

ORIGINAL ARTICLE

Women's role in orthopedic and trauma surgery in Colombia

El rol de la mujer en la ortopedia y traumatología en Colombia

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Abstract

Introduction. Over the years, a significant gender gap has been observed in the orthopedics and trauma specialty. This gap has persisted in other countries, suggesting a similar trend in Colombia.

Objective. To establish the gender distribution of orthopedics and trauma residents in Colombia at three critical moments: enrollment in the selection process, admission to the specialty, and completion of the academic program and awarding of the corresponding degree.

Methodology. Cross-sectional study that analyzed the data registered between 2001 and 2021 in the National Information System for Higher Education (SNIES by its Spanish acronym) for postgraduate programs in orthopedics and trauma.

Results. In 2021, the proportion of female graduates from surgical specialties increased compared to 2001 (26.56% vs. 44.84%). Between 2007 and 2021, 16 979 people applied for postgraduate programs in orthopedics and trauma, 975 were admitted, and 702 graduated as orthopedists, with the proportion of women at each stage being 22.47%, 22.56%, and 16.80%, respectively. Furthermore, when admissions were stratified by gender, the percentage of women graduating as orthopedists was significantly lower than that of men (53.64% vs. 77.35%).

Conclusions. Despite an increase in the number of female graduates from medical specialties, women continue to have a very low participation rate in orthopedics and trauma in terms of applications, admissions, and graduation.

Keywords: Orthopedics; Medical Residency; Gender Inequality; Gender Studies; Sexism (MeSH).

Resumen

Introducción. A lo largo de los años se ha observado una importante brecha de género en la especialidad de ortopedia y traumatología. Su persistencia en otros países sugiere una evolución similar en Colombia.

Objetivo. Determinar la distribución por sexo de los residentes de ortopedia y traumatología en Colombia en tres momentos fundamentales: la inscripción al proceso de selección, la admisión a la especialidad y la terminación del programa académico y obtención del correspondiente título.

Metodología. Estudio transversal en el que se analizaron los datos registrados entre 2001 y 2021 en el Sistema Nacional de Información de la Educación Superior - SNIES para los programas de posgrado de ortopedia y traumatología.

Resultados. En comparación con 2001, la proporción de mujeres egresadas de especialidades quirúrgicas en 2021 aumentó (26,56% vs. 44,84%). En el caso de los programas de posgrado en ortopedia y traumatología, entre 2007 y 2021, 16 979 individuos se postularon al proceso de admisión, 975 fueron admitidos y 702 se graduaron como ortopedistas, siendo la proporción de mujeres en cada etapa 22,47%, 22,56% y 16,80%, respectivamente. Además, en relación con el número de admitidos estratificado por sexo, el porcentaje de mujeres que se graduaron como ortopedistas fue notablemente menor que en los hombres (53,64% vs. 77,35%).

Conclusiones. A pesar del aumento en la proporción de mujeres egresadas de las especialidades médicas, en el caso de ortopedia y traumatología, las mujeres siguen teniendo una participación muy baja en términos de aspirantes inscritos, admitidos y egresados.

Palabras clave: Ortopedia; Residencia médica; Inequidad de género; Estudios de género; Sexismo (DeCS)

Introduction

Throughout history, women have played an essential role in health care; however, their formal incorporation into medicine as a discipline only began in the 18th century.^{1,2} Dorothea Erxleben was the first woman to obtain a medical degree in Germany in 1754, followed, several decades later, by other pioneers such as Elizabeth Blackwell, who was the first woman to graduate as a physician in the United States in 1849.^{1,2}

In contrast, Colombian women faced a much longer wait before they could study medicine, and initial opportunities to do so were limited only to those who were able to settle abroad. For example, in 1877, Ana Galvis Hotz became the first Colombian woman to graduate as a physician (degree awarded by the University of Berne, Switzerland), but it was only until 1925 that Paulina Beregoff, the first female physician trained in Colombia, received her degree, which was awarded by the Universidad de Cartagena. However, this was an exceptional event, since the admission of women to university programs was forbidden in Colombia until 1936.²⁻⁴

In the case of the orthopedic specialty, the first woman to graduate as an orthopedist was the Ukrainian Anna Frumina, in 1919. However, in Colombia, even though the specialty has been offered as a medical residency program since 1959, it was only in 1979, and after over 100 men had received the degree of orthopedists, that Yolanda Alicia Restrepo became the first woman to receive the degree of orthopedist in the country, which was granted by the Universidad Nacional de Colombia.⁴

Since then, female representation in the medical profession has progressively increased. In fact, by 2001, the proportion of Colombian women graduating as physicians was higher than the proportion of men,⁵ a situation similar to that reported in other countries such as the United States.⁶ Nevertheless, the number of women graduating from surgical specialties has not grown at the same rate. In orthopedics and trauma, it has been reported that, along with neurosurgery, thoracic surgery and urology, it was one of the specialties in which the proportion of female graduates increased the least between 2005 and 2016 in the United States,⁷ a phenomenon that has probably had a similar behavior in Colombia.

There are currently no studies that address the gender gap in orthopedics and trauma surgery in Colombia. In view of the above, the objective of the present study is to establish the gender distribution of orthopedics and trauma residents in the country at three critical moments: enrollment in the selection process, admission to the specialty, and completion of the academic program and awarding of the corresponding degree. These data are also compared with those observed in other surgical and non-surgical specialties offered in the country.

This diagnostic analysis is necessary as medicine seeks to move ever closer to providing quality patient-centered care. In this context, it is very important for health professionals to understand the perspective of the individuals to whom they provide health services, and it is really useful for physicians to reflect, in a more accurate way, the characteristics of the population they serve.^{8,9}

Methodology

Cross-sectional study. Information was collected from the National Higher Education Information System (SNIES by its Spanish acronym), which provides free access to databases with official data from the Colombian Ministry of National Education on the number of individuals registered, admitted, enrolled, and graduated from the different higher education academic programs in the country.

Data registered in the SNIES between 2001 and 2021 for orthopedics and trauma postgraduate programs were analyzed. Data entered for related programs such as pediatric orthopedics and orthopedic oncology were excluded, as they are subspecialties.

On the other hand, to evaluate the current gender distribution of students graduating from undergraduate medical programs in the country, data on graduates in 2021 were extracted. Furthermore, to analyze the current behavior of the distribution by sex in the orthopedics specialty in comparison with other medical and surgical specialties, the number of residents who graduated as specialists in the country in 2021 was obtained, using the list of medical residencies offered in Colombia from the *Observatorio de Talento Humano en Salud* as a reference for the search of these data.¹⁰ Likewise, data on residents graduating as specialists in the country in 2001 (the oldest record available in the SNIES) were also collected to compare possible changes in the gender distribution among graduates in the different medical specialty programs (anesthesiology, radiology, dermatology, internal medicine, physical medicine and rehabilitation, pediatrics, psychiatry, pathology, emergency medicine, forensic medicine, neurology, geriatrics, family medicine, pain medicine and palliative care) and surgical specialties (general surgery, plastic surgery, neurosurgery, gynecology, urology, pediatric surgery, ophthalmology, otorhinolaryngology, and orthopedics and trauma) offered in the country.

Data are described using absolute frequencies and percentages. Given that this was a secondary analysis of publicly available data, no approval from a research ethics committee was required for the study.

Results

As shown in Table 1, in Colombia, between 2001 and 2021, there was an increase in the number of women graduates both in undergraduate medical programs and in medical and surgical specialties. In 2021, more than half (59.48%) of the graduating physicians were women, a situation that was also observed in non-surgical medical specialty programs, where 54.15% of the graduating residents from these programs were women. Conversely, the proportion of female surgical specialty graduates in 2021 was considerably lower (44.84%); however, when compared to 2001 data, there was an increase in the proportion of female surgical specialty graduates (26.56% vs. 44.84%, with a net increase of 159.72% [72 vs. 187 females]).

Table 1. Distribution by gender of undergraduate medical graduates and surgical and non-surgical specialty programs graduates from 2001 and 2021 in the country.

Academic program	2001	2021
Undergraduate medical program		
Men	1157 (48.34%)	2581 (40.51%)
Women	1236 (51.65%)	3790 (59.48%)
Total	2393 (100%)	6371(100%)
Surgical specialties		
Men	199 (73.43%)	230 (55.15%)
Women	72 (26.56%)	187 (44.84%)
Total	271 (100%)	417 (100%)
Non-surgical specialties		
Men	381 (54.04%)	463 (45.84%)
Women	324 (46.02%)	547 (54.15%)
Total	705 (100%)	1010 (100%)
Specialties (surgical and non-surgical)		
Men	580 (59.42%)	693 (48.56%)
Women	396 (40.57%)	734 (51.43%)
Total	976 (100%)	1427 (100%)

Source: Own elaboration.

Between 2007 and 2021, 16 higher education institutions offered residency programs in orthopedics and trauma in Colombia, however, it should be noted that the data presented in Table 2 on the graduates of these programs during this period pertain to only 13 institutions, since, unfortunately, there is no record in the SNIES of the data from the other 3 institutions. Between 2007 and 2021, 16 979 people enrolled in the selection processes for orthopedics and trauma residency training, the majority of whom were men (77.53%). Of these, only 5.74% (n=975) were admitted, of which 22.56% were women. In total there were 702 graduates from orthopedics and trauma specialty programs, and only 16.80% of these were women.

On the other hand, and assuming that residents admitted between 2007 and 2017, as well as those admitted in previous years, completed their residency consecutively (4 years), it is estimated that, of the total number of women admitted in that period, 53.64% completed the orthopedics and trauma residency program. Under the same assumption, the proportion of men admitted in the same period who completed their residency consecutively and graduated within 4 years of admission was 77.35%. Finally, of the 7 higher education institutions in which a lower number of women were registered in the enrollment and admission processes, as well as a lower number of women graduates, 6 were public universities.

Table 2. Total number and proportion of women enrolled, admitted and graduated from 13 orthopedics and trauma residency programs offered in Colombia between 2007 and 2021.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Enrolled	476	516	622	802	834	853	775	942	1150	1273	1520	1513	1861	2270	1572	16979
Women	58	52	57	102	117	124	144	236	288	319	377	407	494	578	463	3816
%	12.18	10.07	9.16	12.71	14.02	14.53	18.58	25.05	25.04	25.05	24.80	26.90	26.54	25.46	29.45	22.47
Admitted	52	52	62	58	52	59	53	62	66	64	75	82	83	84	71	975
Women	7	5	12	7	8	9	14	20	19	13	16	19	21	28	22	220
%	13.46	9.61	19.35	12.06	15.38	15.25	26.41	32.25	28.78	20.31	21.33	23.17	25.30	33.33	30.98	22.56
Graduated	38	33	41	32	48	47	45	44	50	48	41	52	63	50	70	702
Women	5	7	2	1	6	6	5	4	9	5	10	14	17	13	14	118
%	13.15	21.21	4.87	3.12	12.50	12.76	11.11	9.09	18	10.41	24.39	26.92	26.98	26	20	16.80

Source: Own elaboration based on SNIES data.

Discussion

Less than a century ago, Colombian women were able to access professional medical training in the country for the first time. Since then, their participation has progressively increased and currently more than half of the doctors graduating each year in Colombia are women. Despite the above, both in Colombia and in the world, some surgical specialties, such as orthopedics and trauma, have not had the same success in terms of attracting and including women.^{7,11-13}

According to the data analyzed, between 2001 and 2021 less than a quarter of the candidates enrolled in the selection process of the orthopedics and trauma residency programs offered in the country were women. This could be related to the fact that up to 68% of female physicians tend to discard specialties that they consider to be biased in terms of the sex of the applicants as a career option, which is why it is essential to determine the stereotypes that, in relation to this specialty, make the sex of the applicant be considered as a predictor in the selection process.¹⁴⁻¹⁸

It has been suggested that the perception that the lifestyle of orthopedists is incompatible with raising a family due to the lack of an adequate work-life balance is one of the possible factors that lead women to choose other specialties;^{13,14,16,18} however this assertion has been disproved by other studies.^{14,18,19} In this regard, it should be pointed out that in other surgical specialties with similar characteristics to orthopedics and trauma in terms of working hours, duration of training, and repercussions on personal life, for example gynecology and obstetrics, the majority of specialists are women.^{12,19,20}

Another misconception that might keep women physicians from choosing to become orthopedists is that an athletic build and/or great physical strength is required, as well as a keen interest in sports, when nowadays and thanks to advances in terms of anesthesiology and the development of better surgical tools this is not necessary.^{13,14,16,17,19}

In addition, since orthopedics is not part of the mandatory subjects of medical programs in many medical schools, early exposure to sports and musculoskeletal injuries has taken on an important role as an initial approach of future physicians to this surgical specialty and could even be considered an influential factor in the gender gap.^{14,21,22,23} On the other hand, it has been suggested that women tend to require more time than men to decide on orthopedics, which is a potential disadvantage in the selection processes, as this situation implies a later active search for mentors, research projects and, in general, clinical opportunities.¹¹

The lack of representation of women in leadership positions in the orthopedics and trauma specialty has also been pointed out as a factor that discourages the entry of female physicians, since this generates a lack of mentors or role models of the same sex. The percentage of Colombian female orthopedists holding such positions in the country is currently unknown, although figures may not be far from those reported in the United States, a country where, by 2018, only 17.8% of faculty in orthopedic residency programs were women (the lowest proportion among all medical specialties) and only two of them held the position of department head or director.^{11,24,25} Also, women remain a minority in most orthopedic societies in the United States, even in superspecialties where women have traditionally been perceived to be more involved, such as pediatric orthopedics and hand surgery.^{21,26,27}

Similarly, the existence of a differentiated selection during the orthopedic residency admission process based heavily on the sex of applicants has been questioned, and it has even been suggested that women might be viewed as less desirable or competent candidates under the belief that their performance as residents is worse than that of their male peers. However, so far the available evidence is insufficient to ensure that the selection of those admitted to orthopedic residency programs is sex-dependent or related to beliefs regarding differential performance based on the gender of the applicant.¹⁸⁻²¹ In this sense, the data reported in the present study do not indicate a differential admission process to the specialty based on the gender of the candidates, since the percentage of women admitted to orthopedic residency programs was proportional to the number of women enrolled.

One finding that stands out in the present study is that public universities had the lowest percentages of women enrolled in the selection process, admitted to the specialty, and graduated as orthopedists. While it is not clear why these institutions are less attractive to female general practitioners regarding enrollment in the selection process, it should be noted that, as far as admission is concerned, and in line with what was stated above, in some of these universities, the decision on admission to the orthopedics and trauma residency depends solely on the score obtained by the applicant in a series of evaluations, without resorting to interviews in which gender could be considered as a significant factor.

In addition, based on the data obtained in the SNIES and analyzed here, it was observed that, once admitted, women had a lower graduation rate than men between 2007 and 2021 (53.64% vs. 77.35%) compared to the number of students admitted (220 and 755, respectively). However, the available information does not allow us to elucidate the possible reasons for women completing orthopedic residency training at a lower rate than men.

It should be noted that, while this is the first study to explore the gender gap in orthopedics in Colombia, there are limitations since, although SNIES is so far the most complete and reliable source of information on higher education programs in the country, the data collected and analyzed here could be inaccurate in terms of the situation of this specialty in the country, given the possibility of underreporting and missing data. Likewise, the SNIES was designed to record data for a purpose different from that of the present study, thus affecting the analysis of secular trends and of the causes and consequences of the phenomena observed. Therefore, information available in the SNIES does not allow explaining, for example, the reasons for attrition among orthopedics residents, nor should it be used to establish the causes of the low participation of women in the specialty.

Notwithstanding the above, it is clear that the data presented here show the need to develop strategies to reduce the gender gap in terms of access and participation in this specialty. One of the proposed strategies is to reinforce a supportive institutional culture for women that ensures that mentoring opportunities and early exposure to the specialty are the same for both male and female applicants. This is highly relevant, as having a same-sex mentor properly validates the gender-specific challenges faced by the student in the specialty and can help the student find more effective strategies to overcome those obstacles.¹⁹ Along the same lines, opportunities for academic participation of women orthopedists in medical schools and orthopedic departments should also be increased, as well as encouraging their active performance as mentors for other women in the specialty.^{11,19,21,28,29}

Lastly, it is also worth mentioning that multiple partnerships have been created in the United States with the goal of reducing gender inequity and increasing the inclusion of women in orthopedics, but the emergence of these societies in Latin America has taken much longer. *Orthowomen, the first organization for female orthopedists founded by Latin American women, was created in 2020 and, in the particular case of Colombia, although there were no such societies as of August 5, 2021, the first meeting of female orthopedists in the country was held with the support of the Sociedad Colombiana de Cirugía Ortopédica y Traumatología (SCCOT), suggesting that greater awareness is being generated with respect to the need to empower women as leaders in this specialty.*

Conclusions

Further studies to understand and provide solutions to the factors that promote the gender gap in the orthopedics and trauma specialty in Colombia are required, since having a clearer view of this situation will allow overcoming stereotypes and misconceptions, thereby increasing the participation of female physicians in the enrollment processes of the different orthopedic and trauma residencies offered in the country.

Furthermore, although there is no evidence of a differential gender-based admission of candidates to orthopedic residency programs, the reported data suggest the need to study the reasons why the proportion of women completing orthopedic residency is markedly lower than that of men. This should be a priority because if physicians can better reflect the characteristics of the population they serve, they will be able to ensure a high-quality, more empathetic and more equitable delivery of health care.¹⁵

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Conflicts of interest

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