FROM THE EDITOR'S DESK

First Authors in Deutsches Ärzteblatt: Women Are Catching Up

The Number of Female Authors in Medical Literature Is Increasing, but Is Still Considerably Lower Than That of Male Authors and Corresponds to the Proportion of Women Working in Academic Medicine.

Christopher Baethge

Emilie Lehmus, the first German woman to study medicine, would never have imagined it possible: almost 140 years after beginning her medical studies in Zurich because she had not been allowed to enroll in German universities (1), six out of ten of those pursuing a degree in human medicine in Germany are women. In fact, this figure was even higher last winter semester, with women accounting for a full 64% of those beginning medical studies. A cover story in March 2008 in *Deutsches Ärzteblatt* summed up the trend in its title: "Die Medizin wird weiblich" ("Medicine is becoming feminized") (2).

This observation applies not only to medical students, but also to physicians – both in Germany and worldwide. The growing proportion of women working at all levels of the medical profession deserves greater attention for a variety of reasons, including the real or perceived cultural transformation of medical practice through "feminization" (3), or the fear of income dispar-

ity and devaluation of the profession (4, 5). Yet other authors address issues related to balancing work and family (2, 6). In this editorial, I will be discussing another important question related to this topic: what percentage of scientific authors in medical journals, and in *Deutsches Ärzteblatt* in particular, are women?

Female authors in *Deutsches Ärzteblatt* and other journals

In *Deutsches Ärzteblatt*, the proportion of female first authors has increased considerably. First author status is particularly well suited for analysis because the first author – together with the last author – is generally the person who carries the main responsibility for the manuscript. First authorship is thus especially important for academic evaluation. Fifty years ago, women did not appear at all as first authors in *Deutsches Ärzteblatt*, but in 2007 they accounted for 17.2% of first authors of original articles and reviews (figure 1). This figure is roughly comparable to that seen in the interdisciplinary Dutch journal *Nederlands Tijdschrift voor Geneeskunde*, which is published weekly and addresses a general medical audience – a journal similar to *Deutsches Ärzteblatt*. Between 1948 and 1998, the percentage of female first authors in *Nederlands Tijdschrift voor Geneeskunde* increased from 2% to 9% (7). The corresponding figure for *Deutsches Ärzteblatt* in 1998 was 9.6%.

In contrast, women are much better represented in many American journals: Jagsi et al. (8) analyzed the percentage of female first authors in the United States between 1970 and 2004 in six major medical journals: *New England Journal of Medicine*, *Journal of the American Medical Association*, *Annals of Internal Medicine*, *Annals of Surgery*, *Obstetrics & Gynecology*, and *Journal of Pediatrics*. In 2004 an average of 29.3% of all first authors were women, although the figures for the *New England Journal of Medicine* and *Annals of Surgery* were considerably below this average (figure 2).

Other studies have confirmed the increasing importance of women as first authors. A review of four otolaryngology journals showed that first authorship by women increased linearly from 3.2% to 11.4% between 1978 and 1998 (9). In emergency medicine publications, the percentage of female first authors in four American

FIGURE 1

Percentage of women among all first authors of original articles and reviews in *Deutsches Ärzteblatt* (1957–2007) since the inception of its scientific section. For papers published during the first 10 to 15 years, the gender of the authors could not be determined with complete accuracy, because the first names had not always been included in full. In addition, the overall number of papers during this period was smaller than it is today, increasing the likelihood of outliers (e.g. 1966). Percentage for 1957: 0%; percentage for 2007: 17.24%.

Percentage of women among all first authors in six international journals (8)

journals rose from 9% to 24% between 1985 and 2005 (10). Even in two leading American surgery journals, the percentage of female first authors had risen to approximately 20% by 2003 (11). It should also be noted that, in the studies cited above, the number of female last authors is sometimes markedly lower than the number of female first authors.

The findings presented here demonstrate two things: first, the proportion of female first authors in the operative specialties (surgery, otolaryngology; exception: gynecology) is lower, albeit sometimes only minimally, than in the more conservative specialties (pediatrics, emergency medicine, internal medicine). Second, the number of women with first author status in American journals is greater than that in Germany or the Netherlands. The former finding is likely related to the fact that there are fewer women physicians working in otolaryngology and surgery than in pediatrics, internal medicine, emergency medicine, or gynecology (12). The latter finding raises the question of whether women here have fewer opportunities for publication.

To answer this question, we need to know not only which proportion of published papers, but also which proportion of submitted (i.e. accepted and rejected) papers, had a female first author. A look at the publication statistics for *Deutsches Ärzteblatt* reveals the following: of all papers submitted to the journal in 2007, 17.99% had a female first author. This percentage is similar to the 17.24% of published papers with female first authorship (figure 1). Because we can assume that there were no fundamental differences in quality between the papers submitted by women and men, it is thus safe to say that male and female authors receive equal treatment in *Deutsches Ärzteblatt's* review process.

Proportion of female authorship corresponds to proportion of women with academic positions

It appears that the proportion of female first authors is closely related to the proportion of women working in

Percentage of women in the medical field in Germany. Because all figures are based on the latest available data, the years indicated do not always match. Also, the diagram does not take cohort effects into account: the proportion of women occupying professorial positions in 2006 cannot be directly compared to the proportion of women who began medical studies in 2007/2008, because in the cohort that gave rise to today's female professors, fewer women took up medical studies than in winter semester 2007/2008. In 1986, 42.8% of those taking up medical studies were women. If all other conditions remained the same, and assuming that it takes approximately 20 years to become a professor after initiating one's studies (Federal Statistical Office figures and [12]), we would expect this figure to correspond to the proportion of new professorial positions occupied by women in 2006. In reality, however, only 15.7% of all professorial positions in medicine in 2006 were occupied by women, who accounted for 14.2% of all applicants to these positions (15). WS = winter semester. Source: German Federal Statistical Office, National Association of Statutory Health Insurance Physicians, and author's own data

academic medicine. The vast majority of authors whose papers are published in the science section of *Deutsches Ärzteblatt* are either part of a university hospital's staff or, as professors or lecturers, are members of its faculty. Of course, not everyone working at a university hospital writes scientific articles. In Germany, those who do are likely pursuing the postdoctoral qualification of Habilitation (the precondition to become a professor), and thus an academic career. If we take a closer look at the percentage of women with professorial positions in medicine (11.8%) and the percentage of women pursuing a Habilitation (17.6%), we can see that women at university hospitals are underrepresented compared to students or other colleagues in medicine (figure 3). Because *Deutsches Ärzteblatt* publishes almost exclusively clinical research, the number of female first authors in its pages appears plausible considering the low number of female professors (8.1%) and of graduates pursuing a Habilitation (15.1%) in clinical specialties. Moreover, the percentage of professors in clinical specialties who are women roughly corresponds to that of female professors on the scientific advisory board of *Deutsches Ärzteblatt*. The parallel between the percentage of women working in academic positions at universities and that of female first authors in emergency medicine (10) and surgery (11), as well as in other areas of scientific study such as biology (13), has also been drawn by the authors of some papers.

After completing her studies in 1875, Dr. Emilie Lehmus was not granted a license to practice medicine in Germany. However, based on *Kurierfreiheit* – a freedom to practice medicine granted to unlicensed healers and other medical practitioners in Germany – she nevertheless opened up her own office and worked as a physician in Berlin until 1900 (1). One year earlier, Baden had become the first German state to allow women to study medicine (14), some fifty years after women were first allowed to enroll in medical studies in the United States. Over a century later, this editorial would like to encourage female and male authors in equal measure to publish in *Deutsches Ärzteblatt*.

Conflict of interest statement

The author is Chief Scientific Editor of *Deutsches Ärzteblatt* and *Deutsches Ärzteblatt International*.

Translated from the original German by Matthew D. Gaskins.

REFERENCES

1. Bornemann R (ed.): Erste weibliche Ärzte. Die Beispiele der „Fräulein Doctores“ Emilie Lehmus (1841–1932) und Franziska Tiburtius (1843–1927) – Biographisches und Autobiographisches. In: Brinkschulte E: Weibliche Ärzte. Die Durchsetzung eines Berufsbildes in Deutschland. Berlin, Edition Hentrich 1993; 24–32.
2. Hibbeler B, Korzilius H: Die Medizin wird weiblich. Dtsch Arztebl 2008; 105(12): A 609–12.
3. Kilminster S, Downes J, Gough B, Murdoch-Eaton D, Roberts T: Women in medicine – is there a problem? A literature review of the changing gender composition, structures and occupational cultures in medicine. Med Educ 2007; 41: 39–49.
4. van der Reis L: Causes and effects of changed gender ratio in medicine. Med Teach 2004; 26: 506–9.
5. Lyon DS: Where have all the young men gone? Keeping men in Obstetrics and Gynecology. Obstet Gynecol 1997; 90: 634–6.
6. Bühren A: Ärztinnen-Gesundheit. Dtsch Med Wochenschr 2008; 133: 23–5.
7. van Duursen RAA, Overbeke WH: Toename van het percentage vrouwelijke artsen die publiceren in het Nederlands Tijdschrift voor Geneeskunde (1948–1998), gelijkblijvend percentage onder mannelijke. Ned Tijdschr Geneesk 200; 144: 1171–4.
8. Jaggi R, Guancial EA, Cooper Worobey C, Henault LE, Chang Y, Starr R, Tarbell NJ, Hylek EM: The „gender gap“ in authorship of academic medical literature – a 35-year perspective. N Engl J Med 2006; 355: 281–7.
9. Bhattacharyya N, Shapiro N: Increased female authorship in otolaryngology over the past three decades. Laryngoscope 2000; 110: 358–61.
10. Fai Li S, Latib N, Kwong A, Zinzuwadia S, Cowan E: Gender trends in emergency medicine publications. Aca Emerg Med 2007; 14: 1194–6.
11. Kurichi J, Kelz RR, Sonnad SS: Woman authors of surgical research. Arch Surg 2005; 140: 1074–7.
12. Nonnemaker L: Women physicians in academic medicine: new insights from cohort studies. N Engl J Med 2000; 342: 399–405.
13. Stinson S: Participation of women in human biology, 1975–2001. Am J Hum Biol 2003; 15: 440–5.
14. Burchardt A: Die Durchsetzung des medizinischen Frauenstudiums in Deutschland. In: Brinkschulte E. Weibliche Ärzte. Die Durchsetzung eines Berufsbildes in Deutschland. Berlin: Edition Hentrich 1993: 10s–23.
15. Bund-Länder-Kommission für Bildungsplanung und Forschungsförderung. Heft 139: Chancengleichheit in Wissenschaft und Forschung. Bonn: BLK 2007; Tabelle 5.2.1.

PD Dr. med. Christopher Baethge

Chief Scientific Editor
baethge@aerzteblatt.de

Dtsch Arztebl 2008; 105(28–29): 507–9
DOI: 10.3238/arztebl.2008.0507