks, including those with less prestige than an editorship.

Persons may indicate to editors in chief or publishers that they wish to be editors; at least some editors may be chosen from a self-selected pool. It is possible that women are less likely to nominate themselves for editorships than men, either because of differences in behavior between men and women or because women are not aware that this is commonly done.

Another explanation for our findings is that there has been a selection bias favoring men for editorial positions. Methods of selecting the editor in chief vary across journals, but the community of scientists plays a key role in this process because of the vital role of this person in the scientific reputation and financial success of the journal. Editorial boards and associate editors are chosen by the editors in chief, and the perceived stature of these persons will also influence the success of the journal. If women in general are not perceived to have the same stature as men in a field or are not part of the existing informal and formal networks involved in the nomination process, there may be a selection bias against them.

Another interpretation is that rather than being selected against, women were not even considered for editorial positions; this hypothesis is supported by 2 studies. Many studies have shown that women remain outside the community of science and are less likely to be involved in the informal networks that lead to editorships and invitations to appear on programs, serve on governing boards of professional societies, consult, or travel.

A selection process favoring men would have profound ramifications for the professional advancement and influence of women epidemiologists. Hiring, promotion, and the success of grant applications, all measures of success in scientific endeavors, are closely tied to recognition among one’s peers. Being selected for an editorial board communicates public recognition of achievements to one’s department, institution, reviewers of one’s work, and colleagues around the world. If a woman has less opportunity for this type of recognition, it may appear that she has done less solid or creative work or that her peers in general find her below par. This exclusion, in turn, may lessen a woman’s chances of advancement in academic and other positions.

In addition, we suggest that increased “professional influence” is conferred by being an author, reviewer, or editor and that each of these roles has progressively more influence in the scientific community. Authors are influential in educating readers. Reviewers are more influential, as they influence decisions on manuscript publication. Editors, and in particular the editor in chief, are the most influential in the scientific community, given their ultimate authority in determining a journal’s contents. They serve as authors and reviewers and also decide journal policies, scientific direction, and scope, topics for editorials, composition of the editorial board, and the reviewers. Since the overwhelming majority of US epidemiology journal editors over a recent 12-year period have been men, women have had less opportunity to influence the scope and direction of epidemiology.

We have 2 recommendations. First, this study should be replicated in other fields of biomedical research to describe the current situation regarding the contribution of and rewards for women in research. Second, the epidemiology journals surveyed (and others who recognize that their journals have a similar problem) should immediately appoint more women to their editorial positions. Indeed, a precedent has been set by the publishers of the 10 American Medical Association journals, which have recently made a priority to seek women for editorial positions. We propose that journal publishers should consider appointing qualified women as editors in chief, and to other editorial positions, as openings occur.

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References

Reviewing the Reviews
The Example of Chronic Fatigue Syndrome

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Objective.—To test the hypothesis that the selection of literature in review articles is unsystematic and is influenced by the authors’ discipline and country of residence.

Data Sources.—Reviews in English published between 1980 and March 1996 in MEDLINE, EMBASE (BIDS), PSYCHLIT, and Current Contents were searched.

Study Selection.—Reviews of chronic fatigue syndrome (CFS) were selected. Articles explicitly concerned with a specialty aspect of CFS and unattributed, unreferenced, or insufficiently referenced articles were discarded.

Data Extraction.—Record of data sources in each review was noted as was the departmental specialty of the first author and his or her country of residence. The references cited in each index paper were tabulated by assigning them to 6 specialty categories, by article title, and by assigning them to 8 categories, by country of journal publication.

Data Synthesis.—Of 89 reviews, 3 (3.4%) reported on literature search and described search method. Authors from laboratory-based disciplines preferentially cited laboratory references, while psychiatry-based disciplines preferentially cited psychiatric literature ($P = .01$). A total of 71.6% of references cited by US authors were from US journals, while 54.9% of references cited by United Kingdom authors were published in United Kingdom journals ($P = .001$).

Conclusion.—Citation of the literature is influenced by review authors’ discipline and nationality.

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