

ORIGINAL ARTICLE

Gender patterns in Spanish otolaryngologic doctoral theses

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KEYWORDS

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Abstract

Introduction and objective: In last decades women in Spain have a greater access to postgraduate education. The objective of this study was to perform a gender analysis on the Otolaryngology doctoral theses presented in a 25 year-period.

Methods: The TESEO data base on doctoral theses was searched for theses on Otorhinolaryngology written between 1981 and 2005. As strategy for the research we employed the terms: 1) *Otorrinolaringología* (Otorhinolaryngology); 2) *Cirugía de garganta, nariz y oídos* (Ear, nose and throat surgery); 3) *Fisiología de la audición* (Physiology of hearing); 4) *Fisiología del equilibrio* (Physiology of balance); 5) *Física de la audición* (Physics of hearing); and 6) *Bioacústica* (Bioacoustics).

Results: A total of 450 theses (18.0 ± 8.3 theses/year) were found, of which 129 were written by females (28.6%). There was a gender imbalance among authors, with 5.2 ± 3.4 theses/year for women vs 12.9 ± 6.6 theses/year for men ($P=.0002$). Nevertheless, there was a tendency toward equality in the last 10 years ($P=.001$). On the other hand, the PhD student's gender was clearly related to the supervisor's gender ($P=.0001$). With respect to the main topics in our area (otology, audiology/ vestibular diseases, rhinology and pathology of paranasal sinuses and neck diseases), there were no significant differences between males and females ($P=.231$).

Conclusions: These results indicate a tendency towards equality in the number of men and women successfully completing doctoral studies in Otolaryngology. However, the PhD student's gender is clearly related to the supervisor's gender.

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PALABRAS CLAVE

Género;
Sexo;
Tesis doctorales;
Otorrinolaringología;
Investigación

El género en las tesis doctorales en otorrinolaringología en España**Resumen**

Introducción y objetivo: En España se ha facilitado el acceso de las mujeres a la educación superior en las últimas décadas. Nuestro objetivo es realizar un análisis de género en las tesis doctorales en otorrinolaringología presentadas a lo largo de 25 años.

Métodos: Se empleó la base de datos TESEO para obtener información acerca de las tesis doctorales en otorrinolaringología defendidas entre los años 1981-2005. Como estrategia de búsqueda en dicha base fueron empleados los siguientes descriptores: 1) Otorrinolaringología; 2) Cirugía de garganta, nariz y oídos; 3) Fisiología de la audición; 4) Fisiología del equilibrio; 5) Física de la audición, y 6) Bioacústica.

Resultados: Encontramos un total de 450 tesis ($18,0 \pm 8,3$ tesis/año). Ciento veintinueve de ellas fueron realizadas por mujeres (28,6%). Hay un desbalance entre géneros entre los autores de dichas tesis con $5,2 \pm 3,4$ tesis/año en mujeres vs. $12,9 \pm 6,6$ tesis/año en hombres ($p = 0,0002$). Sin embargo, existe una tendencia hacia la igualdad en los últimos 10 años ($p = 0,001$). Por otro lado, el género del doctorando está claramente relacionado con el de su director ($p = 0,0001$). Con respecto a los principales temas de nuestra área (otología, audiología/patología vestibular, rinología y patología de los senos paranasales y patología cervical) no hubo diferencias significativas entre los hombres y las mujeres ($p = 0,231$).

Conclusiones: Aunque globalmente hay más autores masculinos, existe una tendencia hacia la igualdad de género entre los estudiantes que concluyen exitosamente los estudios de doctorado en otorrinolaringología. Sin embargo, el género del doctorando está relacionado con el de su director.

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Introduction

The enrolment of women in Spanish medical schools increased uniformly over the last decade until it surpassed the percentage of men. However, it was not until the end of the 19th century that the incorporation of women into the medical profession began in Spain, with the first Bachelor of Medicine being María Elena Maseras, in 1878.¹ From that moment on, the percentage of female graduates has been increasing gradually and inexorably, with oscillations derived from the many historic events in the last century. In the year 2003, out of the 190,665 physicians counted in official medical schools in Spain, 40% were females.² This percentage has continued to grow until the present time, when the number of women has surpassed that of men.³

There is solid evidence that women generate fewer publications than men in practically all areas of knowledge and all nations.³ Our country does not escape that trend, which has been proven in fields such as neurology, drug addiction, infectious diseases and clinical microbiology.³⁻⁵ The reasons for this concurrent situation have not yet been found, with this phenomenon having been called "the puzzle of science".^{6,7}

Scientific production is not limited to articles published in medical magazines, as there other scientific documents (such as doctoral theses) that can and should be included. Despite the goals intended of the Ley Organica 11/ 1982 de la Reforma Universitaria (Law of 11/ 1982 of University Reform⁸) 25 years ago, such as training researchers and creating new

investigation teams, little has been investigated about whether those goals have been equally effective in relation with the gender of those future PhDs.⁹

Our objective was to study the gender of authors of otolaryngology doctoral theses in Spain in the 25 years following the first thesis carried out by a woman.

Material and methods

The TESEO database is a tool available on the Internet that allows information about the doctoral theses approved in Spanish universities since 1976 to be collected.¹⁰ This database is maintained by the Consejo de Coordinación Universitaria (Council of University Coordination), which currently has the following URL address: <http://www.micinn.es/teseo>.¹⁰

The TESEO database was accessed during the month of August 2009 to obtain registers of theses written and defended between 1976 and 2008. The strategy used was the same as in another previously-published article, with the selection of 6 general descriptors: 1) Otolaryngology; 2) Surgery of the throat, nose and ears; 3) Physiology of hearing; 4) Physiology of balance; 5) Physics of hearing, and 6) Bioacoustics.¹¹ Once the global information had been gathered, all repeated theses (those that appeared under various descriptors) were eliminated.

We registered all the data available in the associated text archive in each search: author/ doctor, director, title,

summary, university, faculty, centre where it was carried out, school year and descriptors. The gender of the authors/ doctors was deduced based on their given name and the topic and/ or approach of the thesis was deduced looking at the title and/ or summary of the thesis.

The data acquired was analysed with an INVE PENTIUM computer, using the statistical software BMDP (Statistical Software 12.0, 2004). The Pearson χ^2 test was used to study the possible association between variables (adjusting the number of theses to the Poisson model for counts when deemed necessary). All tests received the same significance level of 0.05.

Results

There are no entries for which the author/ doctor was of female gender until the year 1982 (Figure 1). Because of this, we discarded the first 5 years in which no female authors/ doctors appeared (in the period 1976-1980). From that point, we compiled the information from theses from the following 25 years, consequently also discarding the available information from 2006-2008.

From 1981 to 2005 (both inclusive), there were a total of 450 theses in otolaryngology. Out of these, 129 were defended by women (28.6%) and 321 by men (71.4%). A mean of 18.0 ± 8.3 theses were defended annually. The distribution along the time sequence analysed according to gender is shown in Figure 1. The annual mean of theses by females was 5.2 ± 3.4 , vs 12.9 ± 6.6 by males. Adjusting the number of theses to a Poisson model for counts (with the year as a covariable), the number of females presenting their theses in the period analysed was significantly lower than that

of males ($P=.0002$). We later analysed whether this global trend had undergone some type of evolution over the years, for which we divided the time sequence into 5 year units (Figure 2). We were then able to observe that the proportion of theses read by women had increased significantly in the period of 1980-1985 and 2001-2005 (Figure 2), $P=.001$. In

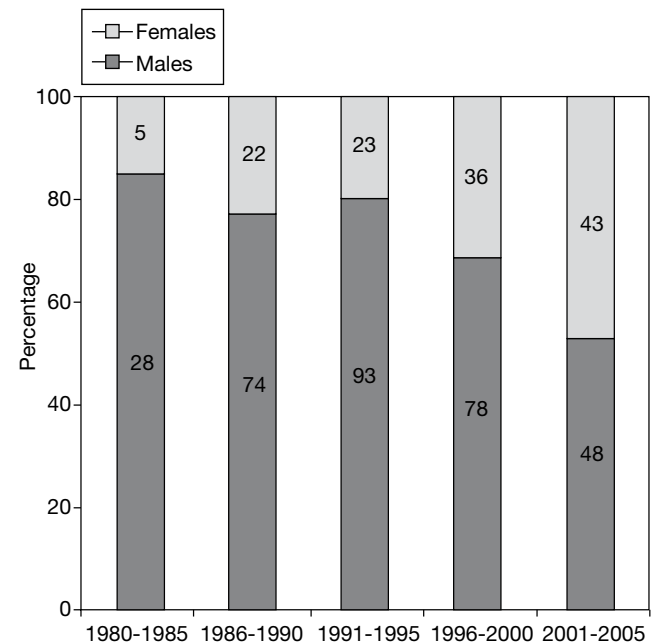


Figure 2 Distribution of otolaryngology theses according to the university affiliated and the gender of the author/doctor (1981-2005).

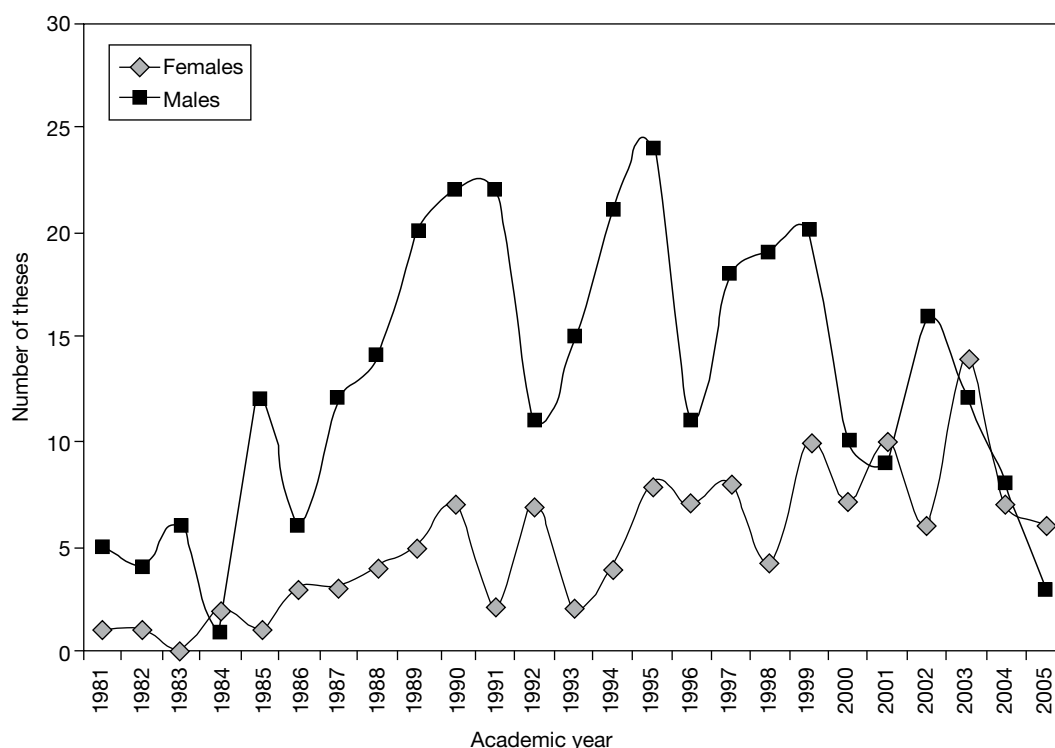


Figure 1 Annual evolution of the number of theses read in otolaryngology according to gender during the period 1981-2005.

Out of all theses by female authors, 10.1% were about topics related to otology (13 out of 129), with that percentage being 17.4% among men (56 out of 321) (Figure 4). Audiology and/or pathology of the vestibular system was the topic chosen by 21.7% of female authors (28 out of 129) and 17.8% of males (57 out of 321) (Figure 5). Rhinology and paranasal sinus pathology were chosen by 7.8% of females (10 out of 129) and 9.3% of males (30 out of 321) (Figure 6). The proportions in theses related to cervical

Finally, out of the 450 theses included in this study, 92 had no information about their director/s in the TESEO database. Out of the 358 left (108 female vs 250 male), 268 of them had only 1 director (74.9%) and the other 90 had co-directors (25.1%). There were a total of 14 theses (3.9%) in which the director was female and 344 (96.1%) in which the director was male. There were 5 theses with a female co-director (5.6%); in the other 85, the co-director

Centre	Females	Males
<i>School of Medicine</i>	120	307
<i>School of Biology</i>	2	2
<i>School of Science</i>	2	2
<i>Polytechnic Schools</i>	1	5
<i>Pharmacy</i>	1	0
<i>IT</i>	1	2
<i>Odontology</i>	1	0
<i>Psychology</i>	0	0
<i>School of Physics</i>	0	2
<i>Veterinary</i>	0	1

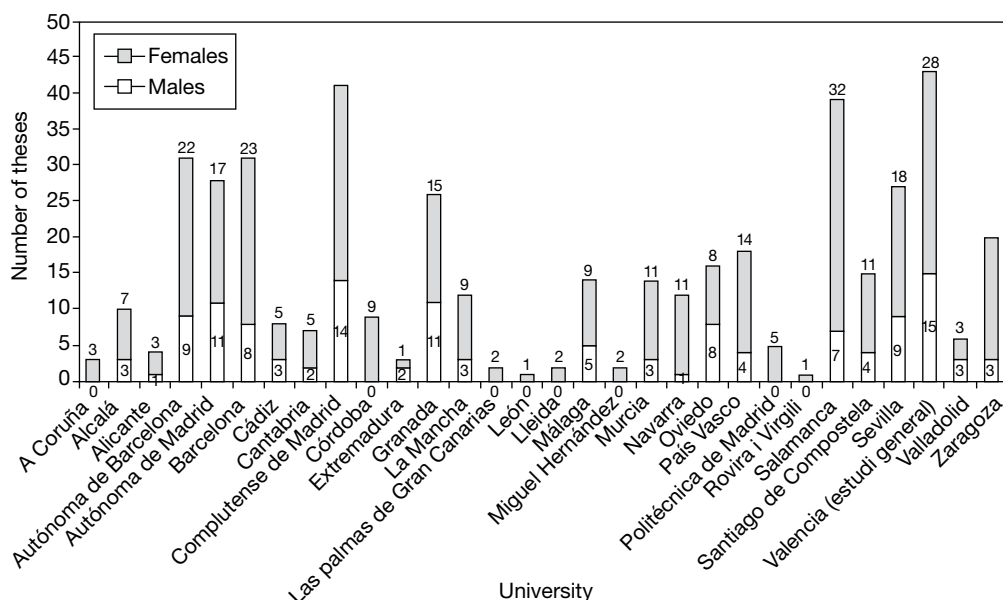


Figure 3 Doctoral theses in otology according to the gender of the author.

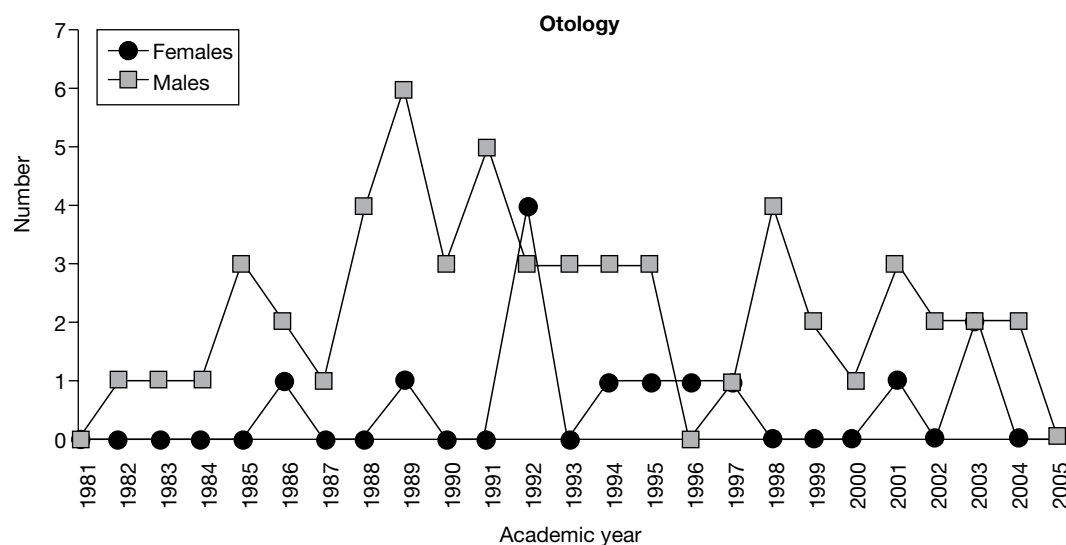


Figure 4 Doctoral theses in audiology/ vestibular pathology according to the gender of the author/ doctor.

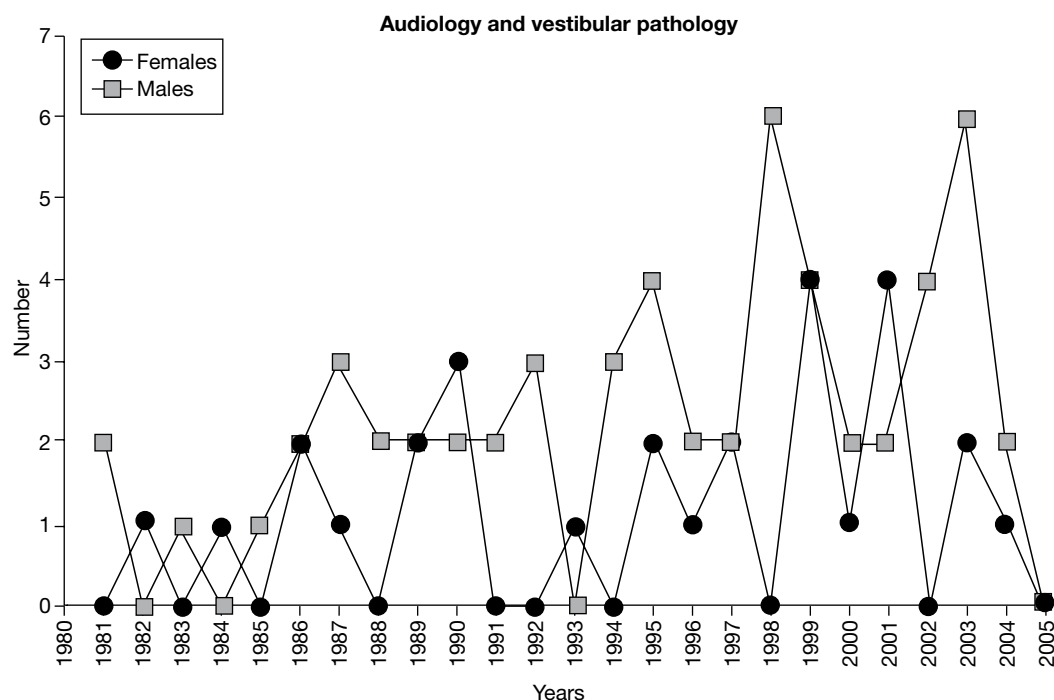


Figure 5 Doctoral theses in rhinology and paranasal sinus pathology according to the gender of the author.

was male (94.4%). We did not find any theses co-directed by two females. Female authors were directed by a female in 9 cases (8.3%) and by a female co-director in 4 cases (4.4%). Male authors were directed by females 5 times (2.0%) and once by a female co-director (1.1%). Comparatively, females tend to be directed or co-directed by females significantly more than men ($P=.0001$).

Discussion

Nowadays (the beginning of the 21st century), society believes that equality of rights is one of the basic pillars of

society.³ In the field of science, the lack of full integration of women means not only a violation of ethical principles, it also has negative consequences economically through the loss of human potential. Consequently, articles that study scientific production in relation with gender allow us to ascertain the relative participation of women through quantitative data.³

Although some areas of knowledge of scientific literature in Spain³⁻⁵ have been analysed methodically, the same has not happened in relation with doctoral theses. We have in fact found only 2 studies related to this topic in our bibliographical search based on data collected in our country.^{8,12}

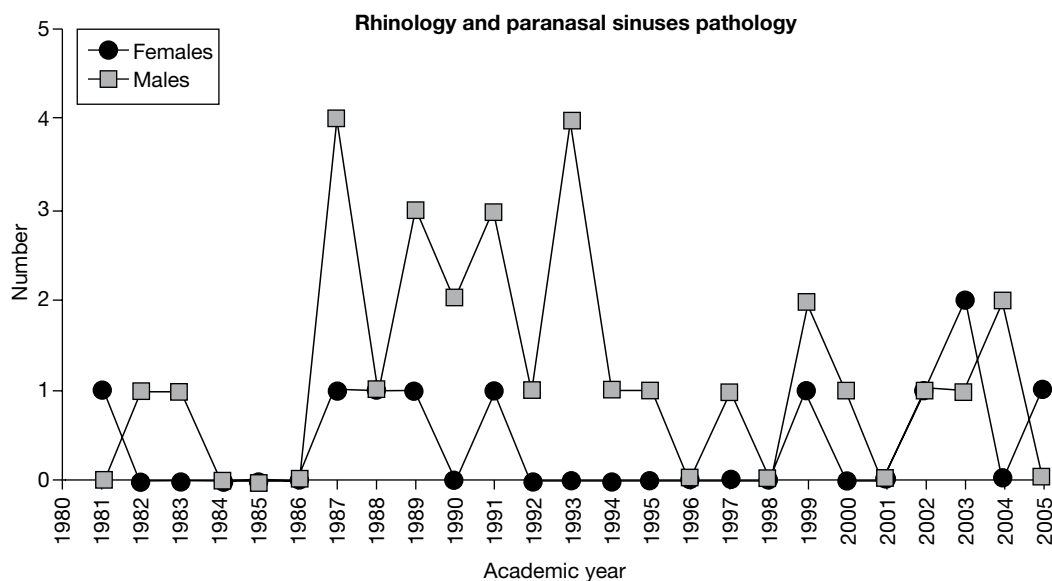


Figure 6 Doctoral theses in cervical pathology according to the gender of the author.

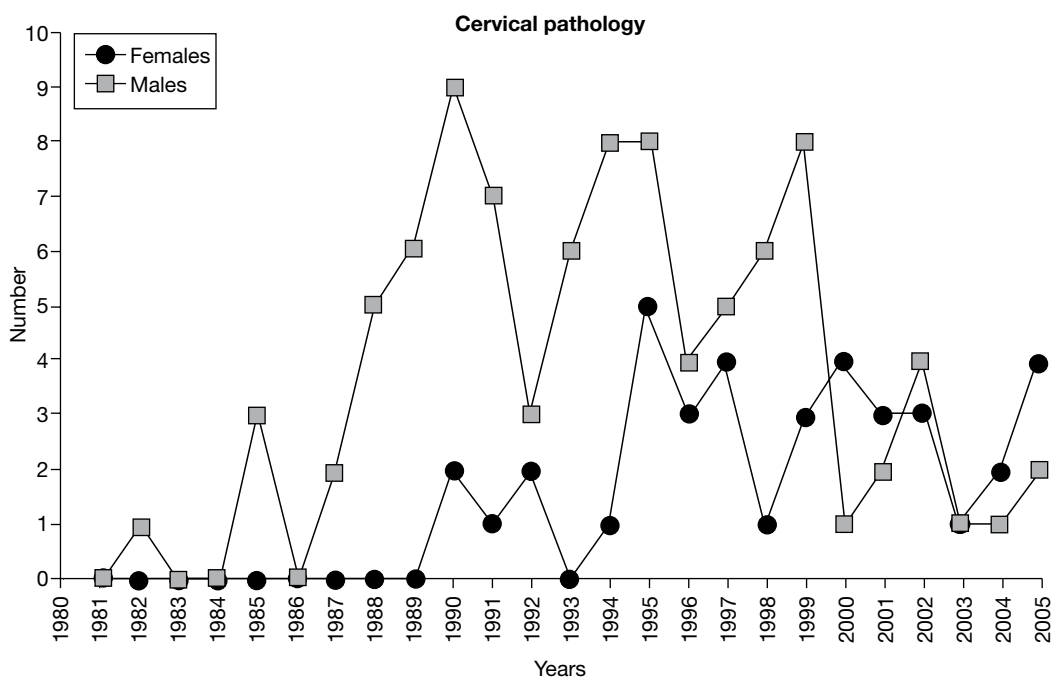


Figure 7 Doctoral theses in cervical pathology according to the gender of the author.

In the first one of them (in the area of Education Science), it concludes that even though the proportion of authors/doctors is favourable to women, the same is not true of the percentage of directors (higher in men).⁹ In the specific case of the faculty that was studied (Sciences of Education in the Universidad de Alcalá), this has not resulted in a gender imbalance in the staff of tenured teachers. However, it is still a fact to be taken into account, especially considering what directing a thesis represents towards access to a career in university and the subsequent possibilities of promotion.⁹ Even bearing in mind that the criteria for directing theses is not being a professor but rather being a researcher and, in turn, that not all people who have

become professors had previously tutored thesis, it is still considered (almost unanimously) that having directed some theses is a requirement for access to the post of university professor. Although there is no global difference in relation with tenured professors, there is a divergence in the number of professors, favourable to males.⁹

The situation seems to be different if it is studied on a more global level in Spain (not forgetting that pedagogy and education science disciplines have usually been more related with women). Villarroya et al¹² conclude in their study that there is a clear tendency towards equality in the numbers of men and women in Spain who complete their doctorate successfully. There is, however, a clear disproportion (in

favour of men) in the percentages of directors of theses as well as in members of the commissions that judge them. These authors also found a significant relationship between the author's gender and that of directors and members of examining committees.¹²

Comparing our results with those of the 2 studies that include data from our country, the number of theses related to otolaryngology defended by women is statistically inferior to that of those presented by men. This fact differs in the area of Education Science,⁹ but is in accordance with the other areas of knowledge in Spain.¹² Although there is a certain disproportion favourable towards men, this has tended to level out in the last years (in the last 2 5-year periods and mostly in the last one according to our study). We have also been able to observe a significant concordance between the gender of authors and directors. However, if we analyse theses in otolaryngology according to the different thematic approaches (ears, nose, etc.), there are no proportional gender-related differences. This is to say, the theses are quantitatively fewer in the female gender but the proportionality of topics is similar (there are no thematic approaches in otolaryngology that have been studied by a majority of one gender or the other).

Our data in relation to the variable of thesis director points to substantial gender-related differences depending on gender (as in the studies by Fresno-Martín⁹ and Villarroya et al¹²). The proportion of female directors and co-directors is statistically inferior to that of male directors and co-directors in relation to the total number of people included in our study, while there is a significant tendency of women to be directed by persons of their same gender.

The possible repercussions of the data previously presented on the staff of tenured otolaryngology professors are outside the objectives of this study; however, we are going to discuss this in the following paragraph.

In the annual journal of the Sociedad Española de Otorrinolaringología (Spanish Society of Otolaryngology, SEORL) from 1999,¹³ there was an extra-official census of professors and lecturers who were currently working in Spanish universities.¹¹ In this census, there were few female professors and no lecturers, a situation that appears not to have changed substantially in the last 10 years. In fact, we are still waiting for the first female lecturer in otolaryngology to be appointed in Spain.

Conclusions

Gender has an influence on the number of doctoral theses in otolaryngology. The number of women was statistically lower during the period analysed, although there is a

statistically significant tendency towards equality in the last 2 5-year periods. However, the gender proportion in different topics from our area of knowledge does not show such differences. Finally, directors (male) are significantly more numerous despite there being a statistical tendency for women to be directed by someone of their own gender.

Conflict of interest

The authors declare no conflict of interests.

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