



## Original Research Article

## Sex disparities in parenteral and enteral nutrition societies' leadership worldwide: a 20-year retrospective analysis



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## A B S T R A C T

**Background:** Despite advancements in the global dialog surrounding sex and gender equity, an important gap persists with women markedly under-represented in major roles within health care leadership.

**Objectives:** We examined the extent of women's representation in prominent positions within parenteral and enteral nutrition (PEN) societies worldwide over a span of 2 decades.

**Design:** This retrospective analysis explored the sex distribution of society chairs, conference presidents, and editor-in-chief positions across 64 PEN societies between 2003 and 2022. Additionally, data on the first and last authors of endorsed clinical guidelines were collected from the 2 leading societies.

**Results:** Over the past 20 y, women held society chair positions in 34.4% of cases. The representation shifted from 30% during the decade from 2003 to 2012 to 40.5% from 2013 to 2022. Throughout these years, the numbers consistently ranged from 0 to 10; however, the median shifted upward from 1 during the first decade to 4 in the subsequent decade ( $P = 0.04$ ). Of 420 congress presidencies, ~30% were women. In endorsed guidelines, women were

*Abbreviations:* AANEP, Asociación Argentina de Nutrición Enteral y Parenteral; ACHINUMET, Asociación Chilena de Nutrición Clínica, Obesidad y Metabolismo; ACNC, Asociación Colombiana de Nutrición Clínica; AKE, Austrian Society for Clinical Nutrition; ANUMGUA, Asociación de Nutrición Clínica y Metabolismo de Guatemala; APNCM, Asociación Panameña de Nutrición Clínica Y Metabolismo; APNEP, Associação Portuguesa de Nutrição Entérica e Parentérica; ASENPE, Asociación Ecuatoriana de Nutrición Parenteral y Enteral; ASPEN, American Society of Parenteral and Enteral Nutrition; ASPETEN, Asociación Peruana de Nutrición Parenteral y Enteral; AuSPEN, Australian Society for Parenteral and Enteral Nutrition; BAPEN, British Association for Parenteral and Enteral Nutrition; BNS, Belgian Society of Clinical Nutrition; BRASPEN, Brazilian Society of Parenteral and Enteral Nutrition; CMNCTN, Colegio Mexicano de Nutrición Clínica y Terapia Nutricional; CSPEN, Chinese Society for Parenteral and Enteral Nutrition; CzechSPEN, The Czech Society for Clinical Nutrition and Intensive Metabolic Care within the Czech Medical Association of Jana Evangelisty Purkyne; DGEM, German Society for Nutritional Medicine; EDI, equity, diversity, and inclusion; EgSPEN, Egyptian Society of Parenteral and Enteral Nutrition; ESPEN, European Society for Clinical Nutrition and Metabolism; FELANPE, Federación Latino-Americana de Nutrición Parenteral y Enteral; HoSPEN, Ho Chi Minh Society for Parenteral and Enteral Nutrition; HSPEN, Hungarian Society of Parenteral and Enteral Nutrition; IAPEN, India Association for Parenteral and Enteral Nutrition; ISCN, Israeli Society for Clinical Nutrition; ISPEN, Indian Society for Parenteral and Enteral Nutrition; KEPAN, Turkish Society of Clinical Enteral and Parenteral Nutrition; KSPEN, Korean Society for Parenteral and Enteral Nutrition; LSPEN, Lithuanian Society of Parenteral and Enteral Nutrition; NESPEN, Netherlands Society for Clinical Nutrition and Metabolism; NORCS, Nutrition Obesity Research Centers; NUPENS, National Society in Clinical Nutrition Serbia; PEN, Parenteral and Enteral Nutrition; PENSA, Parenteral and Enteral Society of Asia; PhilSPEN, Philippine Society for Parenteral and Enteral; POLSPEN, Polish Society for Parenteral, Enteral Nutrition and Metabolism; ROSPEN, Romanian Society of Parenteral and Enteral Nutrition; SASPEN, South African Society for Parenteral and Enteral Nutrition; SEEN, Sociedad Española de Endocrinología y Nutrición; SENPE, Sociedad Española de Nutrición Clínica y Metabolismo; SFNCM, Société Francophone en Nutrition Clinique et Métabolique; SINPE, Italian Society for Artificial Nutrition and Metabolism; SPENT, Society of Parenteral and Enteral Nutrition of Thailand; SPN, Sociedad Paraguaya de Nutrición; SSPEV, Slovak Society for Parenteral and Enteral Nutrition; SUNUT, Sociedad Uruguay de Nutrición; STROBE, Strengthening the Reporting of Observational Studies in Epidemiology; SWESPEN, Swedish Society of Clinical Nutrition and Metabolism; UNESCO, United Nations Educational, Scientific and Cultural Organization; WASPEN, West African Society of Parenteral and Enteral Nutrition.

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the first authors in 27.1% of cases ( $P < 0.001$ ) and the last in 28.9% ( $P < 0.001$ ) compared with men. Of the 123 journal editor-in-chief positions, women occupied 23 (18.7%).

**Conclusion:** Over the last 2 decades, women have been consistently underrepresented in prominent leadership roles in PEN societies globally. Although there has been a noticeable shift toward more women in chair positions, true sex equality remains elusive. Moreover, sex disparities are even more pronounced in positions, such as conference presidents, authors of major guidelines, and editors-in-chief of society-affiliated journals. These data underscore the pressing need to enhance efforts toward sex equality across these domains.

**Keywords:** gender disparities, gender gap, sex disparities, leadership positions, parenteral and enteral nutrition societies

## Introduction

In recent years, sex and gender equity has taken center stage in many global discussions. Despite men slightly outnumbering women, making up just >50% of the population, this difference is projected to disappear by 2050 [1]. The field of medicine reflects this trend, with women constituting about half of the student body in medical schools [2]. Among dietetics students and professionals, women's representation is even higher, with figures standing at 91%, 96%, and 94.1% in the United States, Canada, and Brazil, respectively [3–5]. Although a similar trend of women's representation is evident among nurses worldwide [6], they continue to be underrepresented in senior healthcare positions. Additionally, evidence suggests that women's earnings lag behind those of their men counterparts [7]. The substantial absence of women in pivotal healthcare leadership positions has been a subject of prior research [8–12].

The term “gender gap” has been proposed to describe the social, political, and economic disparities between men and women. In 2016, the “Women in Medicine and Science” group from the Association of American Medical Colleges conducted a 15-y survey focusing on sex distribution among leaders in specialty societies [8]. Although there was a 10% increase in women holding leadership positions between the first and second halves of this period, women's representation was only 25.4% in 2005, increasing modestly to 29.3% in 2015 [8]. Esparza et al. [13] examined women's leadership positions in medical societies and found their presence in presidential roles to be almost nonexistent. Furthermore, a recent survey highlighted pronounced disparities based on both gender and race within medical and surgical organizations in the United States [14].

In academic medical centers, woman physicians experience lower promotion rates and are less likely to serve as department chairs [15]. Descriptive terms, such as “glass ceiling” and “sticky floor” are commonly used to describe challenges faced by women academic surgeons [16]. Among faculty members in academic medicine, the H-index for women is notably lower than for men at all academic ranks [17], and men are twice as likely to be named on any scientific document across all job titles and fields [18]. Gender inequity is also evident among 44 journal editorial boards, where women constitute a mere 29% [19]. Several factors are hypothesized to contribute to this disparity, such as the absence of protected time for women balancing multiple responsibilities [13]. A systematic review pinpointed these challenges as primary reasons for women leaving academic positions [10].

The proportion of women in prominent leadership positions serves as an indicator of an institution's commitment to gender equality [19]. This promotes equal rights, responsibilities, and opportunities. Gender equity is foundational to achieving gender equality. Given the global efforts toward equality, diversity, and inclusion, the persistent aforementioned disparities are no longer acceptable. Intriguingly, although women constitute the majority of members in parenteral and enteral

nutrition (PEN) societies, our understanding on gender equality within these organizations is limited. This retrospective study aimed to evaluate women's representation within PEN societies, focusing on prominent positions such as chairs, congress presidents, first or last authors of society-endorsed guideline papers, and editors-in-chief of society-endorsed journals.

## Methods

Data spanning the past 20 y (2003–2022) were collected from PEN societies worldwide. These societies embody both foundational and practical applications, primarily addressing various forms of malnutrition, including undernutrition, overnutrition, and micronutrient imbalances. Their core objective is to implement nutritional support strategies, including the utilization of artificial nutrients.

Societies that incorporated basic science or other aspects of human nutrition, not solely focused on PEN or clinical nutrition were excluded. Additionally, dietetic societies were also excluded from our study because they are primarily focused on dietitians/nutritionists and lack interdisciplinary representation.

We identified a total of 132 societies globally, using various sources: a report from the European Society for Clinical Nutrition and Metabolism (ESPEN), which lists several PEN societies worldwide [20], a study by Bolasco [21] outlining key nutrition-related societies across different regions. Using the former reference, we identified the official websites of the Federación Latino-Americana de Nutrición Parenteral y Enteral (FELANPE) and Parenteral and Enteral Nutrition Society of Asia (PENSA), which lists their member PEN societies [22,23]; these lists contributed to the identification of additional societies (Figure 1). Additionally, authors from North and Latin America, Europe, Oceania, the Middle East, and Asia identified 4 more societies. These societies, which were incorporated into our analysis, are the Ho Chi Minh Society for Parenteral and Enteral Nutrition (HosPEN), Philippine College of Medical Nutrition Physicians (PCNMP), West African Society of Parenteral and Enteral Nutrition (WASPEN), and Sociedad Española de Endocrinología y Nutrición (SEEN).

Fifty societies did not meet our inclusion criteria because they were categorized as dietetic societies (Supplemental Table 1). We were unable to reach 11 societies because of the absence of or our inability to find accessible contact details or website addresses, and 7 societies did not reply. Consequently, our analysis had a final sample of 64 societies (Table 1).

We obtained information through direct email correspondence with society members and by examining publicly available accessible data on the respective society websites (Supplemental Table 2). We used a one-page survey for data collection, which requested details on the society's founding year, the sex of the inaugural chair, and chairs over the past 2 decades. If applicable, we also asked about the sex of national congress presidents and the editor-in-chief positions for associated journals. Society email addresses were obtained directly from their

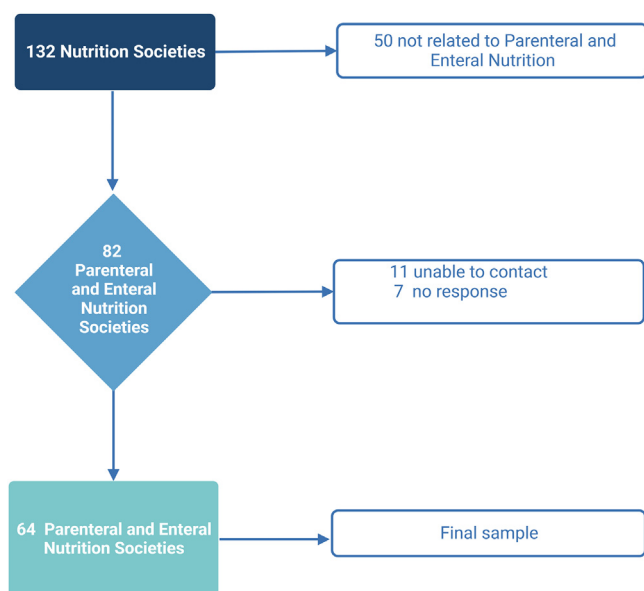


FIGURE 1. Data selection flowchart.

websites. For societies with which the authors had prior affiliations or connections, personalized e-mails were sent to specific members, as outlined in [Supplemental Table 2](#).

To enhance responsiveness and overcome potential language barriers, we translated both the survey and introductory e-mail into multiple languages, as shown in [Supplemental Table 2](#). A follow-up e-mail was sent 2 wk after the initial contact. If societies did not respond or provided incomplete information, we sourced additional data from their official website, if available. [Supplemental Table 2](#) provides a comprehensive list of societies approached, their website links, contact e-mail addresses, and the data source (that is, survey, website, or both).

Because our study used only publicly available data and did not involve identifiable human subjects, it was exempt from both institutional review board clearance and the informed consent requirements of the Common Rule. We adhered to the STROBE guidelines.

The primary metric of interest was the sex of society chairs over the last 20 y (from 2003–2022). We also assessed the sex of the society's founding chair to gauge initial leadership representation. Additional outcomes included the sex of national congress presidents and editor-in-chief positions for society's affiliated journal. Information on first and last authorship of society-endorsed guidelines was obtained from the 2 leading PEN societies: the American Society of Parenteral and Enteral Nutrition (ASPEN) and ESPEN. We considered the latter authorship as a senior position. To gather these data, we performed an online search on PubMed, the Clinical Nutrition Journal (for ESPEN), and the Journal of Parenteral and Enteral Nutrition (for ASPEN). Searches targeted nutrition and health guideline literature from the past 2 decades using the search terms "guideline" or "recommendations," and "nutrition" or "nutritional." A filter for publications "since 2003" was applied.

"Sex," determined by biological attributes, was identified using society data, and confirmed, when needed, via online profiles or direct e-mail communication. Unfortunately, we did not concentrate on "gender" reflecting personal identification. Regarding terminology used throughout this article, the term "gender gap" often alludes to socio-cultural constructs around sex differences in outcomes and in comparison to the literature. In this context, we adopted the UNESCO definition

of gender and gender equality, which views gender as a social and cultural construct delineating the attributes of men and women. This emphasizes societal roles and responsibilities over biological differences [24]. Therefore, we employed the terms "males" and "females" when referring to data based on biological sex (i.e., data collection within the Results section), and "women" and "men" when discussing gender roles (e.g., in the Introduction and Discussion sections).

Descriptive statistics were used, with data presented as percentages and proportions where applicable. Data on chair positions from 2003 to 2022 are presented yearly, quarterly, per decade (first and last 10 y), or by trends as identified in figures. Additionally, data are organized and presented by region, allowing for a comprehensive analysis of leadership patterns in different geographic areas. Nonparametric data comparisons are presented as median and interquartile ranges, with the Wilcoxon test used to assess differences. The chi-square ( $\chi^2$ ) test was used to compare the sex distribution among published guidelines' first and last authors. Statistical analyses were conducted using IBM Corp. Released 2021, IBM SPSS Statistics for Windows, version 28.0.

## Results

Of 64 societies, 18 were founded with females as chairs ([Table 1](#)). A regional breakdown of societies for which comprehensive data were available revealed varied trends: in Asia and Oceania, 21.1% (4 of 19) were founded by females. European societies showed a slightly higher percentage, with females founding 28.6% (6 of 21) of them. North American societies had the highest proportion of female founders at 66.6% (2 of 3). For Central and South American societies, the representation was 38.5% with 5 of 13 societies founded by females. African societies had a 33.3% representation, with females founding 1 of 3 societies. [Table 1](#) includes the founding year and the sex of each society's founding chair. We were unable to obtain this information for the Asia Pacific Clinical Nutrition Society (APNCS), the Hungarian Society of Parenteral and Enteral Nutrition (HSPEN), Swiss Society for Clinical Nutrition (GESKES-SSNC), and the Slovenian Society for Clinical Nutrition (SZKP).

Regarding society chairs, 10 of 58 societies have never had females serve as chairs. This includes the British Association for Parenteral and Enteral Nutrition (BAPEN), ESPEN, Indonesia Society for Parenteral and Enteral Nutrition (INASPEN), Iran Society for Parenteral and Enteral Nutrition (IrSPEN), Japan Society of Parenteral and Enteral Nutrition (JSPEN), PCMNP, Taiwan Society for Parenteral and Enteral Nutrition (TSPEN), Croatian Society of Clinical Nutrition Croatian Medical Association CSPEN-CMA, Asociación de Nutrición Clínica y Metabolismo de Guatemala (ANUMGUA), and the Norwegian Society for Clinical Nutrition and Metabolism (NSKE).

Data on sex-representation over the past 20 y were complete for 43 societies. [Figure 2A](#) illustrates a consistent increase in the number of female chairs from 2003 to 2018. However, between 2018 and 2021, this representation decreased, and in 2022, it reverted to the levels of 2018. From 2003 to 2012, females occupied the chair position for an average of 27.6% of the time; this number increased to 38.6% between 2013 and 2022. Numbers consistently ranged from 0 to 10, with a median of 0; however, the median shifted from 1 to 4 comparing the first with the last decade ( $P = 0.04$ ).

To further explore patterns of female chair distribution, we segmented our data by geographic location ([Table 2](#)) and quartile ([Table 2](#), [Figure 2B](#)). Over the past 20 y, the proportion of female chair

**TABLE 1**  
Clinical Nutrition Societies included in this study (N = 64)

Society	Abbreviation	Founding year	First chair
<b>Asia and Australia</b>			
Asia Pacific Clinical Nutrition Society	APCNS	1992	Not available
Australasian Society for Parenteral and Enteral Nutrition	AuSPEN	1973	Male
Chinese Society for Parenteral and Enteral Nutrition	CSPEN	Not available	Not available
Ho Chi Minh Society for Parenteral and Enteral Nutrition	HoSPEN	2010	Female
India Association for Parenteral and Enteral Nutrition	IAPEN INDIA	2019	Male
Indian Society for Parenteral and Enteral Nutrition	ISPEN	1994	Male
Indonesian Association for Parenteral and Enteral Nutrition	INASPEN	2004	Male
Iranian Society for Clinical Nutrition	IrSPEN	2014	Male
Japanese Society for Clinical Nutrition and Metabolism	JSPEN	1999	Male
Parenteral & Enteral Nutrition Society of Malaysia	PENSMA	1998	Male
Parenteral and Enteral Nutrition Society of Asia	PENSA	1995	Male
Philippine College of Medical Nutrition Physicians	PCNMP	2007	Male
Philippine Society for Parenteral and Enteral Nutrition	PhilSPEN	1995	Male
Society for Parenteral and Enteral Nutrition (Singapore)	SingSPEN	2015	Female
Society of Parenteral and Enteral Nutrition of Thailand	SPENT	1985	Male
Sri Lanka Medical Nutrition Association	SLMNA	2013	Female
Taiwan Society for Parenteral and Enteral	TSPEN	1993	Male
The Israeli Society for Clinical Nutrition	ISCN	1994	Male
The Korean Society for Parenteral and Enteral Nutrition	KSPEN	2001	Male
Turkish Society of Clinical Enteral and Parenteral Nutrition	KEPAN	1994	Male
Vietnamese Society for Parenteral and Enteral Nutrition	VietSPEN	2020	Female
Subtotal = 21			
<b>Africa</b>			
Egyptian Society of Parenteral and Enteral Nutrition	EgSPEN	2004	Male
South African Society for Parenteral and Enteral Nutrition	SASPEN	1987	Male
West African Society of Parenteral and Enteral Nutrition	WASPEN	2019	Female
Subtotal = 3			
<b>Europe</b>			
Austrian Society for Clinical Nutrition	AKE	1979	Male
Belgian Society of Clinical Nutrition	BNS	2009	Male
British Association of Parenteral and Enteral Nutrition	BAPEN	1992	Male
Croatian Society of Clinical Nutrition Croatian Medical Association	CSPEN-CMA	1994	Male
Estonian Society for Parenteral and Enteral Nutrition	EstSPEN	2007	Female
European Society for Clinical Nutrition and Metabolism	ESPEN	1980	Male
French Speaking Society of Clinical Nutrition and Metabolism	SFNCM	1978	Male
German Society for Nutritional Medicine	DGEM	1981	Male
Hungarian Society of Parenteral and Enteral Nutrition	HSPEN	1990	Not available
Italian Society for Artificial Nutrition and Metabolism	SINPE	1984	Male
Lithuanian Society of Parenteral and Enteral Nutrition	LSPEN	1995	Male
National Society in Clinical Nutrition Serbia	NUPENS	2003	Female
Netherlands Society for Parenteral and Enteral Nutrition	NESPEN	1983	Male
Norwegian Society for Clinical Nutrition and Metabolism	NSKE	2006	Male
Polish Society for Parenteral, Enteral Nutrition and Metabolism	POLSPEN	1998	Male
Portuguese Association of Enteral and Parenteral Nutrition	APNEP	1997	Female
Romanian Society of Parenteral and Enteral Nutrition	ROSPEN	1999	Female
Slovak Society for Parenteral and Enteral Nutrition	SSPEV	1991	Female
Slovenian Society for Clinical Nutrition	SZKP	2003	Not available
Sociedad Española de Endocrinología y Nutrición	SEEN	1950	Male
Spanish Society of Clinical Nutrition and Metabolism	SENPE	1977	Male
Swiss Society for Clinical Nutrition	GESKES-SSNC	1985	Not available
The Czech Society for Clinical Nutrition and Intensive Metabolic Care within the Czech Medical Association of J.E. Purkyne	CzechSPEN	1985	Male
The Swedish Society for Clinical Nutrition and Metabolism	SWESPEN	1998	Female
Subtotal = 24			
<b>North America</b>			
American Society for Parenteral and Enteral Nutrition	ASPEN	1975	Male
Canadian Nutrition Society	CNS – SCN	2000	Female
Mexican College of Clinical Nutrition and Nutritional Therapy	CMNCTN	1995	Female
Subtotal = 3			
<b>Central and South America</b>			
Asociación Argentina de Nutrición Enteral y Parenteral	AAANEP	1983	Male
Asociación de Nutrición Clínica y Metabolismo de Guatemala	ANUMGUA	2018	Male
Asociación Salvadoreña de Nutrición Parenteral y Enteral	ASANPEN	1993	Male
Asociación Panamena de Nutrición Clínica Y Metabolismo	APNCM	1992	Male
Brazilian Parenteral and Enteral Nutrition Society	BraSPEN	1975	Male

(continued on next page)

TABLE 1 (continued)

Society	Abbreviation	Founding year	First chair
Chilean Association of Clinical Nutrition Obesity and Metabolism	ACHINUMET	1994	Male
Colombian Clinical Nutrition Association	ACNC	1985	Female
Ecuadorian Society of Parenteral and Enteral Nutrition	ASENPE	2018	Female
Federación Latino-Americana de Nutrición Parenteral y Enteral	FELANPE	1988	Male
Peruvian Association of Enteral and Parenteral Therapy	ASPETEN	2002	Female
Sociedad Dominicana Nutrición Enteral y Parenteral	SODONEP	2002	Female
Sociedad Paraguaya de Nutrición	SPN	1991	Male
Uruguayan Society of Nutrition	SUNUT	1998	Female
Subtotal = 13			

We were unable to contact societies from the following countries: Bolivia, Bosnia & Herzegovina, Bulgaria, Costa Rica, Cuba, Cyprus, Denmark, the Federation of African Nutrition Societies (FANUS), Finland, Greece, Hong Kong, Ireland, Kyrgyz Republic, Latvia, North Macedonia, Russia, and Ukraine.

distribution across continents was as follows: Europe (23.2%), Asia and Oceania (29.2%), South and Central Americas (47.2%), and North America (65%). Quartile analysis from 2003 to 2007 revealed that North America consistently had female chairs in leadership positions for 60% of the time during this period. This was followed by South and Central Americas at 28.9%. Between 2008 and 2012, Asia and Oceania experienced an increase in female leadership, with females chairing societies 41.5% of the time. Between 2013 and 2017, South and Central Americas saw an increase in female chairs (at 53.3%). In North America, females represented 66.7% of the chair positions. In the most recent quartile, Europe's female leadership increased, and they chaired positions 40% of the time. Meanwhile, all societies in South and Central America maintained female chairs. In Africa, the representation remained consistent, primarily because of the South African Society for Parenteral and Enteral Nutrition (SASPEN) society, where females held the chair position 75% of the time in the past 20 y.

Table 3 presents data on society congresses and their respective presidents. In the last 20 y, of the 420 conferences with available data, females presided over 128 of them, accounting for 30%. Twelve societies appointed a female as their first congress president: the Canadian Nutrition Society (CNS), Asociación Salvadoreña de Nutrición Parenteral y Enteral (ASANPEN), Estonian Society for Parenteral and Enteral Nutrition (EstSPEN), ANUMGUA, Parenteral and Enteral Nutrition Society of Malaysia (PENSMA), Colegio Mexicano de Nutrición Clínica y Terapia Nutricional (CMNCTN), Singapore Society for Parenteral and Enteral Nutrition (SingPEN), SASPEN, Sri Lanka Medical Nutrition (SLMNA), Sociedad Dominicana Nutrición Enteral y Parenteral (SODONEP), WASPEN, and the Vietnamese Society for Parenteral and Enteral Nutrition (VietSPEN). Notably, not all societies conducted national conferences or congresses, and some did not disclose this information. Additionally, ASPEN co-organized its Nutrition Week conference with other societies from 2003 to 2017; as a result, we excluded the presidents of these events from our analysis.

Table 4 outlines the historical data on editor-in-chief positions across 22 journals affiliated with 19 societies. Of these journals, only 5 had a female as their inaugural editor-in-chief, representing the following societies: Asociación Argentina de Nutrición Enteral y Parenteral (AANEP), Austrian Society for Clinical Nutrition (AKE), Asociación Colombiana de Nutrición Clínica (ACNC), CMNCTN, and SEEN. Conversely, 11 journals have yet to appoint a female editor-in-chief. Overall, over the past 2 decades, across these 22 journals, females have occupied 23 of 123 editor-in-chief positions, accounting for 18.7%.

Regarding ASPEN and ESPEN clinical guidelines, females were the first authors in 13 of 25 ASPEN guidelines reviewed (52%,  $\chi^2 P = 0.84$ ), and the last author in 18 of these (72%,  $\chi^2 P < 0.001$ ).

Conversely, of the 82 ESPEN guidelines reviewed, females were the first authors in 16 (19.5%,  $\chi^2 P < 0.001$ ) and the last authors in 13 (15.8%,  $\chi^2 P < 0.001$ ). Additional details can be found in Supplemental Tables 3 and 4.

## Discussion

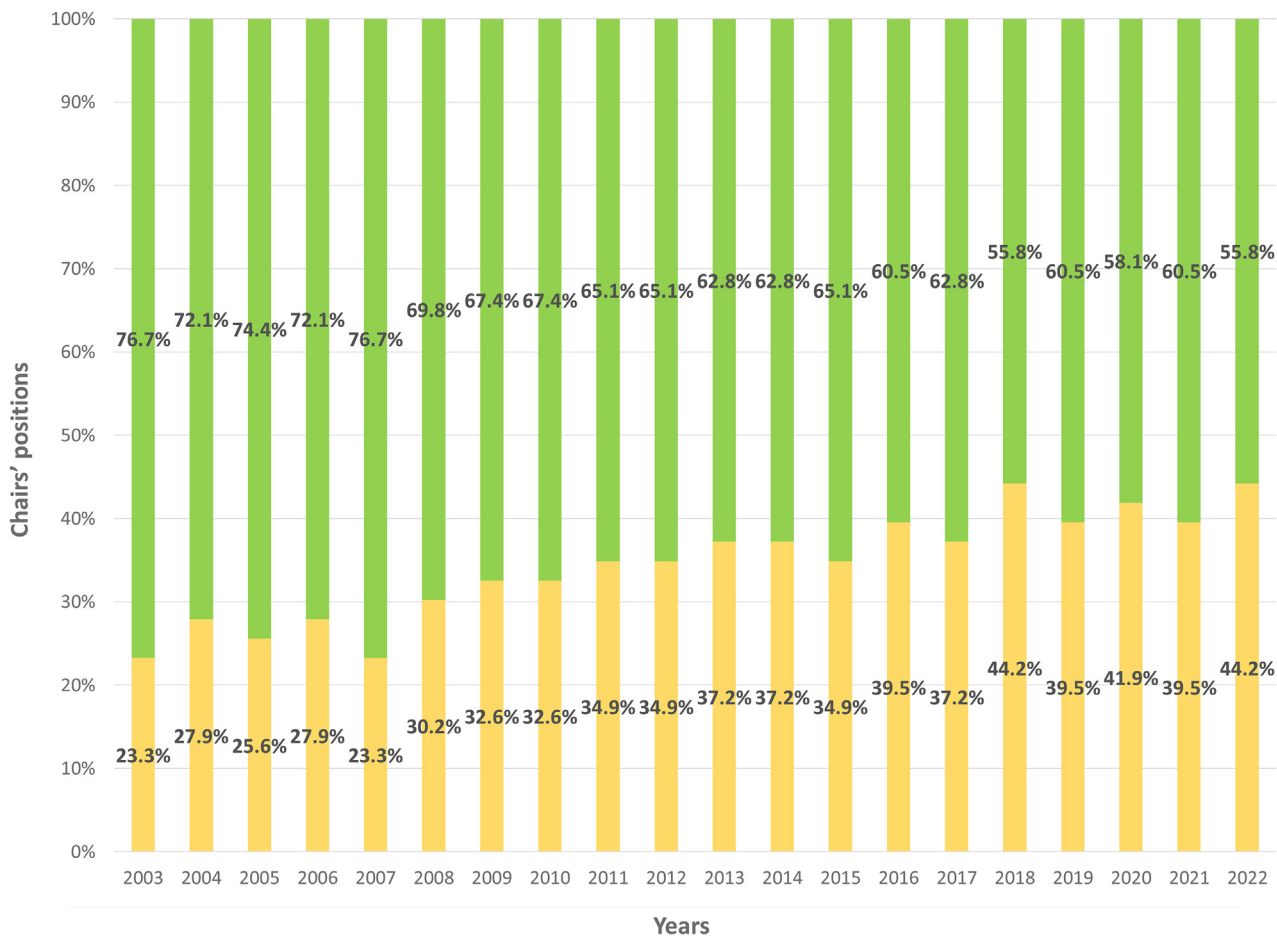
To the best of our knowledge, our findings are the first to highlight sex disparities in prominent leadership positions within PEN societies on a global scale. This comes at a time when there is a growing call to amplify women's representation across diverse sectors, including the workplace, health care, and research. Esteemed organizations, such as the WHO and the National Institutes of Health (NIH), champion the cause of gender equity. For instance, WHO has released a policy action paper advocating for gender equity within the global health and care workforce [25]. Similarly, in 2019, the NIH underscored the need to bolster women's representation in research. Dr. Francis S Collins, former NIH director, even declared his decision to forgo speaking invitations from conferences that lacked adequate representation of women and other marginalized groups [26]. Notwithstanding these initiatives, our findings suggest that the rhetoric may not always evolve into tangible changes within professional societies.

Sex and gender inequalities transcend being merely an ethical dilemma; it is a fundamental human right and an essential cornerstone for sustainable progress. The essence of promoting equity lies in ensuring that all individuals are treated equitably, upholding dignity, respect, and fairness. Over the past 20 y, chair positions in PEN societies have been predominantly male-dominated (65.6% of the time). Although there has been an uptick in female representation, peaking in 2018, there has been a regression in the subsequent years (Figure 2A, B). One potential explanation for this decline could be the ramifications of the global COVID-19 pandemic, which has had disparate impacts on men and women [27], further intensifying pre-existing disparities [28].

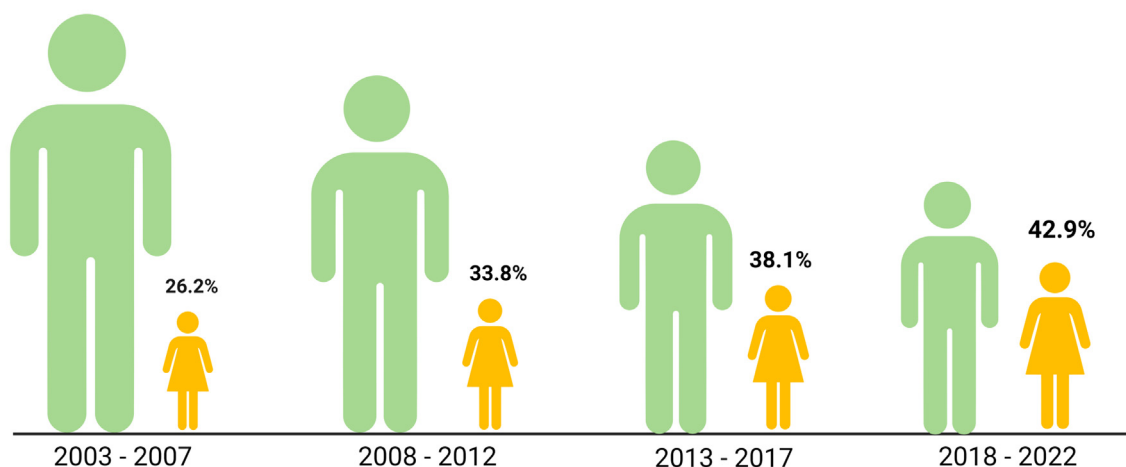
Notable disparities were also observed among congress presidents and editors-in-chief positions. Among the 19 societies with scientific journals, only 23 of 123 editor-in-chief positions were held by women. Such underrepresentation aligns with previous studies reporting that women represented only about 1 in 5 editors-in-chief at top-ranked medical journals [29]. This discrepancy remained even in specialties where women are well-represented or in areas that focus on women's health, where no woman had ever held the editor-in-chief title [30]. Similarly, men have outnumbered women in congress presidential positions over the past 2 decades.

Clinical practice guidelines, published in peer-reviewed society journals, guide healthcare professionals in determining the optimal

A)



B)



**FIGURE 2.** Ratio of males and females serving as chairs from 2003 to 2022 presented annually (A) and by quartiles (B). Yellow: Female; Green: male.

treatment strategies based on consolidated research evidence. In the past 20 y, guidelines from ESPEN predominantly featured men as both first and last authors, with women representing <20% of these authorial positions. Conversely, sex disparities were absent from ASPEN guidelines, and women predominantly held the senior author position. It is noteworthy that the ASPEN website explicitly mentions their commitment statement to promoting sex equity. Similarly, ESPEN

has never had a woman serving as society chair or as editor-in-chief of its journals. As one of the most prominent and influential PEN societies in the world, ESPEN has a unique opportunity to foster greater inclusivity and set a precedent for others to follow.

Our findings align with previous research on women’s representation as invited speakers at PEN congresses. Occhiali et al. [31] analyzed data from 2011 to 2019, specifically from ESPEN congresses.

**TABLE 2**  
Years with female chairs in Nutrition Societies over the past 20 y, separated by quartiles (N = 43)

Society	Abbreviation	Q1 2003–2007	Q2 2008–2012	Q3 2013–2017	Q4 2018–2022
<b>Asia and Australia</b>					
Australasian Society for Parenteral and Enteral Nutrition	AuSPEN	2	5	5	5
Chinese Society for Parenteral and Enteral Nutrition	CSPEN	0	0	4	0
Indian Society for Parenteral and Enteral Nutrition	ISPEN	3	5	5	1
Indonesian Association for Parenteral and Enteral Nutrition	INASPEN	0	0	0	0
Japanese Society for Clinical Nutrition and Metabolism	JSPEN	0	0	0	0
Parenteral & Enteral Nutrition Society of Malaysia	PENSMA	5	2	0	0
Parenteral and Enteral Nutrition Society of Asia	PENSA	0	2	0	0
Philippine Society for Parenteral and Enteral Nutrition	PhilSPEN	0	0	4	2
Society of Parenteral and Enteral Nutrition of Thailand	SPENT	0	4	0	2
Taiwan Society for Parenteral and Enteral	TSPEN	0	0	0	0
The Israeli Society for Clinical Nutrition	ISCN	0	4	5	0
The Korean Society for Parenteral and Enteral Nutrition	KSPEN	0	1	1	0
Turkish Society of Clinical Enteral and Parenteral Nutrition	KEPAN	5	4	0	0
Subtotal = 13		15 (23.1%)	27 (41.5%)	24 (36.9%)	10 (15.4%)
<b>Africa</b>					
South African Society for Parenteral and Enteral Nutrition	SASPEN	3	2	5	5
Subtotal = 1		3 (60%)	2 (40%)	5 (100%)	5 (100%)
<b>Europe</b>					
Austrian Society for Clinical Nutrition	AKE	0	0	0	3
British Association of Parenteral and Enteral Nutrition	BAPEN	0	0	0	0
Croatian Society of Clinical Nutrition Croatian Medical Association	CSPEN-CMA	0	0	0	0
European society for clinical nutrition and metabolism	ESPEN	0	0	0	0
French Speaking Society of Clinical Nutrition and Metabolism	SFNCM	0	0	0	1
German Society for Nutritional Medicine	DGEM	0	0	0	1
Italian Society for Artificial Nutrition and Metabolism	SINPE	0	0	0	4
Lithuanian Society of Parenteral and Enteral Nutrition	LSPEN	0	0	0	1
National Society in Clinical Nutrition Serbia	NUPENS	5	5	5	4
Netherlands Society for Parenteral and Enteral Nutrition	NESPEN	0	0	0	5
Polish Society for Parenteral, Enteral Nutrition and Metabolism	POLSPEN	0	0	0	1
Portuguese Association of Enteral and Parenteral Nutrition	APNEP	3	3	0	0
Romanian Society of Parenteral and Enteral Nutrition	ROSPEN	5	5	5	3
Sociedad Española de Endocrinología y Nutrición	SEEN	0	0	1	3
Spanish Society of Clinical Nutrition and Metabolism	SENPE	0	0	0	2
Swiss Society for Clinical Nutrition	GESKES-SSNC	2	0	4	1
The Swedish Society for Clinical Nutrition and Metabolism	SWESPEN	0	0	2	5
Subtotal = 17		15 (17.6%)	13 (15.3%)	17 (20%)	34 (40%)
<b>North America</b>					
American Society for Parenteral and Enteral Nutrition	ASPEN	1	1	3	1
Canadian Nutrition Society	CNS – SCN	3	5	2	3
Mexican College of Clinical Nutrition and Nutritional Therapy	CMNCTN	5	5	5	5
Subtotal = 3		9 (60%)	11 (73.3)	10 (66.7%)	9 (60%)
<b>Central and South America</b>					
Asociación Salvadoreña de Nutrición Parenteral y Enteral	ASANPEN	0	5	2	3
Asociación Panamena de Nutrición Clínica Y Metabolism	APNCM	0	0	5	5
Brazilian Parenteral and Enteral Nutrition Society	BraSPEN	0	0	0	2
Chilean Association of Clinical Nutrition Obesity and Metabolism	ACHINUMET	3	1	2	3
Colombian Clinical Nutrition Association	ACNC	0	2	2	2
Federación Latino-Americana de Nutrición Parenteral y Enteral	FELANPE	0	0	2	5
Peruvian Association of Enteral and Parenteral Therapy	ASPETEN	3	3	5	2
Sociedad Dominicana Nutrición Enteral y Parenteral	SODONEP	5	5	3	5
Uruguayan Society of Nutrition	SUNUT	2	2	3	3
Subtotal = 9		13 (28.9%)	13 (40%)	24 (53.3%)	30 (66.7%)

They found a stable percentage of women as speakers in oral communication sessions (~40%), with men overrepresented across all session types [31]. Moreover, when it came to esteemed positions such as opening ceremony lectures, keynote addresses, session moderators, and best abstract sessions, women’s representation remained low [31]. Adding another dimension, Gerull et al.’s [32] study demonstrated a positive correlation between the proportion of women organizing an event and the number of women presenters. This insight suggests that sex disparity in speakers might stem, at least in part, from the prevalent male dominance in Congress presidential positions [33].

Research on gender disparities in healthcare, particularly in medicine, has grown over recent years [34–38]. Our findings are an essential first step in addressing this issue within PEN societies. Open discussions and concerted efforts are needed to address the observed gender gap, with key PEN societies like ESPEN and ASPEN leading the way globally. This approach not only aligns with principles of equity, diversity, and inclusion (EDI) but also accommodates the increasing number of women physicians and PhDs in the field [39]. Notably, societies might contend they have made efforts to include women in various positions, such as committees and subcommittees. Although

**TABLE 3**  
Overview of female representation as Congress President (N = 38)

Society	Abbreviation	1st congress	1st president	Female president (last 20 y)	Number of events (last 20 y)
American Society for Parenteral and Enteral Nutrition	ASPEN	1977	Male	0	0
Asociación Argentina de Nutrición Enteral y Parenteral	AAANEP	2001	Not informed	7	9
Asociación de Nutrición Clínica y Metabolismo de Guatemala	ANUMGUA	2018	Female	5	5
Asociación Salvadoreña de Nutrición Parenteral y Enteral	ASANPEN	1997	Female	7	18
Austrian Society for Clinical Nutrition	AKE	1979	Male	4	20
Belgian Society of Clinical Nutrition	BNS	2010	Male	3	10
Brazilian Parenteral and Enteral Nutrition Society	BraSPEN	1977	Male	1	10
British Association of Parenteral and Enteral Nutrition	BAPEN	1992	Male	0	20
Canadian Nutrition Society	CNS	2010	Female	6	13
Chilean Association of Clinical Nutrition Obesity and Metabolism	ACHINUMET	1995	Male	3	8
Croatian Society of Clinical Nutrition Croatian Medical Association	CSPEN-CMA	2000	Male	0	5
Estonian Society for Parenteral and Enteral Nutrition	EstSPEN	2014	Female	2	2
European Society for Clinical Nutrition and Metabolism	ESPEN	1979	Male	4	20
Federación Latino-Americana de Nutrición Parenteral y Enteral	FELANPE	1987	Male	2	9
French Speaking Society of Clinical Nutrition and Metabolism	SFNCM	1981	Male	1	20
German Society for Nutritional Medicine	DGEM	2004	Male	0	10
Iranian Society for Clinical Nutrition	IrSPEN	2014	Male	0	4
Italian Society for Artificial Nutrition and Metabolism	SINPE	1984	Male	5	15
Japanese Society for Clinical Nutrition and Metabolism	JSPEN	1986	Male	0	20
Korean Society for Parenteral and Enteral Nutrition	KSPEN	2001	Male	2	20
Lithuanian Society of Parenteral and Enteral Nutrition	LSPEN	1995	Male	1	20
Mexican College of Clinical Nutrition and Nutritional Therapy	CMNCTN	2017	Female	4	5
Parenteral & Enteral Nutrition Society of Malaysia	PENSMA	1999	Female	4	9
Parenteral and Enteral Nutrition Society of Asia	PENSA	1995	Male	2	14
Philippine Society for Parenteral and Enteral Nutrition	PhilSPEN	2004	Male	10	17
Polish Society for Parenteral, Enteral Nutrition and Metabolism	POLSPEN	1999	Male	0	20
Portuguese Association of Enteral and Parenteral Nutrition	APNEP	1999	Not Informed	0	1
Slovenian Society for Clinical Nutrition	SZKP	2004	Not Informed	1	1
Sociedad Dominicana Nutrición Enteral y Parenteral	SODONEP	2013	Female	3	4
Sociedad Española de Endocrinología y Nutrición	SEEN	1952	Male	4	20
Sociedad Paraguaya de Nutrición	SPN	2015	Male	2	3
Society for Parenteral and Enteral Nutrition (Singapore)	SingSPEN	2015	Female	2	4
South African Society for Parenteral and Enteral Nutrition	SASPEN	2001	Female	20	20
Spanish Society of Clinical Nutrition and Metabolism	SENPE	1984	Male	7	18
Sri Lanka Medical Nutrition Association	SLMNA	2016	Female	7	7
Turkish Society of Clinical Enteral and Parenteral Nutrition	KEPAN	1996	Male	9	20
Vietnamese Society for Parenteral and Enteral Nutrition	VietSPEN	2021	Female	2	2
West African Society of Parenteral and Enteral Nutrition	WASPEN	2022	Female	1	1
Total				128	420

Between 2003 and 2017, the ASPEN co-organized Nutrition Week with several other organizations, including the American Society for Gastrointestinal Endoscopy (ASGE), the Canadian Society for Clinical Nutrition, Dietitians in Nutrition Support (DNS), the practice group of the American Dietetic Association (ADA), the Infusion Nurses Society (INS), and the Oley Foundation. In 2018, the conference was renamed to ASPEN Nutrition Science & Practice Conference and was solely organized by ASPEN. From 2018 to 2023, 2 women have served as presidents of the conference. Number of events: The total number of congresses held by societies over the last 20 y.

these efforts are commendable, it is essential to understand that these positions, although valuable, often do not carry the same prominence or decision-making power as prominent leadership positions. Inclusivity in primary roles is crucial, not only for visibility but for shaping the direction and policies of the organization. Although participation in sub-committees is a step in the right direction, it should not be used as a justification for the lack of women representation in society’s most prominent positions. By placing women in these central positions, societies can send a strong message about their commitment to true equity.

Promoting gender equality requires dedicated action and strategic planning. An exemplar of such commitment is the Nutrition Obesity Research Centers (NORCs), backed by the National Institute of

Diabetes and Digestive and Kidney Diseases. The NORCs conducted workshops to discern barriers to EDI in obesity and nutrition academia [40], proposing pivotal areas for enhancement, including recruitment, retention, and advancement, addressing intersecting challenges (e.g., racial and gender), engaging funding agencies, and deploying strategies tailored for EDI concerns. To bridge the gender gap, the group endorsed several measures: setting diversity as a foundational organizational objective, laying out clear timelines to amplify women’s presence, articulating leadership stances on gender, ensuring gender-balanced committees, and publicly disclosing the society’s gender membership distribution, among others [37,41]. Adopting similar strategies in PEN societies can pave the way for more equitable



**TABLE 4**  
Female representation as editors-in-chief since the Journal's inception ( $N = 22$ )

Society	Abbreviation	Journal	1st issue	Editors-in-chiefs		
				1st	Total number	Females
Asociación Argentina de Nutrición Enteral y Parenteral	AANEP	Revista RNC	2004	Female	8	3
Austrian Society for Clinical Nutrition	AKE	Nutrition news	2003	Female	3	2
American Society for Parenteral and Enteral Nutrition	ASPEN	Journal of Parenteral and Enteral Nutrition	1977	Male	8	1
Brazilian Parenteral and Enteral Nutrition Society	BraSPEN	Nutrition in Clinical Practice	1986	Male	4	3
Canadian Nutrition Society	CNS – SCN	BRASPEN journal	1995	Male	12	1
Chinese Society for Parenteral and Enteral Nutrition	CSPEN	APNM	2015	Male	3	1
Colombian Clinical Nutrition Association	ACNC	PN&EN		Male	14	0
European Society for Clinical Nutrition and Metabolism	ESPEN	Revista de Nutrición Clínica y Metabolismo	1988	Female	4	4
French Speaking Society of Clinical Nutrition and Metabolism	SFNCM	Clinical Nutrition	1983	Male	6	0
Italian Society for Artificial Nutrition and Metabolism	SINPE	Clinical Nutrition ESPEN	1983	Male	2	0
Japanese Society for Clinical Nutrition and Metabolism	JSPEN	Clinical Nutrition Open Science	2015	Male	1	0
Korean Society for Parenteral and Enteral Nutrition	KSPEN	NCM Nutrition Clinique et Metabolisme	1989	Male	3	0
Mexican College of Clinical Nutrition and Nutritional Therapy	CMNCTN	Nutrition (since 2014), prev. RINPE	1985	Male	2	1
Philippine Society for Parenteral and Enteral Nutrition	PhilSPEN	JSPEN journal	1999	Male	7	0
Polish Society for Parenteral, Enteral Nutrition and Metabolism	POLSPEN	KSPEN Journal	2007	Male	2	0
South African Society for Parenteral and Enteral Nutrition	SASPEN	REDCieN	2019	Female	2	2
Sociedad Española de Endocrinología y Nutrición	SEEN	PhilSPEN online	2007	Male	14	0
Spanish Society of Clinical Nutrition and Metabolism	SENPE	Advances in Clinical Nutrition	2006	Male	3	1
Turkish Society of Clinical Enteral and Parenteral Nutrition	KEPAN	South African Journal of Clinical Nutrition	1988	Male	2	0
Total		Endocrinología, Diabetes y Nutrición	1999	Female	8	4
		Nutrición Hospitalaria	1984	Male	14	0
		Clinical Science of Nutrition	2020	Male	1	0
					123	22

representation. We hope that our findings will inspire these efforts and serve as a call to action for more inclusive gender equality strategies in PEN societies.

Our study faced several limitations. Primarily, data collection was contingent upon the availability of online information and the societies' willingness to participate, both influenced by the completeness of data and the number of nutrition societies assessed. Secondly, our capacity to identify relevant societies might have been constrained by the lack of online information and the absence of research team members from every global region. Consequently, we acknowledge that some eligible societies may have been inadvertently excluded from this analysis. Moreover, language barriers arose, given that only a handful of societies used English on their official web pages. Although we used translation tools to mitigate this, some communication nuances might have been lost. In selected instances, the characterization of sex was based on people's first names. This approach might have led to misinterpretations because of unisex names or cultural variations. As mentioned earlier, another limitation of our study is the omission of gender reflecting personal identification focusing only on biological sex, which may not capture the full spectrum of gender identities and experiences. Furthermore, our study did not explore racial or ethnic diversity. Although we acknowledge the importance of racial and ethnic representation, this was beyond the scope of our work, and with complexities because of regional nuances in defining race/ethnicity, which can vary considerably across different regions and cultures. Additionally, the role of self-racial declaration or self-identification introduces additional complexity to the data availability, collection, and interpretation. Despite our narrower focus, we recognize the

importance of racial/ethnic studies and hope this will be explored in future research, as inspired by others [42].

In conclusion, over the past 20 y, PEN societies worldwide have consistently shown a sex disparity in prominent leadership positions. Despite noticeable improvements, women continue to be underrepresented in positions including society chairs, conference presidents, and editors-in-chief. Addressing this imbalance is imperative. We urge all societies to re-evaluate their vision, commitment, and strategic actions to ensure a more inclusive and representative future. A public-facing statement on their website and other platforms can serve as a powerful tool to underline their commitment to this goal.

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## Author contributions

The authors' responsibilities were as follows – CMP, MITDC: concept and design; all authors: data acquisition, analysis, and/or

interpretation; MITDC, BRS: drafting of the manuscript; and all authors: critical revision of the manuscript for important intellectual content and had full access to all data in the study and took responsibility for the data's integrity and data's accuracy.

### Conflict of interest

The authors report no conflicts of interest.

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### Data availability

The authors will make the data (in deidentified form, if human data) used in the manuscript, code book, and analytic code available to editors upon request either before or after publication.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ajcnut.2023.11.004>.

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