

# THE INCREASING FEMALE PARTICIPATION IN AUTHORSHIP OF ARTICLES PUBLISHED IN NEUROLOGY IN BRAZIL

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**Abstract** – During the past four decades the participation of women in medicine has increased dramatically. This study is focused on the women's participation in authorship of articles published in the *Arquivos de Neuro-Psiquiatria*, the official Journal of the Brazilian Academy of Neurology. The articles were analyzed according to the number of articles and sex of both first and the senior (last) authors. The data were collected from 1945 to 2005. A total of 950 articles were published in this period. The proportion of women serving as first authors increased from 2.8% to 36.6% and the proportion serving as senior authors increased from 2.8% to 23.8% (1945–2005).

**KEY WORDS:** women in medicine, authorship, neurology, *Arquivos de Neuro-Psiquiatria*.

## A crescente participação da mulher na autoria de trabalhos publicados em neurologia no Brasil

**Resumo** – Nas últimas quatro décadas houve um aumento crescente na participação de mulheres na medicina. Este artigo apresenta a participação de mulheres como autoras de artigos publicados em *Arquivos de Neuro-Psiquiatria*, jornal oficial da Academia Brasileira de Neurologia. Foi analisada esta participação em quinquênios, a partir de 1945 até 2005. Foram publicados neste período 950 artigos. A participação de mulheres como primeiro autor apresentou aumento de 2,8% (1945) para 36,6% (2005) e como último autor (chefe de grupo) passou de 2,8% (1945) para 23,8% (2005).

**PALAVRAS-CHAVE:** mulheres médicas, autoria trabalhos, neurologia, *Arquivos de Neuro-Psiquiatria*.

The medical profession and the scientific production have traditionally been dominated by men but this imbalance is likely to change. In fact, during the past four decades the participation of women in medicine has increased dramatically. In the USA, for example, the proportion of women as authors of articles from six prominent medical journals – *N Engl J Med*, *JAMA*, *Ann Intern Med*, *Ann Surg*, *Obst Gynecol*, and *J Pediatr* – has significantly increased<sup>1</sup>. In this study we focused on the women's participation in authorship of articles published in the *Arquivos de Neuro-Psiquiatria*, the official journal of the Brazilian Academy of Neurology.

## METHOD

The articles from the *Arquivos de Neuro-Psiquiatria* were categorized according to the number of articles and the sex of both first and the senior (last listed) authors. The data were col-

lected for the years 1945, 1950, 1955, 1960, 1965, 1970, 1975, 1980, 1985, 1990, 1995, 2000, and 2005.

## RESULTS

A total of 950 articles were published in the journal during the years studied. Overall, 19.5% (186/950) of the first authors and 18.4% (175/950) of the senior authors were women. The proportion of women serving as first authors increased from 2.8% (1/35) to 36.6% (77/210), and the proportion of women serving as senior authors increased from 2.8% (1/35) to 23.8% (50/210) (Table).

## DISCUSSION

This study demonstrates a substantial increase in women's representation as the principal or senior authors of scientific articles published in the *Arquivos de Neuro-Psiquiatria*, the main Brazilian journal in the neurology field. Dur-

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*Table. Representation of female investigators among first and senior authors of published articles in the Arquivos de Neuropsiquiatria.*

Year	Total number of articles	First author Number (%)	Senior author Number (%)
1945	35	1 (2.8%)	1 (2.8%)
1950	28	1 (3.5%)	1 (3.5%)
1955	23	–	3 (13.0%)
1960	24	1 (4.1%)	–
1965	28	–	–
1970	45	2 (4.4%)	5 (11.1%)
1975	44	7 (15.9%)	8 (18.1%)
1980	55	–	10 (18.1%)
1985	63	5 (7.9%)	2 (3.1%)
1990	82	11 (13.4%)	12 (14.6%)
1995	134	28 (20.9%)	30 (22.3%)
2000	179	53 (29.6%)	53 (29.6%)
2005	210	77 (36.6%)	50 (23.8%)
Total	950	186 (19.5%)	175 (18.4%)

ing the period from 1945 to 2005, the proportion of women serving as first authors increased from 2.8% to 36.6%, and as senior authors from 2.8% to 23.8%, respectively.

These data are in accordance with the increasing participation of women in the Brazilian medical practice during the last decades, and reflect the process of equity between sexes that allows a same professional opportunity. This may be confirmed by the analysis of some Brazilian regulatory organizations and professional societies.

The female proportion as active members of the Brazilian Academy of Neurology is 472/1,352 (25.8%).

According to the Brazilian Federal Council of Medicine, there are 132,767 (38.8%) women among 341,765 active physicians in Brazil<sup>2</sup>. The historical strong predominance of men in Brazil is clearly changing due to the increasing proportion of women as new professionals. In fact, in the last three consecutive years, there have been more women than men as new members of the Regional Council of Medicine of the São Paulo State, the most populous State in Brazil. The serial historical data point out the significant growing of female presence: in 1980, the proportion of women was 33.5% of 2,267 new members; in 1990, 43.3% of 2,293; in 2000, 44.6% of 2,562. The inversion of this scenario occurred in 2006, confirmed in 2007 and 2008. In 2006, 1,568 (51.7%) of 3,030 new members were women; in 2007, 1,319 (53.8%) of 2,449, and in 2008, 1,627 (52.9%) of 3,072<sup>3</sup>. Nowadays, the total number of active physicians in the São Paulo State is 97,320, with 39.3% women<sup>3</sup>.

In the USA, women represent an increasingly large

proportion of medical students and the practicing physician work force<sup>4</sup>. In 1960, only about 5% of medical students in the United States were women; today, the number of women and men in medical school are approximately equal<sup>5</sup>. In the United Kingdom, over 60% of medical students are women<sup>6</sup>.

Despite the increased entry of women into the medical profession over the past several decades, some have suggested that women may remain substantially underrepresented in senior leadership positions in academic medicine<sup>7,8</sup>. In a study of faculty members appointed to U. S. medical schools between 1979 and 1981, only 5% of women, as compared with 23% of men, had achieved the rank of full professor; the difference was not fully explained by the number of hours worked or the number of articles published<sup>9</sup>. In 2004, women made up only 19% of associated professor and full professor on the clinical faculties of medical schools<sup>1</sup>. In 2005, 16% of the editorial board members of 16 prominent biomedical journals, including *N Engl J Med*, *Lancet*, *JAMA*, *BMJ*, *Nature Med*, and *Science* were women<sup>8</sup>. Studies have also documented that women receive lower salaries than men with similar experience and academic rank<sup>10,11</sup>, including among neurologists<sup>4</sup>.

Similarly, although the proportion of women among authors has increased over time, the data suggest that a gender gap in authorship remains, particularly among senior authors. The analysis of authorship of original articles from six prominent medical journals, including *N Engl J Med*, *JAMA*, *Ann Intern Med*, *Ann Surg*, *Obstet Gynecol*, and *J Pediatr*, showed that the proportion of women serving as first authors increased from 5.9% to 29.3% during the period of 1970 and 2004<sup>1</sup>. The proportion of women serving as senior authors increased from 3.7% to 19.3%, and the data suggested that this momentum may be reaching a plateau<sup>1</sup>. The gender of the 449 corresponding authors of papers submitted to the *Journal Nature Neuroscience*, from January to March 2005, was female in 92 (20.5%)<sup>12</sup>.

What accounts for the apparent paradox of dramatic growth in the rate of women entering the field of medicine and the achievement of less success in academic medicine by women as compared with men, as least according to the conventional metrics of authorship and promotion? The answer remains unclear, but both institutional barriers to success and sex differences in career and life goals are important<sup>5</sup>. The success in academic medicine has traditionally required working 60 to 70 hours per week, a time commitment that for many is incompatible with the responsibilities associated with raising children<sup>1</sup>. A questionnaire to examine the life choices made by neurology consultants and trainees showed that both sexes would like to do more part-time work or have a career break. Around 87% of women were planning to work part-time at some point, primarily for child-care reasons.

By comparison, 25% of working male doctors wanted to work part-time or take a career break to pursue sporting ambitions, to travel, or for semi-retirement<sup>13</sup>.

If the proportion of women as physician has only recently reached parity or even light predominance, one cannot expect the principal or senior researcher to approach as equal gender distribution until substantial time has passed.

Our results validate the perception that although women have made substantial strides in the past several decades, a gender gap remains among authors of original articles in prestigious academic medical journals, including the *Arquivos de Neuro-Psiquiatria*.

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