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Original Research

Gender disparity in dermatologic society leadership: A global perspective

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ABSTRACT

Background: In the last half-century, there has been increased representation of women in medicine. Despite this increase, there continues to be underrepresentation of women in medical leadership positions. The objective of this study was to investigate the phenomenon of gender disparity in the leadership of professional societies of dermatology worldwide.

Methods: Online databases were used to extract the names of global dermatologic societies. Individual society websites were accessed to obtain information on executive members. Data not available on society websites were obtained through internet searches. Scopus was used to obtain H-indexes and other bibliometric outcomes.

Results: Our data collection spanned 92 countries, with 1733 society leaders identified and information available for 1710. In North America, Europe, Asia, Australia, and the Middle East, women were in a minority in dermatology professional society leadership. In South America, Central America, and Africa, women were in a slight majority. Across all professional societies, the role of president was more frequently held by men (n = 95) as opposed to women (n = 75). Female leaders were less likely to hold concurrent academic positions as deans/chairpersons/directors (83.33%) than their male counterparts (92.06%). The median H-index of female leaders (9) was lower than that of men (14).

Conclusion: Gender disparity exists in leadership positions in professional dermatology societies. Cultural/continental specific factors should be explored further. Enhancement of institutional support, mentorship, and sponsorship for female dermatologists should be encouraged.

Introduction

In the 1960s, women accounted for only 7% of all physicians (Gautam, 2001). Half a century later, the number of practising female physicians in Canada increased nearly 6-fold to 40.6% (Canadian Institute for Health Information, 2016). In 2016, women accounted for 33.5% of actively licensed physicians in the United States, a 3.8% increase from 2010 (Young et al., 2017). Despite this demographic shift, gender disparity persists in medical school leadership's various academic disciplines (Abdellatif et al., 2019a; Chen et al., 2020; Khan et al., 2019; Odell et al., 2019; Sheikh et al., 2018; Yang et al., 2019), professional societies (Hamidizadeh et al., 2018; Shaikh et al., 2019; Waseem et al., 2019; Wu et al., 2019), and editorial boards of journals (Abdellatif et al., 2019b). Female physicians appointed to medical school faculties are less likely to receive a promotion to a higher academic position than their male counterparts, despite similar durations of faculty appointments (Tesch et al., 1995), such that, in 2015, there was only one female dean of medicine in Canada and only two chairs of medicine (Association of Faculties of Medicine of Canada, 2015). Women are also underrepresented in medical research positions, such as expert groups, advisory/policy committees, and peer-reviewed panels (British Medical Association, 2008).

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This trend is highlighted in the context of medical specialities with higher female representation, such as dermatology (Canadian Medical Association, 2017). As of 2018, 50% of dermatologists in Canada were women (Canadian Medical Association, 2018). These trends were similar in the United States, where women represented 47.1% of dermatologists (Association of American Medical Colleges, 2016) and 64.1% of dermatology trainees (Bae et al., 2016). However, female dermatologists represented only 26.1% of faculty leadership positions in the United States and Canada (Shah et al., 2018). One explanation for this discrepancy is the difference in research productivity between women and men, a critical criterion for appointment and promotion in academic institutions (Rezek et al., 2011; Susarla et al., 2015). Within Canadian academic dermatology, men had a median publication rate that more than doubled that of their female counterparts (Shah et al., 2018).

Penny et al. (2014) described central issues resulting from gender disparity in academic medicine. The first consequence is the loss of potential academic research and teaching talent. Second, the lack of women may enhance biases in agendas for academic research, which may have implications for future clinical practice. Previous studies have explored the influence of gender disparity in academic dermatology in North America (Shah et al., 2018); however, gender disparity within dermatologic societies have not been studied yet. The objective of this study was to investigate the phenomenon of gender disparity in professional dermatologic societies and to identify factors that may contribute to such disparities.

Methods

Data collection

This study was exempt from institutional review board approval because no human subjects were involved and the data were retrieved from publicly available sources. Data extraction was completed by D.K. and L.S. between April 2018 and August 2018. Online databases were used to collate the names of global dermatologic societies; only those on the national level were included. For example, the American Academy of Dermatology was included, but dermatologic societies of individual states were not. Societies that did not have publicly accessible directories of executive committee members or those with websites that had not been updated since 2016 were excluded. The societies selected were those with a focus on science, research, and clinical care, but charitable organizations were not included. Using these criteria, 174 societies spanning seven continents were included. From these societies, only society committee members with an MD/DO or equivalent (e.g., MBBS) were included. Individuals holding a leadership position in more than one society were enlisted as such to accurately represent their level of leadership and involvement.

Individual society websites were used to extract data on names, committee position(s), and countries. Academic rank, leadership position(s), subspecialty of dermatology, institution type, and academic degrees were often present on the professional society websites. If this information was not available on society websites, it was obtained via online searches of institution/hospital webpages and/or LinkedIn accounts of the individuals. Gender classification was performed through a combination of pronoun analysis and photo identification.

The H-index is a metric used to define researcher impact based on publications and citations (Hirsch, 2005). The M-quotient is a variant of the H-index in which the number of years spent conducting research is an additional factor (Hirsch, 2005). The online citation database Scopus was used to abstract data on H-index, total number of publications, total number of citations, years since first publication, and years of active research for each committee member. The M-quotient was calculated using the years since first publication and the H-index. If multiple search results with the same name appeared in Scopus, departmental affiliation and publication record within the field of dermatology were used to ensure that the correct and complete author metrics were exported. The H-index is available from multiple online databases, such as Scopus, Web of Science, and Google Scholar. Scopus was used to obtain bibliometric information because it is more accurate than Google Scholar and has a broader database than Web of Science (Bar-Ilan, 2007; Chadegani et al., 2013; Halevi et al., 2017).

Statistical analysis

All analyses were performed using IBM SPSS, version 20. χ^2 tests were used to assess differences in gender distribution across academic ranks, divisions, leadership ranks, and committee ranks for current board of director members. For continuous variables (H-index, M-quotient, citations, number of publications, and years of active research), data were tested for normality, and log transformations were performed. All continuous variables showed a skewed, non-Gaussian distribution. Therefore, nonparametric analyses (Wilcoxon rank sum test and Kruskal-Wallis test) were applied to identify significant gender differences in these continuous variables. A p-value of <.05 was considered significant for all analyses.

A multi-regression analysis was conducted to create a model to predict the H-index. At the univariate level, a simple linear regression was applied. We checked for multicollinearity between the independent variables using a correlation coefficient. Cramer's V test was used for combinations of one nominal and one ordinal variable; the Spearman test was used for combinations of one continuous and one ordinal variable. A correlation of $\geq$0.8 was treated as the presence of multicollinearity. Main effects were identified using a stepwise selection strategy based on p-values. Interaction terms were created between each of the main effects in the model. One significant interaction was found between citations and publications; thus, this was kept in the model.

$$Y(\text{H-index}) = B0 + B1(\text{gender}) + B2(\text{citations}) + B3\ (\text{publications}) + B4\ (\text{years of active research}) + B5\ (\text{M-quotient}) + B6\ (\text{citations} \times \text{publications})$$

$$\text{F test} = 256.10;\ \text{adjusted } R^2 = 0.98;\ p = 0.0001$$

This formula accounted for 98% of the variability in the model. The remaining variability in the model may have been explained by variables beyond the scope of our paper, such as full-time versus part-time employment, years of employment, and contract versus tenure positions.

Results

A total of 92 countries had a national professional dermatologic society with up-to-date information regarding leadership. These countries spanned seven continents. Within the societies, a total of 624 women were committee members (39.52%), 954 men were committee members (60.42%), and one individual had an unidentified gender (0.06%). The academic degrees earned by these physicians are illustrated in Fig. 1. The subspecialty qualifications by gender (n = 269) are shown in Table 1. The percentage of men compared with women within professional society leadership roles varied by continent (Table 2) and ranged between 57.89% women (Central America) to 29.31% women (Australia).

Across all societies, the role of president was more frequently held by men (n = 95) than women (n = 75). Within the dermato-

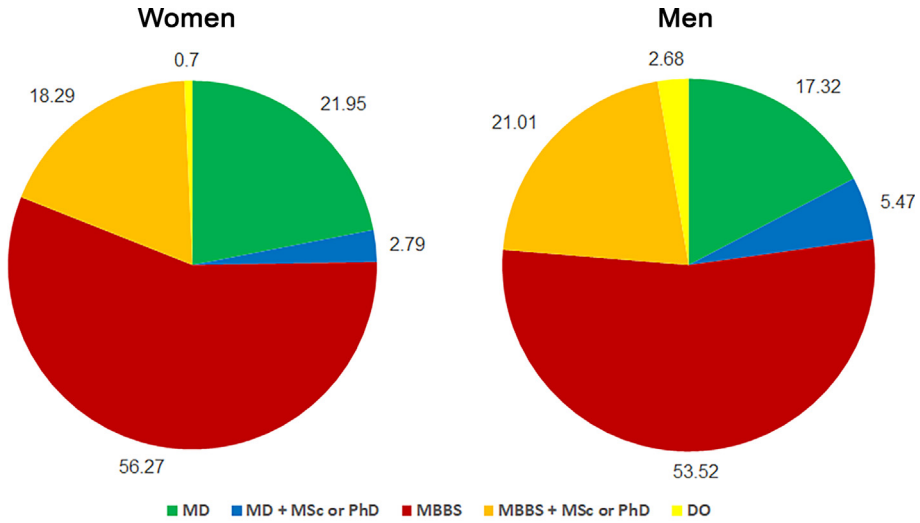

Fig. 1. Advanced degrees earned by men and women in dermatologic society leadership positions. Numbers represent corresponding percentage of the whole.

Table 1
Subspecialty data for men and women dermatologists in leadership positions.

Subspecialty	Women, n (%)	Men, n (%)
Aesthetic/cosmetic	30 (26.55)	31 (20.00)
Pediatrics	38 (33.63)	21 (13.55)
Pathology	14 (12.39)	24 (15.48)
Oncology	12 (10.62)	35 (22.58)
Mohs	7 (6.19)	27 (17.42)
Infectious	7 (6.19)	6 (3.87)
Wound care	3 (2.65)	6 (3.87)
Other	2 (1.77)	5 (3.23)

Table 2
Physicians and female physicians in leadership roles.

Continent	Total, n	Women, n (%)
Central America	19	11 (57.89)
South America	141	81 (57.45)
Africa	45	24 (53.55)
Middle East	36	16 (44.44)
North America	412	158 (38.35)
Europe	594	225 (37.88)
Asia	253	81 (32.02)
Australia	58	17 (29.31)

logic societies, the numbers of physicians in the hierarchy of positions are shown in Fig. 2. Women on the committees of these professional societies were less likely to be deans/chair persons/directors (83.33%) at their parent professional institution than their male counterparts (92.06%). A comparison of professorship status between men and women can be seen in Fig. 3. The distribution of men and women working in public versus. Private institutions was very similar, with slightly fewer (87.50%) women than men (89.11%) working at public institutions.

Research productivity of committee members on these professional societies was compared using the H-index. The average H-index of women (9) was lower than men (14). There were many significant differences between men and women in publications ($p = 0.0001$), citations ($p = 0.0001$), years since first publication ($p = 0.0001$), years of active research ($p = 0.0001$), and H-index ($p = 0.0001$). However, there was no significant difference in M-quotient between the two genders ($p = 0.07$). The complete breakdown of research productivity can be seen in Table 3.

Discussion

Our findings demonstrate that gender disparity exists globally in leadership positions of professional dermatologic societies. Data varied by continent, with more men in leadership positions in North America, Europe, Asia, Australia, and the Middle East and a slight majority of women in dermatology society leadership in South America, Central America, and Africa. Within the leadership structures, women were less likely than men to be in first-in-command positions. Furthermore, within their parent professional institutions, women were less likely to be full professors compared with their male counterparts. H-index was significantly higher for men in dermatology society leadership positions compared with women. However, when the M-quotient was considered, the difference in research productivity between men and women dermatologic society leaders was not significant.

Notably, for the position of president of societies or first in command, women were underrepresented. These findings are consistent with previous studies, which found that as seniority of position increases, representation of women decreases (Penny et al., 2014). Throughout medical school, residency, and fellowship, women receive similar preparation for academic careers as men; nevertheless, they are given fewer promotions (Tesch and Nattinger, 1997). Even though the women in our study had advanced degrees comparable to those of men, their H-indexes were lower. We found that the H-index in dermatology was significantly different for the levels of professorships. Furthermore, the average H-index of female dermatology society leaders was 9 compared with 14 for men, and there was a significantly higher proportion of men as full professors. Multiple studies illustrate that the H-indexes of physicians in the same field are higher among men than women (Desai et al., 2018; Mayer et al., 2017; Mueller et al., 2017; Qamar et al., 2020; Shah et al., 2018).

Citations are accrued over time, so physicians with longer careers naturally have higher H-indexes (Hirsch, 2005). Historically, there are more men in medicine than women. More recently, this has been changing in the direction of including more women. Therefore, the female workforce in medicine is generally younger (Canadian Institute for Health Information, 2016). In fact, 2017 marked the first time that the number of women enrolled in medical schools in the United States exceeded the number of men (Association of American Medical Colleges, 2017). For this reason, we calculated the M-quotient, which is a statistic that alters the H-index based on career years (Hirsch, 2005). With the M-

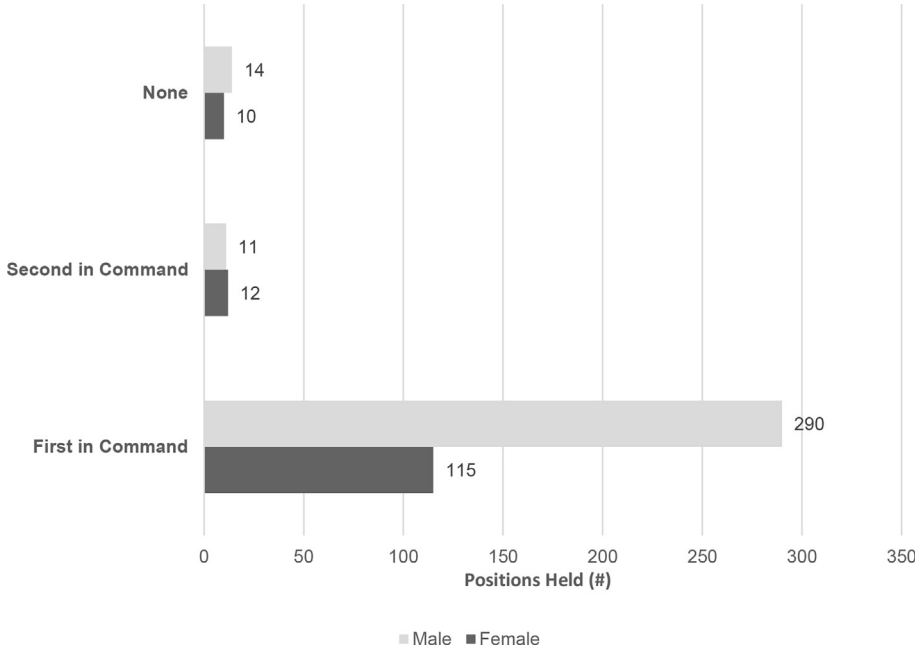

Fig. 2. Rank of leadership positions held within the dermatologic society for men and women dermatologists.

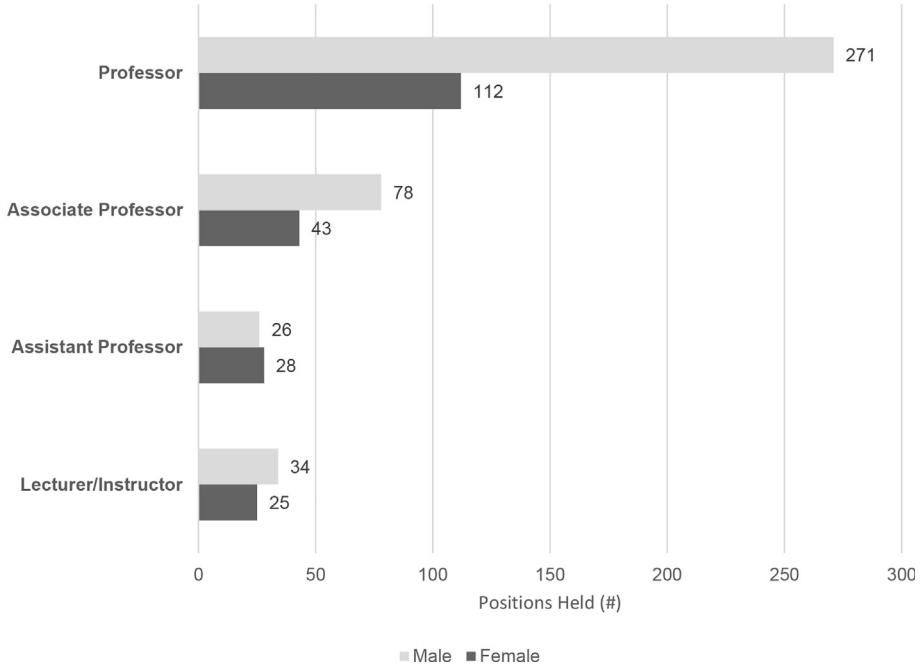

Fig. 3. Positions held by men and women dermatologists at their home institutions.

Table 3
Research productivity of individuals in dermatologic society leadership positions.

Academic variable	Women, median (range)	Men, median (range)	*p*-value
Publications	30 (1–617)	50 (1–1082)	.0001
Citations	359 (0–47323)	741.5 (0–39040)	.0001
Year since first publication	19 (0–49)	24 (0–71)	.0001
Years of active research	11.5 (1–42)	16 (1–52)	.0001
H-index	9 (0–940)	14 (0–12553)	.0001
M-quotient	0.92 (0–76.36)	0.94 (0–482.81)	.08

quotient, there was no significant difference in research impact between men and women, which may imply that, as more women enter medicine and dermatology, over time their H-indexes will catch up to those of men (Zhang et al., 2017). However, many individual and institutional factors affect the academic progress of female physicians, which may negate this pipeline hypothesis.

Of the female faculty who are successfully able to combine career and family, 78% believed that their career progression was impeded by having children (Levinson et al., 1989). More recently, a survey of physician mothers reported that 41% of women faculty felt there was inadequate support for their first child's maternity leave plan (Juengst et al., 2019). The roles and responsibilities asso-

ciated with childbirth disproportionately affect female faculty due to socially constructed gender role stereotypes (Buddeberg-Fischer et al., 2010). Childbearing female faculty face unconscious and conscious workplace discrimination, which may serve as a barrier that prevents them from thriving in their postchildbirth careers (Juengst et al., 2019). Among both male and female faculty members with children, female faculty received less institutional support, such as research funding (e.g., from the National Institutes of Health) than their male counterparts (Carr et al., 1998; Kaatz et al., 2015, 2016). Female physicians also received fewer opportunities for invited manuscripts (Fried et al., 1996; Levey et al., 1990; Larivière et al., 2011). The responsibilities of female physicians currently trends toward more clinical and teaching responsibilities than male colleagues (Kaplan et al., 1996). Additionally, a study of dermatologists in North America demonstrated that female dermatologists had fewer median years of active research than their male colleagues (Shah et al., 2018). It is possible that these years were earlier in their career, providing women with fewer years to accumulate citations over time, which would affect the H-index. Although wide institutional changes are needed, small steps can make a positive change, such as mentorship for women wishing to pursue research (Levinson, et al., 1991) and altering promotion decisions to prioritize teaching and clinical achievements in addition to research (Hamel et al, 2006).

Our study has its share of limitations. First, the results are reported in terms of continent. Certain countries' disparities may skew these results; thus, continental results may not be fully representative of the individual countries within the continent. Second, all data were based on publicly available information; therefore, the data heavily relied on the accuracy of dermatologic society and institutional websites. Third, different societies had different leadership structures (e.g., 2 vs. 30 executive members). We reported findings based on level of leadership (i.e., first vs. second in command) to see trends in the makeup of higher leadership positions. As such, certain societies with a greater number of leadership positions received more representation in this study. Fourth, we based our research metric on the H-index, a bibliometric marker that has been widely discussed and debated in the literature (Hirsch, 2005; Rousseau and Leuven, 2008; Vinkler, 2007).

There are several criticisms of the H-index. Some publications may have been missed as a result of individuals changing their surname during their career, a practice that predominantly affects women (Qamar et al., 2017). Other factors, such as self-citation (Bartneck and Kokkelmans, 2011), publishing a high number of lower-quality publications (Patel et al., 2013), and retracted articles (Texiera Da Silva and Bornemann-Cimenti, 2016), have the ability to inflate one's H-index. Notably, the H-index also does not factor in the location of an author within an author list (Kreiman and Maunsell, 2011).

Due to our retrospective, cross-sectional study design, the results were derived from a snapshot of the female representation within dermatologic society leadership. Our analyses were based on a static state of the societies; however, reshuffling of leadership structures within individual organizations is an expected occurrence. Our study did not collect longitudinal data; therefore, the rate of change of female representation across global dermatologic societies were neither evaluated nor accounted for. Lastly, due to the prioritization of national dermatologic societies, regional organizations were not included in this study. Although our evaluation of national organizations provides a global perspective, the dynamic situation of gender disparity was not fully evaluated. For instance, individuals who hold leadership positions within regional societies may eventually move on to national positions. The interconnectedness of dermatologic societies on the regional and national levels should be explored for a more comprehensive account.

It is important to tackle known existing barriers to create more balance within dermatology leadership, such as providing equal resources to dermatologists of all genders when starting their careers, facilitating work–life balance, and providing mentorship and sponsorship to women. Thus, in addition to further research exploring cross-continental factors of gender disparities, it is important that institutions implement policies and programs that may generate greater equity. Further research could explore the different continental and cultural factors that lead to continents having a majority versus a minority of women in dermatologic society leadership positions.

Conclusion

Gender disparity exists in leadership position in professional dermatology societies. It is essential to enhance institutional support, mentorship, and sponsorship for women dermatologists to begin to tackle this problem. Cultural and continental factors influencing the presence or absence of gender disparity should be explored further.

Conflicts of Interest

Dr. Khosa is the recipient of the AFMC-May Cohen Equity, Diversity and Gender Award (2020). Dr. Larson participated in a one-time advisory board panel on resident education for Sanofi, Genzyme in July 2019.

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Study Approval

N/A.

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