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Original Article

Female insertion in neurosurgery: Evolution of a stigma break

Luiz Severo Bem Junior[1], Nilson Batista Lemos[2], Júlia de Araújo Vianna[3], Juliana Garcia Silva[3], Luana Moury Fernandes Sanchez[3], Ana Cristina Veiga Silva[4], Hildo Rocha Cirne de Azevedo[4]

[1]Department of Neurosurgery, Unifacisa University Center, Campina Grande, [2]Unifacisa University Center, College of Medical Sciences, Campina Grande, [3]Maurício de Nassau University Center, Recife, [4]Department of Neurological Surgery, Hospital da Restauração Governador Paulo Guerra, Recife, Brazil.

E-mail: *Luiz Severo Bem Junior - luizseverobemjunior@gmail.com; Nilson Batista Lemos - nilsonlemos18@gmail.com; Júlia de Araújo Vianna - juliaavianna22@gmail.com; Juliana Garcia Silva - medjulianagsilva@gmail.com; Luana Moury Fernandes Sanchez - luanamfsanchez@gmail.com; Ana Cristina Veiga Silva - neuropernambuco@gmail.com; Hildo Rocha Cirne de Azevedo - neurobrazil2020@gmail.com

***Corresponding author:**
Luiz Severo Bem Junior, Department of Neurosurgery, Unifacisa University Center, Campina Grande.

luizseverobemjunior@gmail.com

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ABSTRACT

Background: Utilizing the Brazilian Medical Demography analysis and a literature review, we evaluated how women choose to become neurosurgeons in Brazil and around the world, specifically citing the Europe, the USA, India, and Japan.

Methods: We utilized the Brazilian Medical Demography prepared by the Federal Council of Medicine and the Regional Council of Medicine of the State of São Paulo (2011, 2013, 2015, and 2018). We also included an evaluation of 20 articles from PubMed, the Scientific Electronic Library Online, and National Health Library databases (e.g., using descriptors "Women in neurosurgery" and "Career").

Results: In Brazil in 2017, women comprised 45.6% of active doctors, but only 8.6% of all neurosurgeons. Of 20 articles identified in the literature, 50% analyzed the factors that influenced how women choose neurosurgery, 40% dealt with gender differences, while just 10% included an analysis of what it is like to be a female neurosurgeon in different countries/continents.

Conclusion: The participation of women in neurosurgery has increased in recent years despite the persistence of gender inequality and prejudice. More women need to be enabled to become neurosurgeons as their capabilities, manual dexterity, and judgment should be valued to improve the quality of neurosurgical health-care delivery.

Keywords: Carrier, Gender disparity, Neurosurgery, Prejudice, Women in neurosurgery

INTRODUCTION

Many women, ahead of their time, dared to overcome the barriers that limited their access to the neurosurgical field. It took until 1945 to produce the first female neurosurgeon in the world, Sofia Ionescu-Ogrezeanu. In Brazil, in 1976, the first Brazilian neurosurgeon was Cleyde Cley da Silva Vescio.

Still, few females have become neurosurgeons in either Brazil or other countries despite the marked increase in female physicians being trained. Here, utilizing data from both Brazilian and 20 studies in the literature we asked what social, economic, and cultural factors impacted woman wishing to choose neurosurgery.

MATERIALS AND METHODS

We studied the Brazilian Medical Demography publications (e.g., prepared by the Federal Council of Medicine (CFM) and the Regional Council of Medicine of the State of São Paulo 2011, 2013, 2015, and 2018), the Regional Councils of Medicine, incorporated into the CFM database, the database from Brazilian Institute of Geography and Statistics, and collected and analyzed data through questionnaires sent to 4.601 physicians.

We also surveyed other medical specialists, extracting data from the National Commission of Medical Residency and the Societies of Medical Specialties linked to the Brazilian Medical Association.

Literature Review: We also utilized PubMed, Scientific Electronic Library Online, and National Health Library databases to identify the 20 studies included in this analysis [Figures 1 and 2]; these were descriptive (13; 65%), quantitative (07; 35%), and qualitative (3; 15%) [Table 1]. Further, 8 studies (40%) dealt with gender differences, and 2 (10%) noted what it is like to be a neurosurgeon [Table 2].

RESULTS

Brazil

Notably, the total number of Brazilian neurosurgeons is 3298 (248 females and 2638 males), and their average age is 49.4 representing than 1% of all medical physicians in the country.[13] In Brazil, 57.4% of physicians under 30 years of age are women who go into, in descending order, pediatrics, gynecology and obstetrics, medical clinic, and dermatology.[13-16] In 2017, women comprised 45.6% of all doctors, but only 8.6% of all neurosurgeons [Figure 2].

In 2017, there were about 813 5-year neurosurgical residency spots offered in Brazil, but only 508 s were filled[13] [Table 3]. Indeed, in 2017, neurosurgery was the first choice of residency positions for less than 1% of newly graduated both female and male medical student's neurosurgical residency training slots.

United States

In the USA, in 2016, women represented less than 20% of all residents in neurosurgery, and about 6% (259/4178) of all neurosurgeons certified by the American Board of Neurological Surgery.[1,3,4,7,11] The main obstacles to becoming neurosurgeons included; the lack of adequate mentoring, inadequacy of many training programs, unique obstacles encountered for women in training, and prejudice/discrimination against women.[3,5,6,11,18] Women in Neurosurgery (WINS), and James Beane M.D. on behalf of the American Association of Neurological Surgeons (AANS), proposed in a 2008 a White Paper for neurosurgery (the future of neurosurgery: a white paper on the recruitment and retention of WINS, Japan Neurosurgical Society [JNS] 2008). In that, Dr. Beane stated that it was critical to recruit and retain female neurosurgical residents; the goal would be

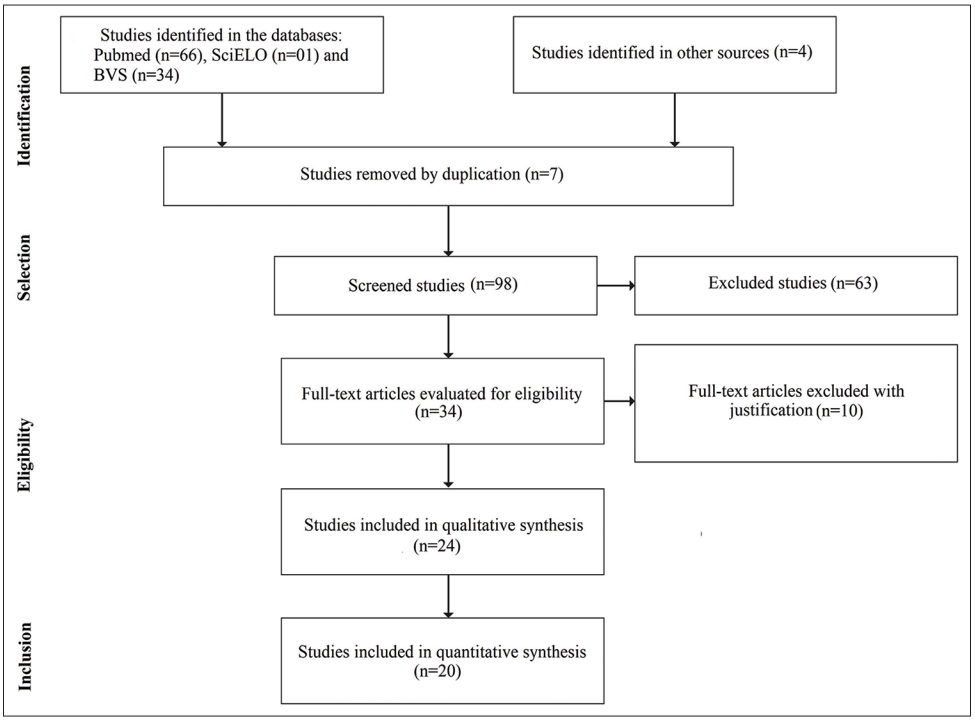

Figure 1: Diagrammatic representation of literature search.

Table 1: Quantitative distribution of the classification of the selected studies.

Classification of studies	Frequency	Relative frequency
Descriptive	13	6.0
Quantitative	7	35
Qualitative	3	15

Table 2: Quantitative distribution of the main subjects covered in the selected tudies.

Main issues addressed in the studies	Frequency	Relative Frequency
Factors that influenced women in the choice of neurosurgery	10	50
Gender difference	8	40
What is it like to be a neurosurgeon in a given counts, continent	1	10

Table 3: Quantitative distribution of the number and occupation of vacancies in neurosurgery in Brazil (2017).

Neurosurgery medical residency vacancies (2017)	
Frequency	1.713
Relative frequency	14%
Occupied places	538
Occupancy rate	66:20%

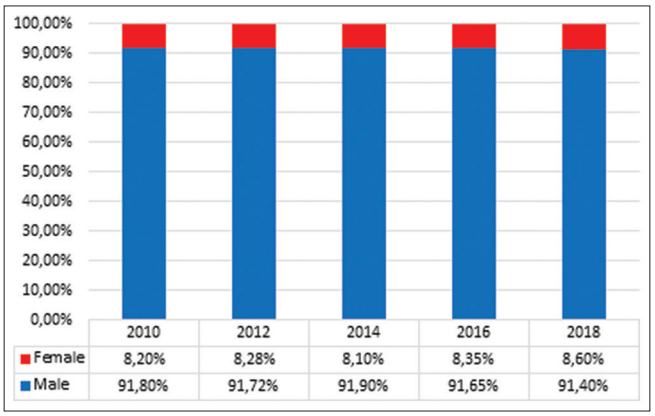

Figure 2: Percentage of neurosurgeons in Brazil by gender (2010–2018).

for 20% of all neurosurgical residents and faculty to be female by 2012.[2,10,19]

However, Dr. James Beane in 2018 spearheaded the Professional Conduct Committee (PCC) in a discriminatory grievance against the 12th board certified female neurosurgeon in the USA, Nancy E. Epstein, M.D the Editor-in-Chief of Surgical Neurology international, on the Editorial Boards of Spine (since 1990), Journal Spinal Disorders/Techniques now Clinical Spine Surgery (since 1990), The Spine Journal (since 2003), Past President of the Cervical Spine Research Society, and author of over 400 peer reviewed publications.[2] They went after Dr. Epstein for being a plaintiff's expert in a case in which a 66-year-old female was unnecessarily subjected to a Transforaminal Lumbar Interbody Fusion (TLIF) by a neurosurgeon's partner who had never spoken to, never examined, or obtained informed consent from the patient prior to the TLIF. After the partner performed the surgery, she was left with a new, permanent right-sided foot drop.[2] After multiple presentations/appeals, the PCC, the AANS' Board, the outgoing President Shelley D. Timmons M.D., and incoming President Christopher I. Shaffrey M.D, voted to suspend Dr. Nancy E. Epstein for a period of 6 months.[2]

Europe

At present, almost half of the doctors in Europe are women.[18,20] In 2016, the European Association of Neurosurgical Societies (EANS) database, including information from 39 member countries, observed that women accounted for just 12% of all neurosurgeons (1565 females vs. 12,985 males).[13] Interestingly, 36% of neurosurgeons in Italy were female, while there were none in Kosovo and Cyprus.[17] The European WINS Project in 2016 observed that the distribution of female neurosurgical residents was 32% (477 out of 1479 residents), and attending female neurosurgeons were just in 24 of 39 countries 11% (467/4439).[17] Here, likely explanations for this poor showing included; the paucity of neurosurgical female mentors, active gender, and cultural discrimination.[6,17,20] At present, in the EANS and the 15 centers of excellence in neurosurgical training in the European Union of Medical Specialists, not one is chaired by a woman.[12,17,20]

India

The number of female neurosurgeons in India is small; only 73 of 2500 certified neurosurgeons including female residents in training.[8] The first female neurosurgeon in India/Asian Continent was Thanjavur Santhanakrishna Kanaka (1968). If took until 1980 for an additional two female neurosurgeons to appear in the country.[8,21] Since then, an additional 33 females (2017 data) have been added to the neurosurgical roster in India.[8] Most female Indian neurosurgeons are now between the ages of 30 and 50, are married, have children, and are satisfied with the profession. Nevertheless, approximately 40% document additional sex-based problems/discrimination in their neurosurgical careers.[8]

Japan

In 2018, only 12% of new members of the JNS were women and their total number was <5% of all members.[9] Among the

94 hospitals that offered training in neurosurgery, the majority had about one to four women enrolled and seven of them had none.[9] Notably, however, in Japan, about 17% of female neurosurgeons leave the profession because of pregnancy and/or marriage.[9] Regarding discriminatory practices, lack of mentoring, and other factors stacked against Japanese women entering the field of neurosurgery were difficult to obtain.

CONCLUSION

Despite advances in gender equality in medicine, neurosurgery is still a male-dominated field. Encouraging women during medical school to face the challenges of neurosurgery are essential to change the field, and only having more women in leadership and mentorship positions will increase their impact on this "old boys" system.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

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