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Gender gap among plastic surgery residents: the Italian experience

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Abstract

Aim: Despite the significant increase in the proportion of graduating female physicians in recent decades, gender representation in surgical training remains imbalanced. The initial rise in female interest in plastic surgery has reached a plateau. Gender bias, affecting women's confidence and opportunities, negatively impacts training and career prospects. This study aims to quantify and analyze disparities in surgical training opportunities, workplace treatment, and career advancement among male and female plastic surgery residents in Italy.

Methods: Our study involved all Italian plastic surgery residents contacted between February and March 2024. A 21-item survey assessed professional, surgical, and personal aspects, focusing on gender gap differences. Responses were expressed in percentages and compared utilizing the Fisher Exact test.

Results: A total of 551 surveys were distributed to Italian plastic surgery residents, with 46 responses each among women and men. Gender disparities persisted in workplace treatment, with more women reporting discrimination. Significant differences were identified in treatment inequality by hospital personnel and patients, the occurrence of inappropriate comments in the workplace, inquiries regarding work-life balance and career advancement opportunities, an augmented gender gap in surgical *vs.* clinical programs, and the perception of a negative impact of gender on surgical training.

Conclusion: In conclusion, our study emphasizes the pervasive gender inequality in plastic surgery training, urging action against systemic biases hindering female surgeons' progress. Gender equity efforts should combat discrimination, promote work-life balance, and foster inclusive training environments. Addressing these issues can create a field that empowers all surgeons to thrive.

Keywords: Gender bias, women in surgery, plastic surgery, gender gap, resident

INTRODUCTION

The percentage of graduating female physicians among medical students has increased considerably since 1965, rising from 7% to 46% in recent years[1]. According to the American Association of Medical Colleges, the percentage of female students enrolled in medical school reached a record high of 53.4% in 2018[2]. However, women are still underrepresented in surgical training programs despite being equally represented in medical colleges[3]. The percentage of women choosing plastic surgery as a specialty increased progressively, from 13% in 1998 to 35% in 2015[1]. However, soon after this initial spike, the number of female physicians graduating and entering the field of plastic surgery has plateaued, with just 27%-34% of applicants being women between 2014 and 2018[4]. Approximately 37% of plastic surgery residents and 16% of members of the American Society of Plastic Surgeons were female in 2019. The American Society of Plastic Surgeons reports that the ratio of male to female plastic surgeons currently in practice is approximately 5:1[5]. Numerous issues have been related to the underrepresentation of women in surgery, including work-life balance, professional happiness, retirement and financial planning, patient and public preference, mentorship and role models, gender bias and discrimination[6]. At all stages of subspecialty surgical training, implicit gender prejudice also occurs; in such cases, it may be more subtle and difficult to identify. This implicit bias probably contributes to the confidence gap between men and women by influencing how female surgical trainees see and evaluate themselves[7]. Additionally, research shows that confidence affects how competent people are seen[8], which is problematic when scientific faculty members have biases and believe women to be less capable than men[9], and female residents already have less autonomy in the operating room[10]. Therefore, the perception of one's competence by attending surgeons and other authority figures is affected by the confidence gap that exists between female and male residents. This could have significant consequences for the quality of education received during training and future employment prospects[11].

This is a prevailing topic in the surgical setting worldwide, and to our knowledge, this is the first study aimed at analyzing gender bias among Italian plastic surgery residents.

METHODS

Study population

The study population comprises all plastic surgery residents in Italy, both male and female, who were contacted via e-mail or telephone message between February and March 2024. Non-responders were sent a reminder e-mail 2 weeks after the initial contact. Out of the total 551 residents, 92 responded to the questionnaire (16.70%). Among these, 46 were women and 46 men.

The questionnaire

We propose a 21-item question survey to compare the professional, surgical, and personal opportunities available to plastic surgery residents in Italy. The questions focused mainly on present and future professional opportunities, satisfaction in the workplace, discrimination in the workplace, and work-life balance to identify gender gap differences [Table 1]. The survey was designed to be completed in approximately 5 min to maximize the number of responses from busy residents.

Table 1. Questionnaire administered to plastic surgery residents

Indicate your gender: men, women, prefer not to answer
Indicate your age:
Indicate the year of residency: I, II, III, IV, V
Indicate the location of your residency school: North, South, Center, Islands
Do you have the same opportunities to participate in operating room activities as your colleagues of the opposite sex?
Do you have equal opportunities to perform surgical procedures compared to your colleagues of the opposite sex?
Do you receive fair treatment from your colleagues compared to your colleagues of the opposite sex?
Do you receive fair treatment from your superiors compared to your colleagues of the opposite sex?
Do you receive fair treatment from patients compared to your colleagues of the opposite sex?
Do the nursing staff treat you with the same consideration as your colleagues of the opposite sex?
Have you ever experienced discrimination based on your physical appearance or attire?
Do you think your physical characteristics may affect your opportunities compared to colleagues of the same sex?
Do you think your personality may affect your opportunities compared to colleagues of the same sex?
Have you ever received inappropriate comments in the workplace?
Do you think becoming a parent during the specialization process could negatively affect your career?
Do you think managing the balance between family and work is more complex compared to a colleague of the opposite sex?
Do you notice any changes in current trends regarding gender disparities in the workplace?
Do you believe you have equal opportunities to participate in scientific work, conferences, and courses compared to your colleagues of the opposite sex?
Do you believe you have equal opportunities in terms of hiring, career, and advancement to managerial roles?
Is there gender equality among the superiors/professors in your institution?
Are there more men or women among your superiors?
In your experience, is there greater gender disparity compared to non-surgical branches?
Do you think your gender has influenced your surgical training?
Do you consider your level of theoretical preparation adequate for your year of training?
Do you consider your operating room skills adequate for your year of training?

E-mails and messages were sent to the target surgeons and groups with an embedded link to complete the survey. A brief description of the survey was included in the e-message, and if the recipient decided to participate, he could click the link for access. By completing the survey, residents agreed to participate in the study. All questionnaires were anonymous. The questionnaire was preceded by questions regarding general characteristics: age, year of residency, geographical location (north, center, south, islands), and gender. The system then divided participants by gender into Group A (men) and Group B (women).

The responses were analyzed according to the different groups and compared utilizing percentages. Statistical analysis (R version 4.4.4 2024-02-29) utilized the Fisher exact test comparing female and male groups. Differences were considered significant when a P value < 0.05 was found.

RESULTS

A total of 551 questionnaires were sent via e-mail or message to all male and female residents in Italy. No survey was excluded, and none were incomplete. Data were analyzed based on the responses of 46 women and 46 men. The results of the questionnaire are reported in Table 2.

The majority of responders were in their third year (30.4%) for females and first and second year of residence (26.1%) for males. The majority of participants worked in Central Italy, 82% females and 73.9% males, and the mean age was 28.52 years for female plastic surgery residents and 27.95 years for male plastic surgery residents. Data are reported in Table 3.

Table 2. Results of the questionnaire (Total questionnaires sent: 551; Excluded surveys: none; Incomplete surveys: none)

Domain	Men	Women	*P*-value
Analyzed data	46	46	
Mean age	27.95 years	28.52 years	
Year of residency	I and II year (26.1%)	III year (30.4%),	
Location of residency	Central Italy (73.9%)	Central Italy (82%)	
Reduced opportunities in OR	21.7%	30.4%	0.865
Discriminatory treatment by colleagues	30.4%	30.4%	NA
Discriminatory treatment by superiors	34.8%	39.1%	0.916
Discriminatory treatment by patients	4.3%	69.6%	< 0.001
Discriminatory treatment by hospital personnel	13%	39.1%	0.032
Discrimination based on physical aspect	26.1%	52.2%	0.221
Inappropriate comments	43.5%	87%	0.004
Influence of physical aspect on opportunities	52.2%	73.9%	0.021
Influence of personality on opportunities	82.6%	82.6%	< 0.001
Impact of parenthood on training and career	73.9%	100%	0.021
Perception of complex personal life balance	87%	100%	< 0.001
Gender gap positive trend	65.2%	73.9%	0.504
Reduced opportunities in scientific work, congresses, and courses	21.7%	26.1%	1
Reduced career advancement possibilities	4.3%	60.9%	< 0.001
Gender equality among superiors	69.6%	56.6%	0.049
Increased gender gap in surgical specialties	65.2%	100%	0.003
Influence of gender on training	17.4%	43.5%;	0.035
Adequacy of theoretical preparation to residence year	43.5%	47.8%	1
Adequacy of surgical skills to residence year	30.4%	34.8%	1

OR: Operating room; NA: not available.

Table 3. Demographic table showing specific numbers of respondents

	Variable	Women	Men
	Total (*n*)	46	46
	Mean age (year)	28.5	27,9
Residency year	I	9	10
	II	10	13
	III	14	9
	IV	7	8
	V	6	6
Location of residency	North	2	5
	South	5	10
	Central	38	31
	Islands	1	0

30.4% of women and 21.7% of men [Figure 1] declared having fewer opportunities in the operating room (OR) compared to their opposite-sex colleagues, even though this difference was not found to be significant. 30.4%, 39.1%, 69.6%, and 39.1% of women and 30.4%, 34.8%, 4.3%, and 13% of men perceived a worse treatment by colleagues, superiors, patients, and hospital personnel, respectively: only treatment by patients and hospital personnel was found to be significant, with *P*-value < 0.001 and *P*-value = 0.032, respectively.

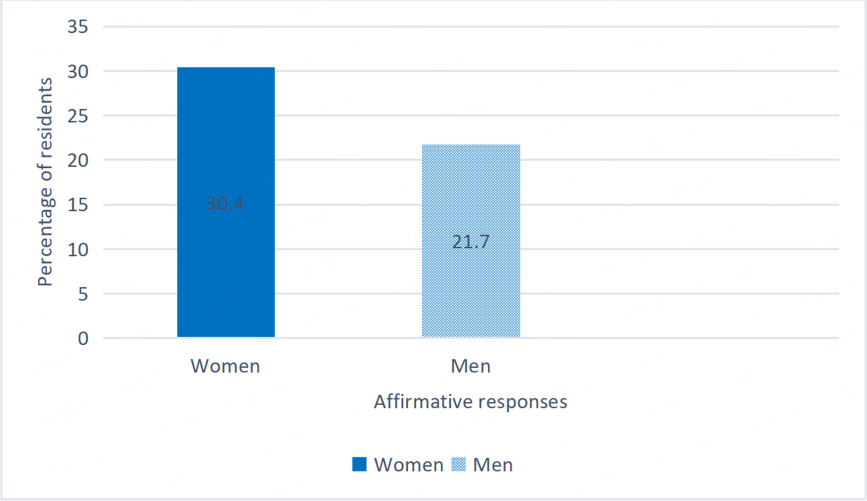

Figure 1. Female users (30.4%) *vs.* male users (27.1%) who declared having fewer opportunities in the OR compared to their opposite-sex colleagues. OR: Operating room.

Only 26.1% of men reported experiencing discrimination based on their physical appearance, compared to 52.2% of women [Figure 2], with no significant difference identified at a *P*-value = 0.221.

Furthermore, 43.5% of men reported inappropriate comments in the workplace, compared to 87% of women, with a statistical significance of *P*-value = 0.004. Male residents perceived that their surgical opportunities were influenced by their personalities in 82.6% of cases and by their physical aspect in 52.2% of cases. Female residents instead perceived their surgical opportunities were influenced in 73.9% of cases by their physical aspect *vs.* 82.6% by their personalities. No significant differences were found in such variables.

Regarding personal life, 73.9% of male and 100% of female residents reported fearing that having a child during residency could negatively impact their training and career. Personal life balance was perceived as complex by 87% of males and 100% of females. Both variables were found to be significant, with a *P*-value = 0.021 and *P*-value < 0.001, respectively.

Compared to the past, a positive trend in gender gap issues was identified by 65.2% of males and 73.9% of female surgeons.

Men in 21.7% and women in 26.1% of cases perceived a lower opportunity to participate in scientific publications, congresses, and courses. Only 4.3% of males consider their career opportunities and advancement to be reduced, compared to 60.9% of female residents, with a *P*-value < 0.001 underlying significance.

Most responders declared equality in the gender gap among their superiors, 69.6% men and 56.6% women. This specifically refers to the number of men and women among their superiors. The majority of responders believe that there is an increased gender gap difference in surgical specialties compared to clinical ones, 65.2% of men and 100% of women sharing this view, with significance and a *P*-value = 0.003. Only 17.4% of males believe that their gender has negatively influenced their training, compared to 43.5% of female residents [Figure 3], with a significance of *P*-value = 0.035.

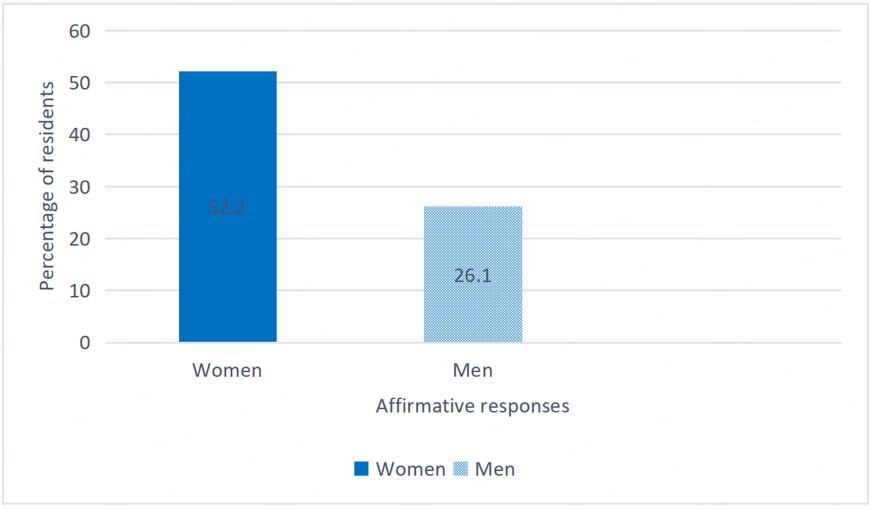

Figure 2. Female residents (52.2%) *vs.* male residents (26.1%) declaring they received discrimination based on their physical aspect.

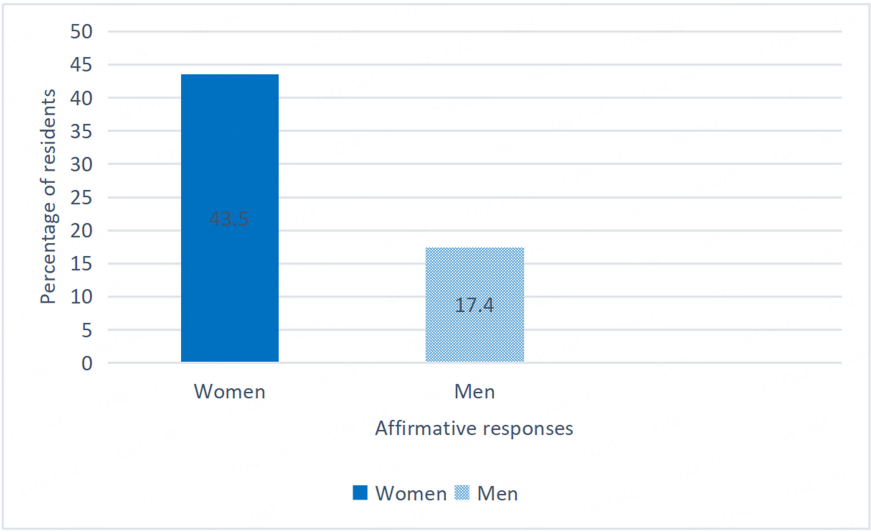

Figure 3. Female residents declaring they believe that their gender has negatively influenced their training (43.5%) *vs.* male residents (17.4%).

Theoretical preparation was considered adequate to their residence year level by 43.5% of males and 47.8% of females, and surgical skills by 30.4% of males and 34.8% of females only.

Therefore, significant differences were identified in treatment inequality by hospital personnel and patients, the occurrence of inappropriate comments in the workplace, inquiries regarding work-life balance and career advancement opportunities, the augmented gender gap in surgical *vs.* clinical programs, and the perception of gender's negative impact on surgical training.

DISCUSSION

In Italy, gender discrepancies are glaring within vascular surgery, general surgery, and transplant surgery, as revealed by studies by Giacomelli *et al.*[12], Parini *et al.*[13], and Franchi *et al.*[14] Substantial gaps exist between

male and female surgeons concerning job satisfaction, career prospects, surgical involvement, scientific engagement, and perceptions of workplace support. Female doctors are more likely to encounter sexual harassment from male peers, colleagues, and patients. Similarly, gender imbalances persist in general and transplant surgery, where women grapple with issues like dissatisfaction with work-life balance, inadequate training, and unequal division of household and childcare duties[15]. Despite women constituting 28% of Italy's transplant surgery workforce, their autonomy remains significantly lower compared to men. Nevertheless, studies suggest that the distribution of researchers and residents' positions is unrelated to gender, hinting at the potential for progress toward gender equality in surgical academia. Nonetheless, concerted efforts are necessary to address systemic challenges and foster a more equitable environment for female surgeons in Italy.

The findings from our survey shed light on the pervasive issue of gender inequality within plastic surgery training programs. Our data suggest that female trainees perceive and experience gender discrimination at a significantly higher rate compared to their male counterparts. This aligns with existing literature that underscores the prevalence of gender disparities within medical specialties, including plastic surgery.

One notable aspect of our results is the disparity in experiences of gender discrimination between male and female trainees. While 87% of females reported inappropriate comments in the workplace, only 43.5% of males acknowledged similar experiences with a *P*-value = 0.004. Furthermore, only 4.3% of males consider their career opportunities and advancement to be reduced, compared to 60.9% of females with a *P*-value < 0.001. This stark contrast suggests that gender-based biases and stereotypes may disproportionately impact female trainees within plastic surgery training programs. Such discrimination can manifest in various forms, including unequal opportunities for mentorship, biased evaluations, and differential treatment in educational and professional settings. This aligns well with literature, which indicates that while the number of female surgical residents rose dramatically during the years, only a small percentage of these female surgeons ended up being chiefs of their units. Therefore, since gender disparity worsens higher up the hierarchy of surgery units, this might discourage young physicians from pursuing a career as a surgeon. Moreover, our findings highlight the unique challenges that female plastic surgery trainees face when navigating the intersection of career advancement and family responsibilities. The fear of negative career repercussions due to pregnancy and motherhood was significantly higher among female respondents, with 100% expressing concerns compared to 73.9% of male respondents with statistical significance. As gender disparity worsens throughout the hierarchy of surgery programs, and persistent societal expectations and institutional barriers continue to hinder women's professional advancement, young physicians may be discouraged from pursuing careers in surgery. The perceived risk of career setbacks associated with maternity further exacerbates the existing gender gap within plastic surgery training, potentially deterring talented female surgeons from pursuing leadership roles and academic pursuits. A paper by Halperin *et al.* underscores that of a pool of 337 female plastic surgeons, 42.9% did not have children, compared to only 11.9% of men; furthermore, men tended to have more children than women during their residency[16]. These staggering numbers are not unique; instead, they can be found consistently throughout literature. Additionally, our data emphasize the significant impact of work-life balance on trainees' perceptions and experiences within the field of plastic surgery. Female respondents overwhelmingly perceived their work-life balance as complex, with 100% expressing challenges in managing professional responsibilities alongside personal obligations, a statistically significant difference compared to males. This finding resonates with current literature, which indicates that a substantial proportion of female residents across various medical specialties report dissatisfaction with their work-life balance. The discrepancy between male and female trainees in our study suggests that women may face additional hurdles in achieving equilibrium between their professional and personal lives, further underscoring the need for targeted interventions and support

mechanisms to address gender-specific challenges within plastic surgery training programs[17]. Our findings also shed light on the prevalence of sexual harassment and sexism within plastic surgery training, with a notable observation that sexism predominantly emanated from patients and non-medical hospital personnel with statistical significance compared to other questionnaire items. While our study highlighted this trend, it is essential to acknowledge broader research, such as the study by Naidu *et al*., which indicates that nearly half of female surgeons report experiencing some form of sexism and gender discrimination[18]. This underscores the multifaceted nature of gender-based biases within surgical practice, encompassing both systemic issues within healthcare institutions and societal attitudes toward female surgeons. Addressing these pervasive challenges requires a comprehensive approach that addresses institutional policies, promotes awareness and education, and fosters a culture of respect and inclusivity within the medical community. Recent data for the American Society of Plastic Surgery (ASPS) state that while only 19% of their current members are women, 47% of new residents entering the specialty are women, suggesting a significant change in trend[19].

To our knowledge, this is the first study in Italy to address gender gap issues in the plastic surgery field. Our study yielded findings that deviated notably from the existing literature. While women reported facing challenges related to gender discrimination and work-life balance, perceptions regarding the loss of opportunity and surgical skill were similar across genders. Additionally, our survey emphasized that discrimination, as perceived by our respondents, primarily occurred within the surgical setting, with fewer instances observed in purely clinical medical domains. These insights provide a nuanced understanding of the gender dynamics within plastic surgery training, suggesting that while certain challenges are gender-specific, others may be more context-dependent.

In accordance with our findings, Chen *et al*. underline how gender bias and sexual misconduct negatively affect women's training and how younger trainees are less prepared to address such issues. In contrast to our study, they found that the majority of harassment originated from other physicians, while in our case, it arose from hospital personnel and patients[20].

The most important limitation of our study is the low survey response rate (16.7%), which potentially limits the generalizability of our results to all Italian plastic surgery residents. In fact, the residents who decided to respond may be the most vulnerable to the issue. Another limitation relates to the fact that the responses were mainly from residents attending the first three years of their program, while seniors might have a more comprehensive view of the residency path in terms of opportunities, skills, and knowledge than their colleagues of the opposite sex. The inability to find objective feedback in the opinions reported by respondents to the questionnaire may be a bias that cannot be underestimated. For example, with regard to the possibility of going to the operating room, it would have been useful to evaluate the operating records to see how much the feeling of having fewer opportunities in that area is actually real. In any case, given the sharpness of response about some specific comparisons (e.g., career opportunities and advancement), our study stands as a pilot study to explore the topic further and as food for thought about the gender gap in Italian plastic surgery residency schools.

In conclusion, our study highlights the pervasive nature of gender inequality within plastic surgery training and underscores the importance of addressing systemic biases and barriers that hinder the advancement of female surgeons. Efforts to promote gender equity in plastic surgery must encompass comprehensive strategies aimed at mitigating gender-based discrimination, supporting work-life balance initiatives, and fostering an inclusive and supportive training environment for all trainees, regardless of gender. By acknowledging and actively addressing these issues, the plastic surgery community can work toward creating a more equitable and inclusive field that empowers all surgeons to thrive and succeed.

DECLARATIONS

Authors' contributions

Conceptualized the study, developed the initial idea, and outlined the overall structure: Grippaudo FR
Made substantial contributions to the conception and design of the study and performed data analysis and interpretation: Schiavone L, Mannella V
Performed data acquisition and technical support: Patrignani A
Supervised the manuscript development: Pagnotta A, Ribuffo D

Availability of data and materials

Not applicable.

Financial support and sponsorship

None.

Conflicts of interest

Grippaudo FR is an Editorial Board member of *Plastic and Aesthetic Research*, while the other authors declared that there are no conflicts of interest.

Ethical approval and consent to participate

The study has been performed in accordance with the principles stated in the World Medical Association Declaration of Helsinki. The local Ethical Committee waived the need for ethical approval in view of the nature of the study.

Consent for publication

Not applicable.

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