Key factors contributing to gender inequity in global rheumatology awards: a global survey analysis

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Keywords: Gender inequity, Gender bias, Career awards

Key Messages

1. Women rheumatologists are underrepresented in leadership roles and prestigious awards.
2. Women rheumatologists are less likely to receive career awards or serve in award selection committees.
3. Domestic demands on women, lack of female nominees and limited visibility of female candidates are contributory.

Abstract

Background: Despite increasing gender equity in the rheumatology workforce, disparities persist in leadership roles and prestigious career awards.

Objectives: To identify key factors contributing to the under-representation of women among recipients of prestigious career awards in rheumatology.

Methods: A 13-item e-survey was distributed to rheumatologists and allied health professionals globally to identify factors contributing to gender disparity in award conferral.

Results: Among 227 respondents from 40 countries, 68.3% were female. The most significant barrier identified was the competing demands of domestic responsibilities on women (42.9%). Additional factors included a lack of female nominees (38.7%), limited visibility of female candidates (38.3%), and fewer leadership opportunities (35.0%).

Conclusion: This study underscores the impact of domestic responsibilities and restricted professional opportunities on gender inequity in rheumatology awards. These results call for diversification of selection committees, enhanced transparency in nomination and accurate assessment of the gender-specific impacts of career breaks on productivity.

Introduction

Despite increasing representation of women in the rheumatology clinical workforce, leadership positions remain male-dominated[1]. A growing body of literature indicates gender disparities in various prestigious roles[2], including full or associate professorships[3], editorial boards of rheumatology journals[4], senior authorship positions[5], conference speakers[6], and presidents of rheumatology societies[7]. A recent study also identified a significant gender gap in the conferral of major rheumatology awards, with male rheumatologists receiving 83% of prestigious career awards[8].

Prizes serve as one the highest forms of recognition among professionals, symbolically highlighting outstanding individuals and showcasing the values of the rheumatology profession to the broader community. Beyond recognising notable ideas or initiatives, awards enhance the status of recipients, lending credibility to their work and positioning them as successful role models. These recognitions have long-term career implications, influencing promotions, funding, invited opportunities, collaborations and tenure. By shaping the future trajectory of recipients, awards not only reward past achievements, but also drive the direction of scientific investment and discovery.

Despite a proliferation of scientific prizes in recent times, their conferral remains concentrated within a tightly connected scientific elite, influenced by social and professional networks[9]. Gender homophily bias in scholarly teams formation may exacerbate these disparities[10]. The underrepresentation of women in the distribution of prestigious awards can perpetuate exclusion from key opportunities, hindering professional advancement and reinforcing systemic gender inequity. To achieve gender balance in the conferral of prestigious awards in rheumatology, it is essential to identify the key contributors to the

underrepresentation of women. We surveyed the rheumatology community to explore factors underlying this gender disparity.

Methods

Survey Design

A 13-item e-survey captured participant characteristics, including demographics, professional details, caregiving responsibilities and self-reported award recipient status. 'Prestigious career awards' were defined as competitive awards conferred by national or international rheumatology bodies or affiliated societies recognizing research, clinical excellence, leadership or service (e.g., named lectureships, lifetime achievement/merit awards). Respondents were asked to identify the most significant factors contributing to the under-representation of women among award recipients from a list of 18 possible multi select responses: 'Implicit gender biases in nominations and selections', 'Undervaluation of women's contributions to the field', 'Lack of female nominees', 'Lack of transparency in nomination and selection processes', 'Limited visibility of deserving female candidates', 'Lack of female role models and award namesakes', 'Competing demands on women for domestic responsibilities', 'Fewer leadership opportunities for women', 'Higher attrition rates for women in academia/research careers', 'Age restrictions disproportionately affecting women due to career disruptions', 'Geographic location limiting visibility, networking and collaborations', 'Lack of dedicated mentoring and sponsorship programs', 'Gender norms and expectations in society and within rheumatology', 'Inadequate institutional support for pursuing career awards', 'Systematic biases in research funding and resource allocation', 'Disproportionate allocation of 'low visibility work' that may not lead to recognition or promotion', 'Reduced access to influential circles and professional networks', and 'I am not sure'. The questionnaire was developed by four rheumatologists and one gender equity policy

expert. Multiple rounds of dummy fill-ups were conducted to identify errors in wording and syntax. The survey was partly anonymised with email addresses as the only linked identifiers. Survey reporting followed CHERRIES standards for internet surveys[11].

Sampling Strategy & Data Handling

The survey was circulated via email and social media among the CHANGE group, previous rheumatology award recipients, professional rheumatology networks and the broader rheumatology community. The survey was voluntary and conducted from 22/02/2024 to 29/7/2024. Informed consent was obtained at the beginning of the survey, and no incentives were offered for survey completion. Data were handled anonymously, with the email lists remaining with the corresponding author. Approval was obtained from the Sanjay Gandhi Postgraduate Institute of Medical Sciences Ethics Review Board (226014).

Statistical analysis

Responses are summarised using descriptive statistics and data are expressed as raw numbers and percentages. Chi-squared was applied to compare groups for categorical variables. Primary outcome of the survey was to identify perceived barriers to women's award receipt. Additionally, in an exploratory model, logistic regression was used to identify determinants of self- reported award receipt status. Incomplete survey responses were included in the analysis if they provided data for the primary question: "*What are the most significant factors contributing to the under-representation of women among recipients of prestigious career awards in rheumatology.*"Primary analysis included respondents who answered the barriers question, item level denominators (n/N, %) are shown for all descriptive results. For inferential models, we conducted complete case analysis and report the modelling denominator explicitly. Multivariate logistic regression was done for the exploratory model for award receipt. Minimal adjustment set, informed by a directed acyclic graph (DAG) (Supplementary figure

1), included career stage, academic role (physician vs AHP), member of selection committee, profession, care giver responsibilities, age, gender, marital status and WHO HDI category. Ethnicity was excluded from the primary model and included in sensitivity analyses. We verified events-per-variable and simplified models (reduced parameters and collapsed sparse categories) where EPV<10. Estimates are presented as odds ratios with 95% Cis with emphasis on effect sizes. . Statistical analysis was performed using STATA 17.0 (StataCorp, College Station, TX, USA). Graphs were generated using GraphPad Prism 9.4.1 (GraphPad Software, San Diego, CA, USA).

Results

This was an open, convenience and snowball sample disseminated via rheumatology societies, professional networks and social media. Because invitations were not individualized, a response rate could not be calculated. We received 227 responses spanning 40 countries and different classes of human development index (HDI). However, the findings may not be representative of the global workforce. Twenty-three incomplete responses were included in the final analysis as they provided relevant data. The majority of respondents were Hispanic or Latino (43.6%) or White (29.9%), and 68.3% were female (Table 1). Ninety four percent were physicians, 48.1% were mid-career, and 67% held academic positions.

Perceived barriers to women's award receipt

The most commonly identified barrier to gender equity in rheumatology awards by respondents was the competing demands on women for domestic responsibilities, selected by 42.9% of respondents (Figure 1). A higher proportion of female respondents identified this factor as a critical barrier than male respondents (48.5% versus 27.4%, p=0.005). Females with caregiving responsibilities were more likely to select this factor compared with respondents

without such responsibilities (51.4% versus 35.5%, p=0.02). Other commonly selected barriers included: lack of female nominees (38.7%), limited visibility of deserving female candidates (38.3%), fewer leadership opportunities for women (35%), under-evaluation of women's contribution (30.3%), higher attrition rates for women in academia (17.3%) and geographic location limiting visibility, networking and collaboration (24.3%).

Of note, a higher proportion of female respondents identified undervaluation of women's contributions to the field (36.0% versus 17.7%, p=0.009) and reduced access to influential circles and professional networks (25.7% versus 8.1%, p=0.004) as critical barriers. Award recipients more frequently identified the disproportionate allocation of 'low visibility work' (29.5% versus 16.6%, p=0.04) and higher attrition rates for women in academia (24.6% versus 15.1%, p=0.04) as barriers compared with non-recipients. Males more commonly indicated uncertainty about significant barriers by selecting 'I'm not sure' (11.3% versus 2.9%, p=0.02).

Determinants of award status

Among male respondents, 39.7% had received a career award and 19.4% had served on an award selection committee, compared with 24.2% and 10.5% of female respondents, respectively. Dependent caregiving responsibilities did not significantly differ between genders and did not correlate with self-reported award recipient status. In an exploratory regression model, having an academic role (OR: 2.66 (1.01-7.03), p= 0.04), age >60 years (OR: 11.89, 95% CI: 2.29-61.8, p=0.003) and having served as a member of award selection committee (OR: 3.41, 95% CI: 1.13-10.27, p=0.02) were associated with increased odds of receiving an award (Supplementary Table 1). Sensitivity analyses with adjustment for ethnicity (Supplementary table 2) and excluding non- physicians and those without an academic role yielded similar results.

Discussion

This study identifies significant barriers to gender equity in prestigious rheumatology awards. The most prominent barrier identified is the competing domestic responsibilities that disproportionately burden women. This factor was highlighted by 42.9% of respondents, with a higher proportion of females -particularly female caregivers- identifying it as a critical barrier compared to male respondents or non-caregivers. This suggests that decision makers who may have limited personal exposure to balancing intensive domestic and primary caregiving responsibilities could potentially undervalue these constraints for applicants. Our findings reflect perceived barriers and may not directly indicate causal determinants of award receipt. Although our binary caregiver variable did not differ by gender nor correlate with self-reported awards, the measure did not capture intensity, 'primary carer' status, or time costs. Global evidence indicates women perform the majority of unpaid care work[12], which may contribute to perceived opportunity gaps in competitive awards even where our measures did not detect group differences.

Female physicians face significant career disadvantages due to the unequal distribution of domestic labour, especially after motherhood[13]. Beyond the time diverted from professional activities, mothers encounter the 'motherhood penalty,' a damaging cognitive bias that assumes they are professionally less committed and competent after having children, while fathers may experience a 'fatherhood bonus'[14]. Emerging evidence suggests that gender-neutral career break policies in academia may inadvertently benefit men more than women, as fathers are more likely to continue publishing during these 'career breaks' while mothers do not[15]. Consequently, a gender-blind assessment of the effects of career breaks by award assessment committees may overlook gender-specific productivity losses associated with

having children. Our findings underscore the importance of diversifying award assessment committees, educating assessors about the unique career challenges faced by female caregivers and the need for gender sensitive evaluation criteria. While including a 'relative to opportunity' section on grants and prize applications is a positive step, assessors must be equipped to truly understand and account for the sustained burden these responsibilities specifically impose on a woman's career.

This study also identified a lack of opportunity as a key contributor to gender inequity in rheumatology awards, with a lack of women nominees and few leadership opportunities being highly scoring barriers. Connected to the nomination and selection process, the limited visibility of deserving candidates was also considered a key factor, as was a lack of recognition and valuation of women's work. Notably, more female respondents perceived the undervaluation of women's work and lack of access to influential circles as critical factors than male respondents. The exclusion of women from influential male-dominated circles represents a subtle but profound barrier that is challenging to quantify and address. The importance of social and professional connectedness in achieving professional success is evident, given research demonstrating that awards concentrate within a highly connected scientific elite[9]. Award recipients were more likely to identify the disproportionate allocation of 'low visibility work' and higher attrition rates for women as crucial issues. It is possible that these individuals, having successfully navigated the system, have a deeper awareness of the systemic barriers.

Prizewinning is of critical importance not only to individuals and their institutions, but also to the broader community, as it shapes future research investment. Therefore, it is essential for award-granting institutions to accelerate progress towards equity. Recommendations to achieve this include diversifying selection committees and award

nominee pools, advertising widely and enhancing the transparency of nomination and selection[8]. These commendable suggestions seek to address some of the key barriers identified in this survey. Nonetheless, the top-scoring factor amongst our survey respondents pertains to the heavier burden of domestic responsibilities on women, which is not readily remediable by a granting body. Reframing 'young investigator awards' as 'early career awards', based on academic age rather than biological age[8] and accurately assessing the impact of career breaks and carer responsibilities will help. However, this deep-seated socio-cultural inequity requires more comprehensive solutions beyond what granting bodies can provide, including increasing men's participation in domestic responsibilities.

This study has several limitations. As a voluntary online survey, it carries the potential for response bias, capturing the beliefs of a self-selected cohort within the rheumatology profession. The overrepresentation of female respondents, who historically face greater disparity in professional recognition, may have skewed the results. Notably, cultural factors that discourage women from seeking leadership roles were not included as a response option, potentially limiting the scope of factors identified. Societal norms and expectations around ambition and power-seeking behaviours among women may discourage them from seeking opportunities, further compounding disparities. The model to identify determinants of award receipt was exploratory and limited by the self- reported nature of award status. The survey was only available in English and respondents predominantly comprised rheumatologists, with an under-representation of allied health professionals. While we asked about carer responsibilities, we did not distinguish between primary and secondary caregiving roles, which could have provided deeper insights into gender dynamics. Future research should aim to broaden the respondent pool, include translations to capture non-English speakers, and further explore the nuances of caregiving responsibilities. Nonetheless, this study is the first

to explore key factors driving gender inequity in global rheumatology awards, providing meaningful insights and a foundation for future research and policy development.

Conclusion

This study sheds light on the barriers to achieving gender equity in prestigious rheumatology awards, with the burden of domestic responsibilities and lack of professional opportunities for women emerging as critical factors. Our results emphasise the need for award-granting bodies to diversify selection committees, enhance transparency in the nomination process and accurately assess career breaks and achievements relative to opportunity to address gender-specific impacts on productivity.

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Data availability statement

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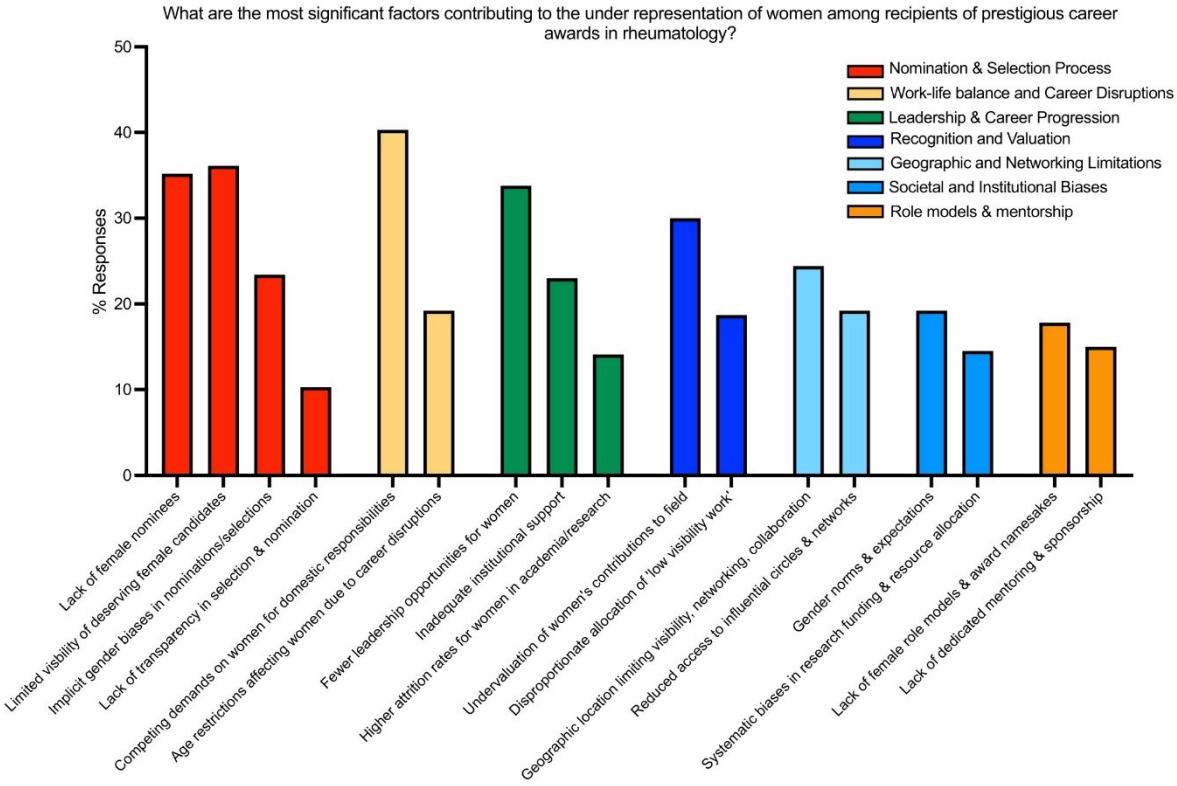
Gender (n=199/227)	
Cisgender male	66 (33.1%)
Cisgender female	136 (68.3%)
Agender	2 (1.0%)
Ethnicity (n=204/227)	
White	61 (29.9%)
Hispanic or Latino	89 (43.6%)
Black/African American	6 (2.9%)
East Asian (e.g., Chinese, Japanese, Korean)	20 (9.8%)
Southeast Asian (e.g., Vietnamese, Thai, Filipino)	7 (3.4%)
South Asian (e.g., Indian, Pakistani, Sri Lankan)	13 (6.3%)
Middle Eastern/North African	8 (3.9%)
Country of origin categorised by human development index (HDI) (n= 209/227)	
Low	10 (4.8%)
Medium	17 (8.1%)
High	96 (45.9%)
Very high	86 (41.1%)
Current relationship status (n=204/227)	
Single	28 (13.7%)
Never married	5 (2.4%)
Married/Cohabitating with partner	153 (75%)
Divorced/Separated	12 (5.8%)
Widowed	4 (1.9%)
Dependent care responsibilities such as children, sick parents, or sick spouse (n=204/227)	
No	88 (43.1%)
Yes	116 (56.8%)
Age (n=210/227)	
Below 30 years	14 (6.6%)
30-34 years	27 (12.8%)
35-39 years	42 (20%)
40-44 years	32 (15.2%)
45-49 years	34 (16.2%)
50-54 years	18 (8.6%)
55-59 years	14 (6.6%)
60 years or more	28 (13.3%)
Primary profession (n=209/227)	
Physician	198 (94.7%)
Nurse	1 (0.47%)
Physical/occupational therapist	1 (0.47%)
Psychologist	0
Social worker	0
Researcher (non- clinician)	5 (2.4%)
Others	0
Do you currently have an academic position? (n=209/227)	
No, I do not have an academic role	59 (28.2%)
Yes, Graduate student	23 (11%)
Yes - Postdoctoral fellow	13 (6.2%)
Yes - Assistant/Associate Professor or similar	70 (33.5%)
Yes - Full Professor	34 (16.2%)

Others	10 (4.8%)
As a physician, what is your current career stage? (n=208/227)	
Early career	59 (28.3%)
Mid-career	100 (48.1%)
Late career	49 (23.5%)
Have you received a prestigious career award or other eminent distinction in rheumatology? (n=211/227)	
No	139 (65.8%)
Yes, once	35 (16.6%)
Yes, more than once	26 (12.3%)
Not applicable	15 (7.2%)
Have you served on a selection committee for a prestigious career award or other eminent distinction in Rheumatology? (n=211/227)	
No	166 (78.6%)
Yes	30 (14.2%)
Not applicable	16 (7.6%)
How often have you seen a call/notification for nominations for rheumatology career awards or other eminent distinctions? (n=211/227)	
Never	85 (40.2%)
Once	43 (20.4%)
More than once	67 (31.7%)
Not applicable	33 (15.6%)
Have you nominated a colleague for a prestigious career award or other eminent distinction in rheumatology? (n=210/227)	
No, I haven't nominated anyone	104 (49.3%)
Yes, I have nominated a male colleague(s)	14 (6.6%)
Yes, I have nominated a female colleague(s)	19 (9.0%)
Yes, I have nominated both male and female colleagues	42 (19.9%)

Figure 1. Factors contributing to the under representation of women among recipients of prestigious career awards in rheumatology (n=227)

Alt text: Bar chart illustrating responses to the question on key factors contributing to underrepresentation of women among recipients of prestigious career awards in rheumatology. The x-axis lists multiple factors grouped by color-coded themes, and the y-axis shows the percentage of respondents. The highest responses cluster around nomination bias, domestic responsibility burden, and career disruption barriers, suggesting systemic and structural contributors to gender inequity in award recognition.



Supplementary Table 1. Exploratory logistic regression model for award receipt

Covariates	Odds ratio (95% CI)	p value
Female gender (vs male)	0.75 (0.34-1.66)	0.48
Profession (Physician vs allied health professional)	0.15 (0.01 - 1.64)	0.20
Having an academic position (vs none)	***2.66 (1.01-7.03)***	***0.04***
Late career stage (vs early career stage)	0.83 (0.16 – 4.36)	0.82
Caregiver responsibilities (vs none)	1.17 (0.49-2.78)	0.72
Medium/Low HDI (vs high)	0.35 (0.10 – 1.32)	0.12
Very high HDI (vs high)	0.66 (0.29 – 1.53)	0.34
Married/cohabiting with partner (vs not)	0.83 (0.34 - 2.03)	0.68
Member of award selection committee (vs not)	***3.41 (1.13 – 10.27)***	***0.02***
Age 50-60 years (vs <50 years)	2.29 (0.69 – 7.62)	0.18
Age >60 years (vs <50 years)	***11.89 (2.29 – 61.8)***	***0.003***

HDI- human development index

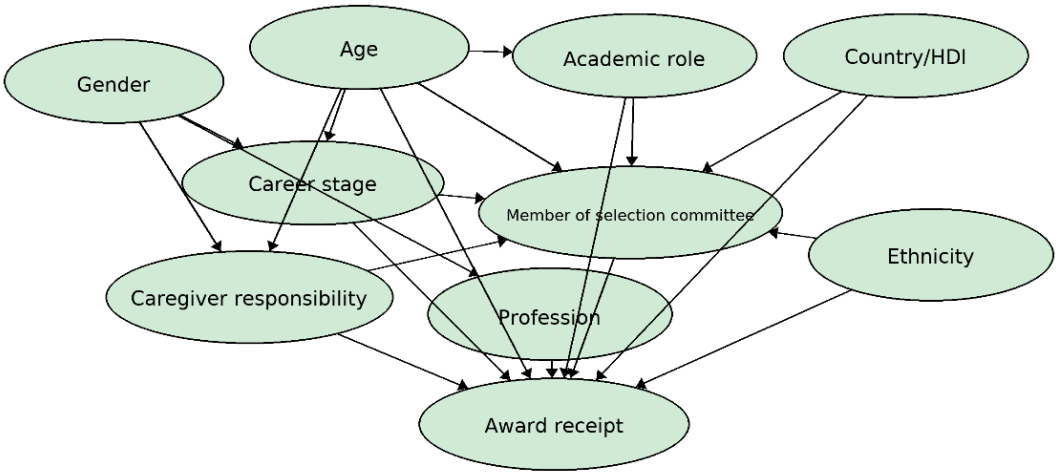
Supplementary Table 2. Exploratory logistic regression model for award receipt with ethnicity included as covariate

Covariates	Odds ratio (95% CI)	p value
Female gender (vs male)	0.77 (0.35-1.71)	0.53
Profession (Physician vs allied health professional)	0.2 (0.01 – 1.46)	0.1
Having an academic position (vs none)	***2.99 (1.07 – 8.31)***	***0.04***
Late career stage (vs early career stage)	0.74 (0.14 – 4.0)	0.72
Caregiver responsibilities (vs none)	1.21 (0.50- 2.91)	0.67

Medium/Low HDI (vs high)	0.36 (0.10 – 1.34)	0.13
Very high HDI (vs high)	0.75 (0.30 – 1.83)	0.53
Married/cohabiting with partner (vs not)	0.79 (0.32 – 1.95)	0.60
Member of award selection committee (vs not)	***3.44 (1.14 – 10.39)***	***0.03***
Age 50-60 years (vs <50 years)	2.48 (0.73 – 8.42)	0.14
Age >60 years (vs <50 years)	***13.62 (2.51 – 73.95)***	***0.002***

HDI- human development index

Supplementary Figure 1: Conceptual directed acyclic graph for factors influencing award receipt



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- French Rheum Association (REF)

- Italian Rheumatology Society

- Openreuma
- Spanish Rheumatology Society (SER)
- Portuguese Rheumatology Society (SPR)
- Greek rheumatology society
- Norwegian Society for Rheumatology
- ERN Reconnect
- Australian Rheumatology Society
- OMERACT