

Gender differences in cardiology professionals: A Latin American Survey

Diferencias de género en los profesionales de cardiología: una encuesta latinoamericana

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Abstract

Background: Gender-based differences among cardiology professionals have been reported in North America and Europe. However, the perspective of Latin American cardiologists remains unexplored. **Objectives:** The objectives of the study were to analyze the gender gap perspective among cardiologists from Latin America. **Methods:** A cross-sectional study using an online survey directed to Latin American cardiologists from five different cardiology societies. The survey included questions on demographic data, professional development in the field of cardiology, and perceived barriers in clinical practice. **Results:** A total of 240 professionals were surveyed, of which 41.7% were women (100) and 58.3% were men (140). The majority of women tend to work in the subfields of clinical cardiology and cardiovascular imaging. Women were underrepresented as heads of departments, earn less, and report less work satisfaction than men. The barriers that female cardiologists face at their workplace include labor discrimination, sexual harassment, family-related concerns, and lack of career development. **Conclusions:** The survey points toward the prevalence of a gender gap among cardiologists in Latin America, which is primarily driven by labor discrimination, sexual harassment, family-related concerns, and lack of career development among female cardiologists. Actions aimed at addressing this issue should be considered by different parties.

Keywords: Gender inequality. Cardiology. Latin America.

Resumen

Antecedentes: Existen diferencias de género entre los profesionales en cardiología en Europa y Norteamérica. La perspectiva de este suceso en América Latina permanece inexplorado. **Objetivos:** Analizar la perspectiva de la diferencia de género entre cardiólogos en América Latina. **Metodos:** Estudio transversal en el que se usó un cuestionario en línea dirigido a profesionales en cardiología en América Latina. El cuestionario incluía datos demográficos, desarrollo profesional en el campo de la cardiología y la percepción de las barreras en la práctica clínica. **Resultados:** un total de 240

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profesionales fueron analizados, de los cuales 41.7% (100) fueron mujeres y 58.3% (140) fueron hombres. La mayoría de las mujeres suelen trabajar en el área de imagen cardiovascular. Se encontró subrepresentación del género femenino en jefaturas de departamento, tienen un menor salario y reportan menor satisfacción laboral en comparación con los hombres. Las barreras que enfrentan en su lugar de trabajo fueron discriminación laboral, acoso sexual y falta de desarrollo profesional. **Conclusiones:** El cuestionario señala la prevalencia de la diferencia de género en América Latina, principalmente por discriminación laboral, acoso sexual y falta de desarrollo profesional. Se necesita tomar acciones interinstitucionales que vayan dirigidas a reducir y eliminar esta brecha.

Palabras clave: Inequidad de género. Cardiología. América Latina.

Introduction

Cardiology is one of the medical specialties with the lowest proportion of female practitioners. In a 2013 ranking by the Association of American Medical Colleges which measured the proportion of active physicians by sex and specialty¹, cardiology ranked 33rd out of 41 specialties. As of today, women represent approximately 30% of all physicians in the United States and 50% of incoming medical students. However, only 12% of cardiologists in the U.S. are women, and the proportion drops further when analyzing subspecialties such as interventional cardiology or electrophysiology²⁻⁴. Furthermore, women are less likely to hold executive positions such as chief of division (19%) and head of service (11%) when compared to men⁵.

Research suggests that possible causes for the underrepresentation of women in leadership positions include family planning related concerns, absence of a work-life balance, gender discrimination, and risk of radiation exposure^{6,7}. In addition, the lack of ethnic and sexual diversity constitutes critical topics in all medical fields, especially in cardiology. In a traditionally male-dominated career, women find it hard to be acknowledged as much as their male peers.

Information regarding gender-based differences in cardiology has been obtained from survey analyses in North America and Europe. Yet, no study has addressed these differences in Latin America. The aim of this project is to assess gender-based differences regarding labor conditions, career perspective, professional barriers (including gender discrimination, gender bias, and radiation hazards), income, and satisfaction among cardiologists in Latin America.

Materials and methods

The method is based on a cross-sectional, analytical, and comparative study performed through an online survey sent through email, which included 28

multiple-choice questions. The 3,037 surveyed cardiologists came from 19 Latin American countries and five different cardiological societies of the region (Mexican Society of Cardiology 303, International Fellowship Society of the Cardiology Institute 2423, Guatemalan Association of Cardiology 100, Cuban Society of Cardiology 31, and Paraguayan Society of Cardiology 180). The survey included questions on demographic characteristics – including gender, age, nationality, marital status, type of professional practice within cardiology – including subspecialty – information on place of work – including hygiene and safety conditions – years of practice, position, work hours per day, monthly income, research development, and existing barriers in their workplace. Survey information and participation was anonymous, and data were handled following ethical standards. Protocol was reviewed and accepted by the ethics and research committee of the corresponding author's institution and complies with the Helsinki Declaration.

Statistical analysis

Statistical analysis was performed using STATA/IC v13 (StataCorp, College Station, Texas). For the descriptive analysis, binary variables were described as frequencies and proportions and analyzed with Pearson's independence test (χ^2) or Fisher's exact test, according to the number of individuals. Quantitative variables were analyzed first with Shapiro-Wilk's normality test and were described as parametric (mean, standard deviation, and minimum-maximum) or non-parametric (median, interquartile range, and minimum-maximum) accordingly. Bivariate analysis was completed with Student's t-test for parametric variables, and with Mann-Whitney's U-test for non-parametric variables. We constructed a logistic regression model to determine the risk factors for labor dissatisfaction. $p < 0.05$ was considered statistically significant.

Results

The survey was answered by 240 cardiologists from 19 Latin American countries, of which 41.7% were women (100) and 58.3% were men (140), with a median age of 42 years old, which represents a relatively young age. Sociodemographic characteristics are shown in (Table 1). In brief, 66.1% of all cardiologists were married, 70% had more than one job, and both genders worked the same number of hours per day. Women were less likely to have children (47.0% vs. 85.4%, $p = 0.001$) than their male counterparts. Male cardiologists showed a higher proportion of cardiovascular conditions (obesity, hypertension, and cardiac conditions), but women presented a higher rate of insomnia, anxiety, and depression.

Regarding their professional activities and subspecialties, 60.2% reported clinical cardiology as their main professional activity. Women were more likely to be echocardiographers (34% vs. 19.4%, $p = 0.01$), while men were more likely to work as interventional cardiologists (28.78% vs. 7%, $p = 0.001$). As for electrophysiology, cardiovascular imaging, nuclear cardiology, cardiac rehabilitation, intensive care, and geriatrics, a 1:1 ratio was found without differences across gender (Fig. 1).

Concerning the type of job, men reported more frequently to occupy a position as head of department (12.9% vs. 8%), manager (10.7 vs. 6%), leadership (2.8 vs. 1%), or general director (2.8% vs. 2%) than their female counterparts (Fig. 2). Most frequently, women reported not having an adequate remuneration for their job as well as the professional place they think they deserve (Fig. 3). Men also tend to have a higher monthly income than women ($p = 0.001$) (Table 2).

Barriers for professional practice, including labor discrimination, sexual harassment, family preoccupations,

and lack of professional advancement, were all found to be more common for women (Fig. 4), except for radiation exposure. A logistic regression model for the prediction of adequate remuneration and job satisfaction showed that female gender, having children, depression, history of sexual harassment, history of any form of discrimination, and familiar preoccupations are associated with inadequate perception of remuneration (Tables 4-8).

Discussion

For the 1st time in Latin America, the present study reports a high rate of professional barriers and considerable gender disparities for female cardiologists. These results coincide with several studies from Europe and North America: since 1996, the American College of Cardiology conducted one of the first professional life surveys to define the member's workforce and identify areas of concern¹. The study reported that by 1996, only 5% of practicing cardiologists in the ACC were women and found lower levels of satisfaction in family life and in their ability to achieve professional goals, as well as higher rates of gender discrimination when compared with their male counterparts. Likewise, a 2005 study from the British Cardiac Society showed a lower proportion (16.8%) of women cardiologists across England and Wales, with a significative underrepresentation of women in the cardiology consultant workforce, and particularly in cardiological politics⁶. Furthermore, an interesting information about our study is the relatively young age of the participants, a mean time from practicing cardiology of 12 years, which could suggest that younger professionals have a better knowledge and management of digital media and are more aware of the gender equity than the older ones.

Table 1. Sociodemographic characteristics of the population

Characteristic	Total (n = 240)	Women (n = 100) (41.7%)	Men (n = 140) (58.3%)	p-value
Age (years)	42 (37-52)	39(34-44)	47 (39-55)	0.001
Working hours per day	10 (8-12)	10 (8-12)	10 (9-12)	0.10
Comorbidities				
Hypertension	43 (17.99)	7 (7)	36 (25.9)	0.001
Diabetes	10 (4.18)	2 (2)	8 (5.76)	0.13
Overweight	75 (31.38)	19 (19)	56 (40.29)	0.001
Metabolic syndrome	8 (3.35)	2 (2)	6 (4.32)	0.27
Insomnia	42 (17.57)	26 (26)	16 (11.51)	0.001
Neoplasia	8 (3.35)	6 (6)	2 (1.44)	0.06
Anxiety	48 (20.08)	30 (30)	18 (12.95)	0.001
Depression	46 (19.25)	33 (33)	13 (9.35)	0.001
Ischemic heart disease	7 (2.93)	0	7 (5.04)	0.02
Smoking	12 (5.02)	4 (4)	8 (5.76)	0.43

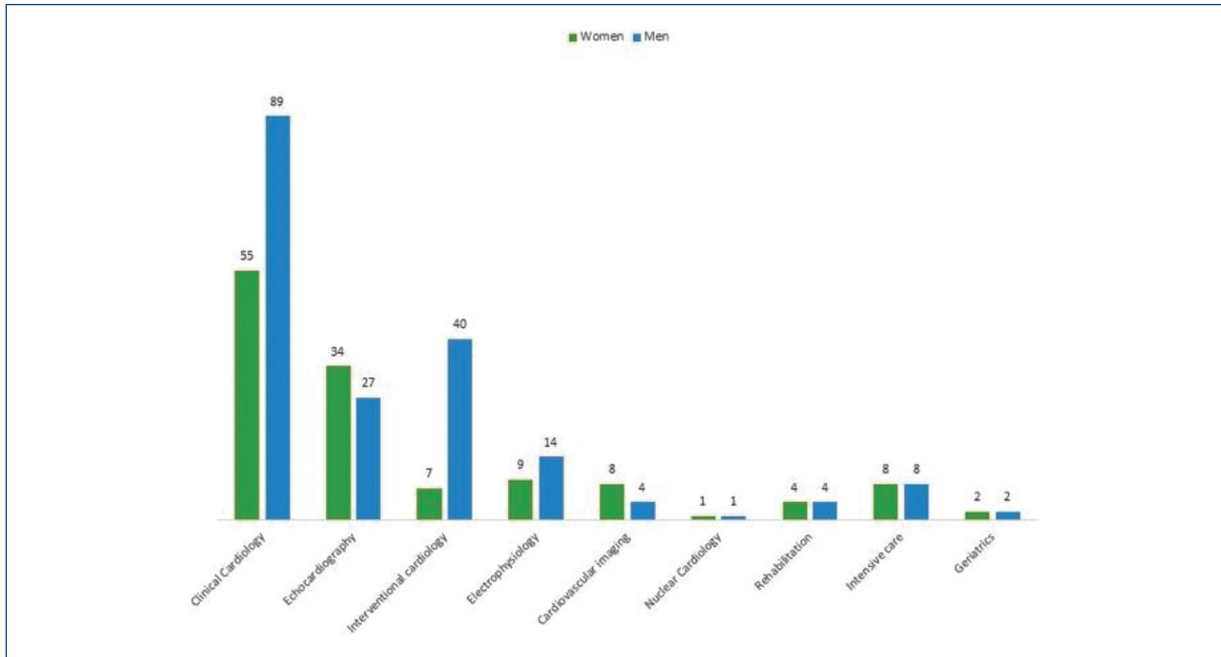


Figure 1. Description of the specialties from the participants.

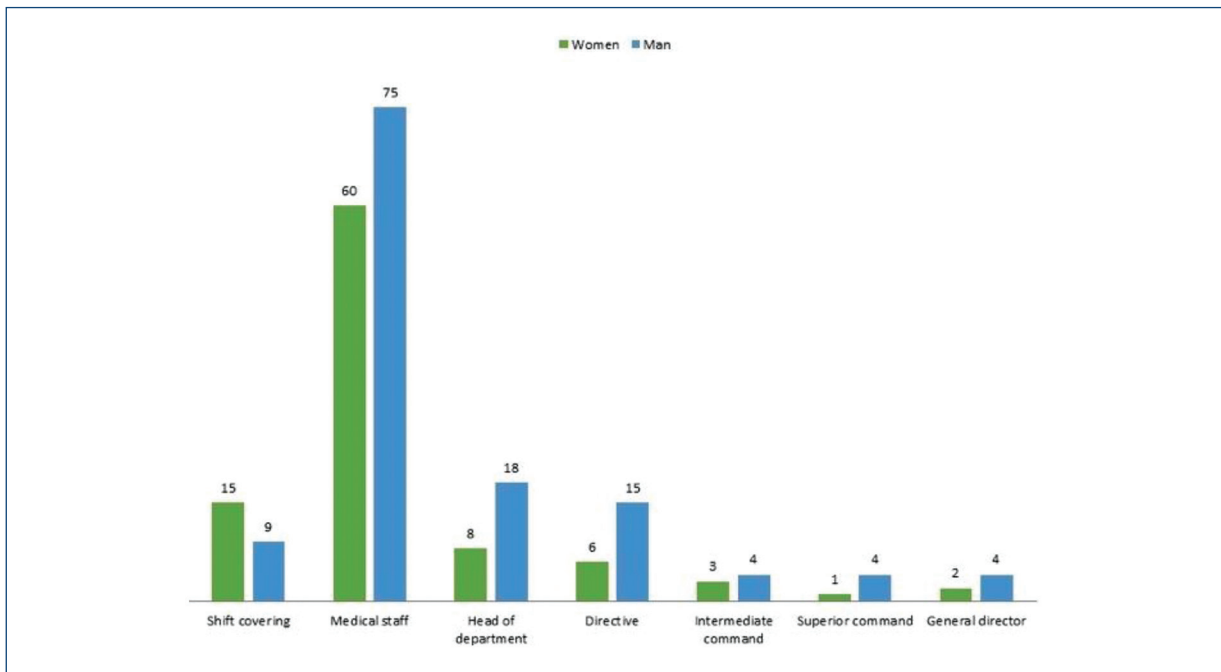


Figure 2. Description of the type of job from the participants.

Female cardiologists also appear to lack career advancement. Evidence from our study shows that the frequency of women occupying managerial positions is lower than for men. In 2017, Blumenthal et al. measured

gender differences among faculty ranked cardiologists in the United States, adjusting for several factors, including clinical experience and research productivity⁸. Their study showed that women were less likely to

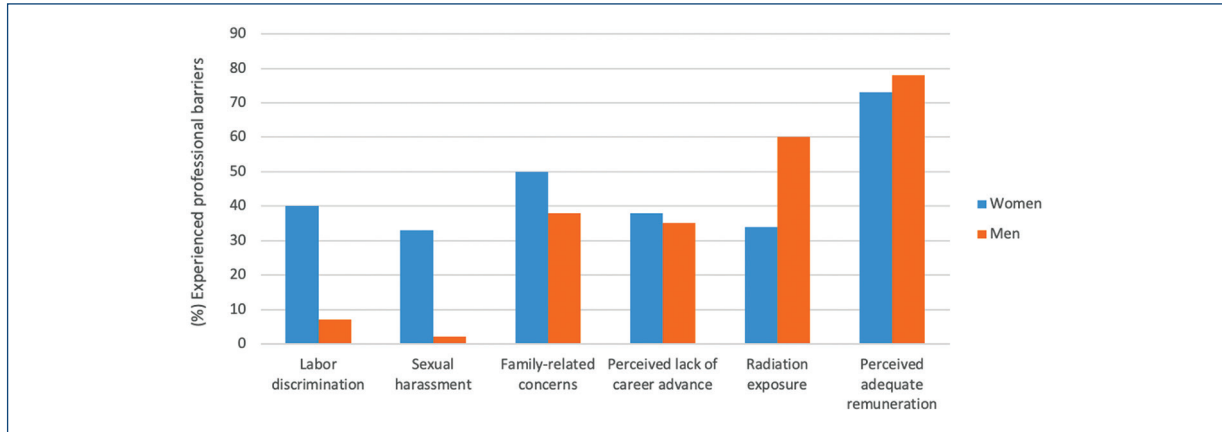


Figure 3. Professional barriers and gender gap among Latin American cardiologists.

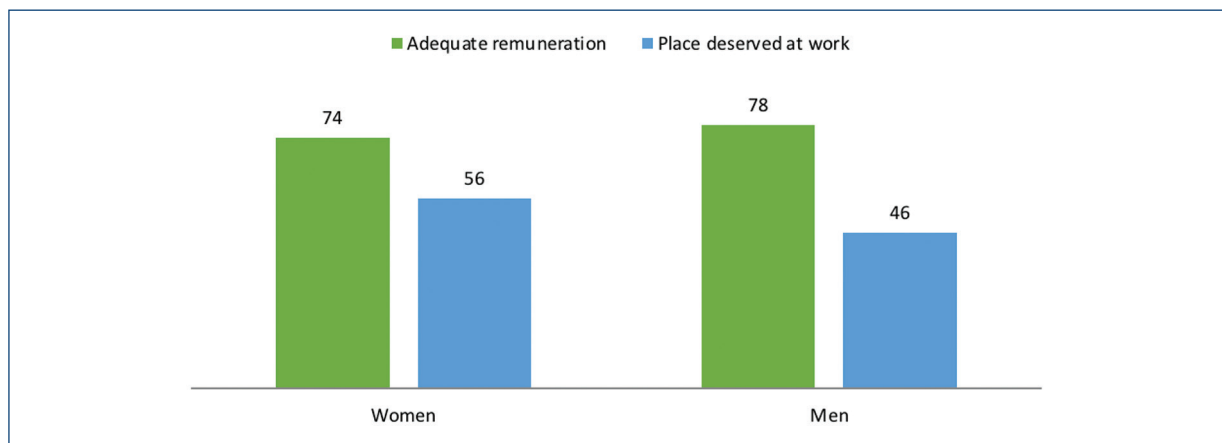


Figure 4. Adequate remuneration and place deserved at work.

Table 2. Description of the monthly income

Monthly income (dollars)	Total n (%)	Women n (%)	Men n (%)
< 1000	20 (8.44)	18 (18.37)	2 (1.44)
1001-2500	86 (32.29)	52 (53.06)	34 (24.46)
2501-5000	63 (26.58)	16 (16.33)	47 (33.81)
5001-10,000	49 (20.68)	11 (11.22)	38 (27.34)
> 10,000	19 (8.02)	1 (1.02)	18 (12.95)

p = 0.001.

reach the rank of professor than men after controlling for several factors known to influence faculty rank. Similarly, a cross-sectional study through a survey carried

out in 98 hospitals in Spain highlighted the lack of female representation in high positions within hospitals and universities. It also revealed that female cardiologists are more likely to be clinical cardiologists or cardiovascular imaging practitioners ($p < 0.001$). Interestingly, in Spain, women constitute half of all cardiologists; however, their proportion as head of department and head professor in universities is markedly lower⁷.

Furthermore, important income disparities were found in our study, as women report to earn less than their male counterparts in all ranges above the median (see supplementary appendix). A 2016 study by Jaggi et al. assessed income disparity among 229 women and 2,450 men from 161 U.S. practices. The results from the sample showed that given the job performed and productivity level, women expected mean salary should have been higher than the observed one².

Table 3. Country of origin from the participants

Country	Total n (%)	Women n (%)	Men n (%)
México	168 (49)	68 (20)	100 (29)
Argentina	2 (0.5)	2 (0.5)	0
Bolivia	6 (1.7)	4 (1.1)	2 (0.5)
Ecuador	5 (1.4)	3 (0.8)	2 (0.5)
República Dominicana	3 (0.8)	2 (0.5)	1 (0.3)
Guatemala	20 (5.8)	5 (1.4)	15 (4.4)
Honduras	1 (0.3)	1 (0.3)	0
Perú	6 (1.7)	2 (0.5)	4 (1.1)
Colombia	7 (2)	5 (1.4)	2 (0.5)
El Salvador	1 (0.3)	0	1 (0.3)
Nicaragua	4 (1.1)	0	4 (1.1)
Panamá	2 (0.5)	0	2 (0.5)
Chile	1 (0.3)	0	1 (0.3)
Cuba	1 (0.3)	0	1 (0.3)
Uruguay	1 (0.3)	1 (0.3)	0
Costa Rica	1 (0.3)	1 (0.3)	0
Paraguay	5 (1.4)	5 (1.4)	0
Brazil	1 (0.3)	0	1 (0.3)

Table 4. Description of the place where the major proportion of the income is obtained

Place of major income	Total n (%)	Women n (%)	Men n (%)
Private practice	153 (64.02)	47 (47)	106 (76.26)
Public sector	78 (32.64)	47 (47)	31 (22.3)
Other	8 (3.35)	6 (6)	2 (1.44)

Regarding professional barriers, women showed significant higher rates of sexual harassment, family-related concerns, lack of professional advancement, and labor discrimination. Contrary to other reports, radiation exposure was not a concern for our surveyed sample, probably due to the fact that < 12% were involved in radiation exposure-related practices. A recent survey study among academic medical faculty in the U.S. reported that women were more likely than men to report gender bias (70 vs. 22%), to have personally experienced sexual

Table 5. Multivariate model for the prediction of inadequate remuneration and job dissatisfaction

Variable	OR	SE	95% CI	p
Male sex	0.39	0.12	0.21-0.71	0.00
Female sex	4.26	1.08	0.58-7.02	0.00
Having children	0.51	0.17	0.26-0.98	0.04
Depression	2.76	1.21	1.17-6.52	0.02
Sexual harassment	5.12	3.19	1.51-17.37	0.00
Discrimination	5.76	3.13	1.98-16.74	0.00
Family/commitments	2.26	0.72	1.21-4.24	0.01

Table 6. Description of the places of professional practice

Places of professional practice	Total n (%)	Women n (%)	Men n (%)
University hospital	7 (2.93)	4 (4)	3 (2.16)
Private hospital	58 (24.27)	18 (18)	40 (28.78)
Pharmaceutical	1 (0.42)	0	1 (0.72)
Private practice	94 (39.33)	31 (31)	63 (45.32)
Policlinic	8 (3.35)	5 (5)	3 (2.16)
University	24 (10.04)	12 (12)	12 (8.63)
Research	9 (3.77)	4 (4)	5 (3.6)

Table 7. Description of physical activity per week

Physical activity per week (min)	Total n (%)	Women n (%)	Men n (%)
< 100 min	83 (34.73)	41 (41)	42 (30.22)
100-150 min	46 (19.25)	17 (17)	29 (20.86)
151-200 min	33 (13.81)	13 (13)	20 (14.39)
201-250 min	26 (10.88)	6 (6)	20 (14.39)
> 250 min	26 (10.88)	8 (8)	18 (12.95)
No physical activity	25 (10.46)	15 (15)	10 (7.19)

p = 0.05.

harassment (30 vs. 4%), and that those who suffered sexual harassment had lower confidence in themselves as a result⁹. They also reported that these experiences had negatively affected their career advancement. In the cardiology field, a 2008 study reported similar results:

Table 8. Description of published scientific articles

Number of published articles	Total n (%)	Women n (%)	Men n (%)
0	69 (29.11)	34 (34.34)	35 (25.36)
1-3	92 (38.82)	42 (42.42)	50 (36.23)
4-6	31 (13.08)	14 (14.14)	17 (12.32)
7-8	7 (2.95)	2 (2.02)	5 (3.62)
9-10	6 (2.53)	1 (1.01)	5 (3.62)
>10	32 (13.5)	6 (6.06)	26 (18.84)

$p = 0.03$.

women were more likely to have experienced discrimination during their career (69 vs. 22%); most of the cases were gender related¹⁰.

The results of the present survey allowed us to perform a multivariate analysis to identify factors associated with inadequate job satisfaction. While female gender was among the factors with higher odds ratio for dissatisfaction, history of discrimination and sexual harassment showed even higher odds.

Limitations

Our study population might not be representative of all cardiologists in Latin America. The majority of respondents were from Mexico. Moreover, while we sent the survey to 3,037 cardiologists, we only had 340 respondents. By itself, the low response rate is not indicative of selection bias, but along with a vast majority of respondents coming from one country, we acknowledge that external validity is compromised. However, this is the first survey of type among Latin American cardiologist, and due to the lack of information from other sources, these results are the only estimates of the magnitude of the problem in our region. Medical societies in Latin America have, proportionally, fewer members, and the demographic information is not publicly available. Furthermore, there is no official statistics of the number of medical graduates, residents, and specialist by gender. Our objective is to call attention to this topic, encouraging other researchers to investigate the gender gap in cardiology in our region. In addition, we hypothesize that women who responded to our survey are more likely to earn more, occupy more leadership positions, and have more satisfaction as compared to non-respondents. This, the gender gap would be even greater among non-respondents. Finally, results from other countries

support our findings, and given the labor, and cultural characteristics of Latin America, we hypothesize that the gender gap in medicine and cardiology would be greater than the gap in the US of European countries. Another limitation is the relatively young age of participants which could suggest that gender equality might not be as important for older practitioners as for the younger ones which is why we should create more awareness on the older population of cardiologist.

Gender gap in medicine and science is a reality. This statement is supported by multiple reports from several societies as well as in different countries and continents. How can we look beyond social and gender hierarchies in medicine? A recent report proposes five solutions to this never-ending story: to treat gender equality as an innovation challenge; to change institutional norms; to create a culture in which people feel personally responsible for change; to implement behavioral guidelines and action plans; and to promote organizational accountability for change. Recognizing the problem is the first step toward meaningful change¹¹.

Conclusions

Our study reports considerable gender bias in the practice of cardiology in Latin America. Women are less likely to feel adequately remunerated, earn less, and face more professional barriers than their male counterparts, including sexual harassment, labor discrimination, family-related concerns, and lack of professional development. Critical actions driven by cardiology societies and health care institutions are needed to overcome these disparities and offer equal professional opportunities and conditions regardless of gender.

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Conflicts of interest

None.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that no patient data appear in this article.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

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