Gender distribution in psychiatry journals' editorial boards worldwide

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ABSTRACT

Gender disparity has been documented in advanced doctoral degrees, research, and academic positions, and therefore, it can logically be deduced that the gender disparity would be found in journals' editorial boards. In this study, we sought to determine the gender distribution in editorial boards of psychiatry journals worldwide. We also studied the academic achievements of editorial board members by comparing professional background, education level, and research productivity indices. We analyzed the gender of editorial members of 119 psychiatry journals from Clarivate Analytics' Journal Citation Reports. Our data included 8423 editorial board members from which we randomly selected 10% editorial board members to represent the full sample for further analyses. Overall, women represented 30.4% of editorial board and approximately 30% in each category: (1) Editor-in-chief/deputies, (2) Associate/section editors, (3) Editorial board*, and (4) Advisory board. The majority (65%) of men were M.D. psychiatrists, and women (58%) were Ph.D. psychologists. Women in editorial leadership positions (Category 1 & 2) were correlated with fewer women in editorial or advisory boards. Women had half the mean number of publications than men while serving journals with approximately the same mean impact factor. Our study results show that, besides gender disparity, gender bias does not exist in the psychiatry journal editorial boards. Given the implication of the editorial board position on science, academic advancement, and networking, this disparity remains detrimental to achieving equity, diversity, and inclusion in academic psychiatry.

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1. Introduction

In academic circles, editorial positions are considered prestigious and influential. Selection of these positions is based on academic rank, i.e., scholarly achievement as a well-cited author of peer-reviewed publications and a valuable and responsible reviewer [1]. A position on an editorial board enhances visibility, prestige, professional network, and career advancement [2]. Therefore, gender disparity in editorial positions of peer-reviewed publishing platforms would be associated with negative connotations.

Despite more women graduating with bachelors and masters than men and over-representation of women in healthcare and welfare fields in many countries [3], the number of women who progress to advanced doctoral degrees, research [4] and higher academic ranks [5] are relatively small in comparison to those with initial qualification. In the

context of our study in psychiatry, in the USA, the representation of practicing women psychiatrists in 2017 was 39.1%, with women filling 50.5% of trainee positions [6]. This was corroborated by Sheikh et al. [7], who reported that women comprised 42% of the workforce in academic psychiatry in 2017. The analysis also revealed that women "remained grossly under-represented in the ranks of associate professor (36%) and full professor (25%), as well as in leadership positions such as department chairs (9%) and deans" [7].

This gender disparity in higher academic positions has been explained by several factors such as gender biases in hiring, tenure, promotion, authorships, scholarly recognition, inflexible and hostile work environments, and lack of role models and mentors [8–12]. Several studies have demonstrated that women are under-represented in academic medicine [7,13–17] and in editorial boards across different specialties [18–21]. However, our literature search did not reveal any study of the gender distribution on editorial boards of psychiatry journals. Our study of psychiatry journals worldwide aims to quantify the percentage of women on the editorial boards. In addition, we compared the academic achievements of editorial board members including

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professional and educational background and research productivity indices.

1.1. Objectives

This investigation using a two tiered approach thus, aims to explore two issues:

a) To quantify the existence and extent of gender disparities in editorial board positions of psychiatry journals.
b) If a disparity among genders does exist, can gender bias be a contributing cause?

2. Methods

In this study, we selected the top 119 psychiatry journals from 142 in the Science Citation Index Expanded (SCIE) list in *Clarivate Analytics' Journal Citation Reports* (JCR) (2017). This selection was limited to journals published in the English language. Journals without editorial board member information available on their website were excluded.

2.1. Operational definitions

The framework of this study is based on two important concepts: gender disparity and gender bias. For this study, gender disparity among editorial groups was defined as the differences in proportion of male and female editorial board members. While gender bias or inequality was defined as a social construct emphasizing an unfair preference/treatment of one gender, especially men, over the other, on part of the journals. This concept thus, emphasizes a negative connotation- for instance, that the disproportional representation of women in academia and editorial boards of psychiatry journals was due to a journal's preference for male editors.

2.2. Data collection

The data were collected in two phases: 1) auditing journal webpages and 2) auditing institutional webpages and Scopus. Phase 1 included all editorial board members, while phase 2 included only 10% of data collected in phase 1 data. The rationale for separating the two phases was to make the data collection process time-efficient. Phase 1 involved the extraction of data on the number of editorial board members ($n =$ 8423), Journal Impact Factor (JIF), and country of journals. A thorough exploratory audit of journal websites was conducted by DMH. Names and gender of editorial board members were manually tabulated in four categories, based on their roles, collectively defined as "Editorial Board": 1) editor-in-chief (EIC)/deputies, 2) associate/section editors, 3) editorial board* members and 4) advisory board members. We defined categories 1 and 2 as editorial leadership. It should be noted that the collectively defined "Editorial Board" includes the four categories aforementioned, one of which itself is called editorial board. For clarity, the category "editorial board" will be denoted with an "*". JIF and country of origin of journals were retrieved from the JCR list and its journal information page.

The gender of all editorial board members was identified by a combination of name, picture, and biographic details.

In phase 2, data was collected using institutional websites and Scopus, on editorial board members' country/university affiliation, the number of publications, H-indices, and total citations, professional background (psychiatrist/psychologist) and highest degree (M.D./Ph.D.). For this phase, using computer software, we randomized our phase 1 data after their stratification based on editorial roles. We then chose an equal percentage (10%) of men and women from each randomized category. For example, phase 1 Total Advisory Board count was 1437, among which 424 were women, and 1013 were men. We randomly

chose 10% of each gender to include 42 women and 101 men in the advisory board category.

The data regarding research productivity indicators (number of articles published, number of citations, and h-index) were collected using Scopus biomedical database. We chose Scopus to determine the h-index because it offered consistently more coverage than Web of Science and greater accuracy than Google Scholar [22]. All data acquisition was completed in September 2018.

2.3. Statistical analyses

For sample size calculation for cluster analysis, previous research on similar analytical techniques such as Latent Class Analysis suggests the minimal sample size to include no <2 k cases (k = number of variables) [23]. All data were analyzed using SPSS v.20 (IBM, Chicago). Firstly, descriptive statistics were calculated for the full sample of editorial leadership and advisory and editorial board* members. Thereafter, one sample Chi-square test was used to determine the difference in the proportions of men and women editors.

For a random sample of editorial leadership and members, descriptive statistics were followed by a series of independent sample *t*-tests and Pearson Chi-square test of association to reveal any gender-based differences in research productivity indices, regional affiliations, and educational and professional background.

Lastly, two models based on a two-step clustering algorithm were created to reveal clusters based primarily on a) professional backgrounds and research productivity indices and b) gender of editors/members and their research productivity. Prior to running these analyses, quantitative variables were standardized into their z-scores. A Log-Likelihood model with Akaike Information Criterion was used to arrive at the suitable number of clusters [24]. Acceptability of the model was based on the average silhouette value of cohesion and separation significant at 0.5, and the ratio of cluster sizes was considered acceptable <2.50 [24]. Clusters were presented diagrammatically to identify the relative distribution and descriptives (means, proportions) of different variables. Naming the clusters was done subjectively by judging the dominant characteristics of each cluster.

3. Results

3.1. Full sample (Phase 1) characteristics

A total of 8423 editorial board members serving at 119 journals were included in this study: 5863 (69.6%) men and 2560 (30.40%) women. These journals were served by 304 Editor-in-Chief and their deputies, 935 associate and section editors, 5755 editorial board* members and 1447 advisory board members. Chi^2 test of independence revealed a significantly lower proportion of women serving at editorial board* or advisory board positions in these journals ($P < 0.001$). Detailed characteristics, frequencies (%) and Chi^2 statistics are presented in Fig. 1 and Supplemental Fig. 1, respectively. Women at editorial leadership positions were associated with fewer women board* members (Chi$^2 = 100.76$, $P < 0.001$) and women advisors (Chi$^2 = 20.69$, P < 0.001).

In Fig. 1A–D, we illustrated the characteristics of the full sample. The greatest numbers of journals were based in the USA (35%, $n = 42$) and UK (33%, 39) followed by Netherlands (8%, 9), Germany (6%, 7), Switzerland (5%, 6), Australia (3%, 4), Italy (2%, 2) and others (8%, 10). Countries with only one journal in the SCIE list were categorized under "Others." Out of the 7 countries mentioned, the USA and the UK represented most women (34.4% and 32.4% respectively) in the editorial leadership. The least women leader representation was found in journals based in Australia (15.4%) and Italy (0%). Overall, the greatest gender disparity was seen in journals based in Netherland (21.8% women) and least was found in American journals (32.2%).
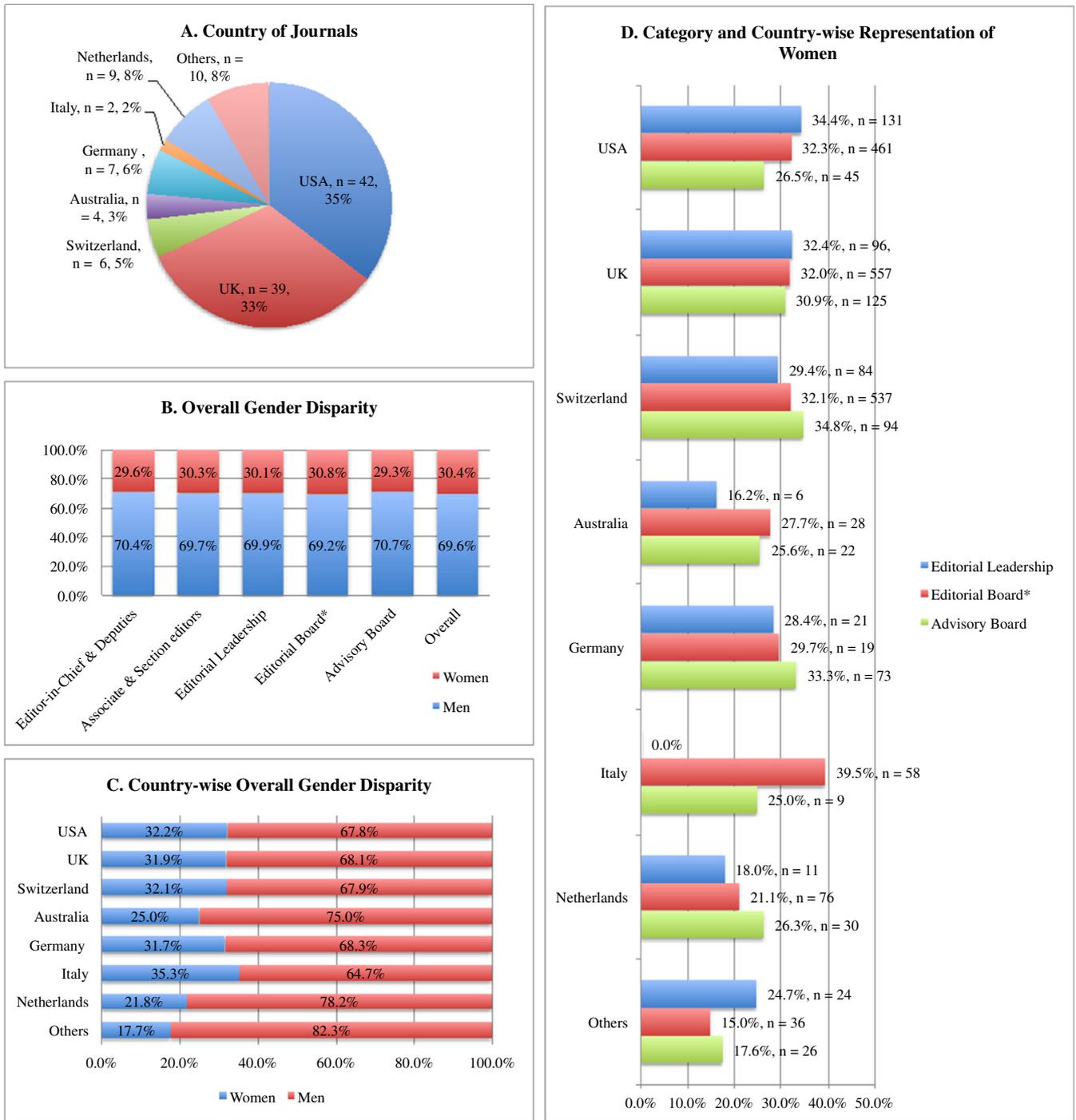
Fig. 1. Characteristics of Full sample (*n* = 8453) based on Phase 1 data. A) Country of Journal, B) Overall Gender Disparity, C) Country-wise Gender Disparity, D) Category and Country-wise Representation of Women. Note: Percentages rounded to first decimal. Countries with only 1 journal were categorized under "Others". "*" Use of asterisk explained in Methods section.

3.2. Randomized sample (Phase 2)

The 10% randomized sample of editors/members (*n* = 836) served journals with a mean impact factor of 3.47 (SD = 2.75), mean number of publications 181.26 (198.67), H-index 36.42 (28.50), and total number of citations 8178.13 (12,702.32). There were 30 editors-in-chief and deputies, 93 associate and section editors (which totals to 123 editorial leaders), 570 editorial board* members, and 143 advisors. There were 462 psychiatrists with MD, of whom 21% were women. One hundred thirty-five of those psychiatrists also carried Ph.D., of whom 23% were women. Psychologists (*n* = 334) constituted 41% women. All

psychologists were PhDs except six men and one woman. Most of the editors/members were based in the USA (355), UK (78), Germany (52) and Australia (49). There were no gender-based differences according to the country where editors/members were based. Detailed characteristics are illustrated in Fig. 2 and results are given in Table 1. It was noted that there were repetitions of 4 editors/members in our randomized sample because they served more than one journal's editorial board.

A higher proportion of men were psychiatrists and MD qualified while women were psychologists with PhDs. *t*-test for independent samples revealed no association between journal impact factors and
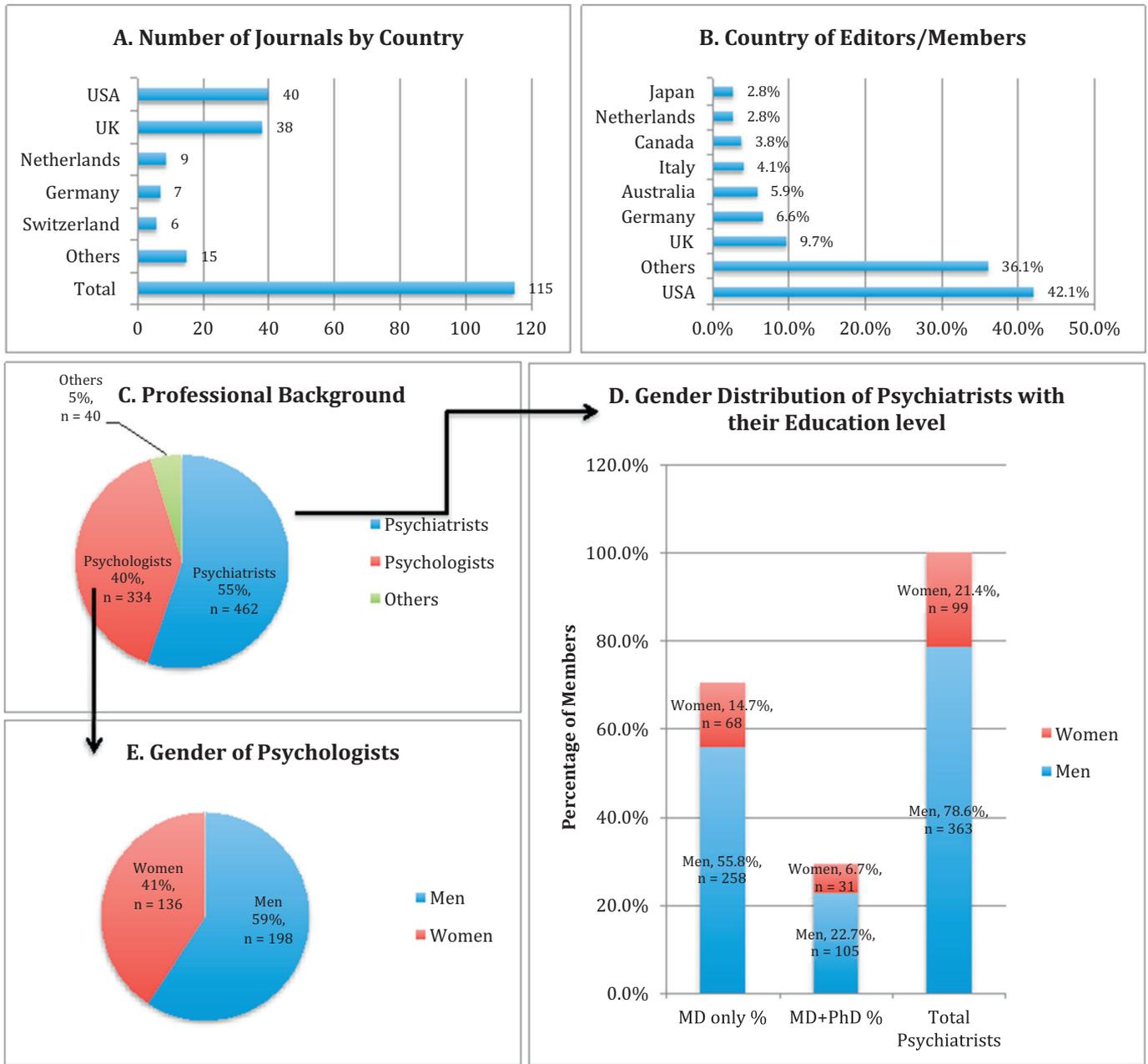
Fig. 2. Characteristics of Phase 2's randomized 10% sample illustrating A) Number of Journals by Country, B) Country of Editors/Members, C) Professional Background of editors/members, D) Gender Distribution of Psychiatrists with their Education Level, and E) Gender of Psychologists. Note: In Fig. 2.E all, except 2% (*n* = 7) of psychologists, were PhDs.

Table 1
Basic characteristics of the Phase 2's 10% randomized sample of editorial board members.

Variables		Frequency	Percentage
Gender	Male	579	69.26%
	Female	257	30.74%
Editor-in-chief and deputies		30	3.59%
Associate editors & section editors		93	11.12%
Editorial leadership		123	14.59%
Editorial board		570	68.18%
Advisory board		143	17.11%
Editors/members with PhD		488	58.37%
Editors/members with MD only		329	39.35%
Editors/members with MD + PhD		136	16.27%

Table 2
Journal characteristics and gender difference in research productivity indices.

Variable	Mean	Std. Deviation	Gender	Mean	Std. Deviation	t
Journal Impact Factor	3.47	2.75	Male	3.47	2.89	−0.6
			Female	3.48	2.42	
No. of publications	181.26	28.5	Male	211.57	220.07	8.55[*]
			Female	112.98	112.39	
H-index	36.42	198.67	Male	39.75	28.78	5.31[*]
			Female	28.94	26.42	
Total citations	8178.13	12,702.32	Male	9592.18	13,839.43	5.76[*]
			Female	4992.40	8895.23	

[*] *p* < 0.001.

gender of editors/members. However, men had a higher number of publications, H-indices, and the total number of citations than women (Table 2).

3.3. Cluster analyses

Two models of cluster analyses were developed. The first model was based on profession, degrees, and research productivity indices. It yielded an acceptable model with average silhouette value of cohesion and separation of 0.7. The ratio of the sizes of the cluster was 1.25. The first cluster comprised of 99.4% psychiatrists, with M.D. degrees, Ph.D.

degrees (21.9%), and majority men (78.4%). This cluster had a higher number of publications (213.39), H-index (40.05), number of citations (9544). While the second cluster comprised of 89.8% psychologists, Ph.D. holders (94.9%), 57.8% men and 42.2% women. This cluster had 141.18 publications, H-index 31.90, and total citations (6474.09). There were no significant differences in journal impact factors. Fig. 3 details the absolute and relative distribution of different variables in the cluster.

The cluster analysis based on the gender of editors/members and their research productivity indices yielded an acceptable model with average silhouette value of cohesion and separation of 0.6. The ratio of the
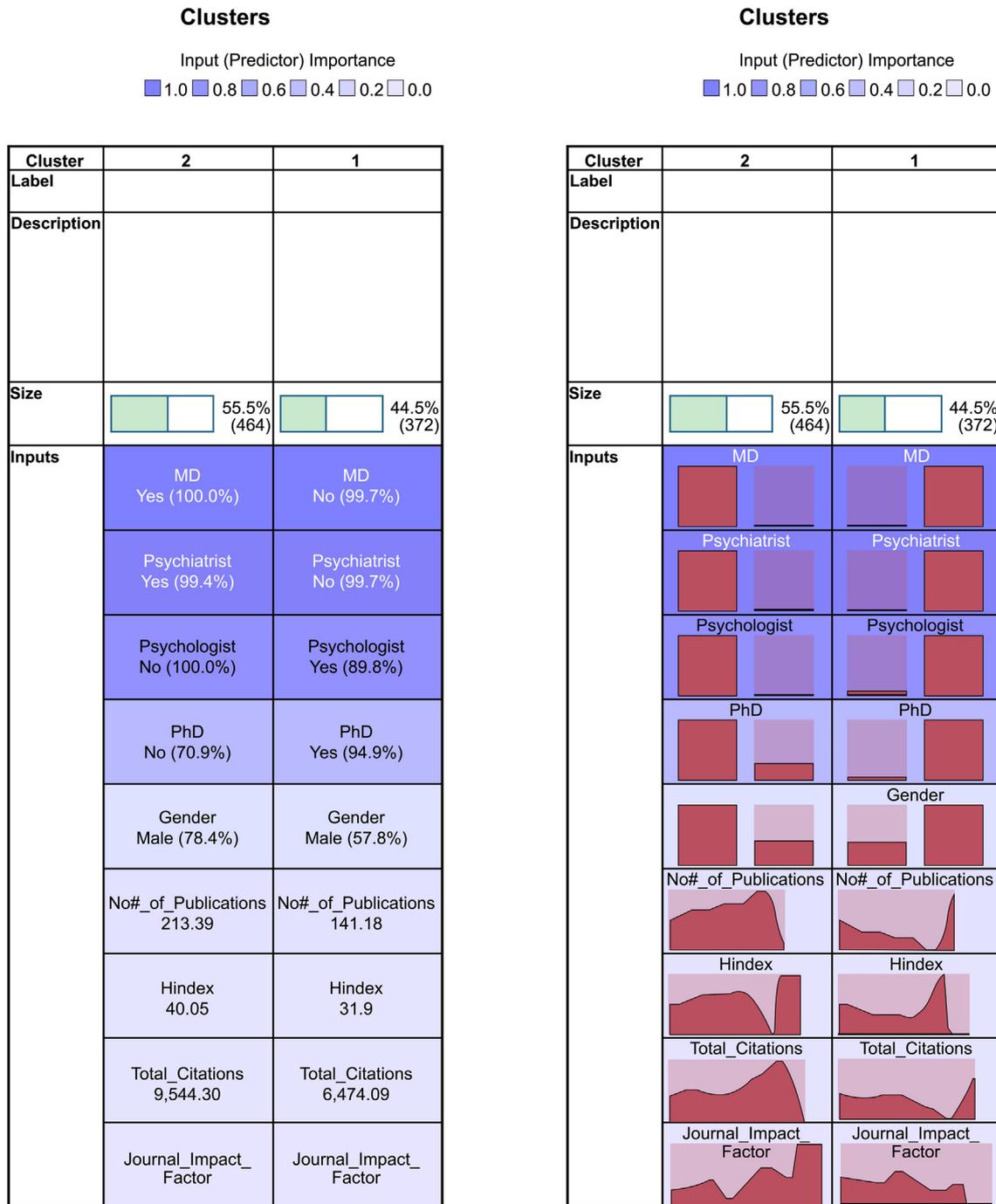

Fig. 3. Cluster analysis of journal editors based on their degrees and research productivity. Average silhouette value = 0.6. The first cluster comprised of psychiatrists, a majority males with MD diplomas and the second comprised of majority psychologists with a PhD and a slightly higher representation of males than females. The former group had a higher number of publications (213.39), H-index (40.05), number of citations (9544) than the latter group with 141.18 publications, H-index 31.90 and total citations (6474.09).

sizes of the cluster was 2.14. It yielded three models named: men with low research productivity, women with intermediate research productivity and predominantly men as the highest performing cluster.

The first cluster of *men with low research productivity* had a mean number of publications (103.38), H-index (25.21), a mean number of citations (3292) and journal impact factor (2.83). The second cluster of *women with slightly higher research productivity* had a mean number of publications (107.7), H-index (25.26), a mean number of citations (3452), however, they served journals with higher impact factors (3.24). The last cluster *editors with high research productivity* comprised 92.6% men, with the mean number of publications (451.22), H-index (74.76), a mean number of citations (24,697.75) and mean journal impact factors of 5.15. Fig. 4 details the absolute and relative distribution of different variables in the cluster.

4. Discussion

The present analyses revealed a significant gender disparity (30.4% women) among the editorial boards of 119 psychiatry journals. Men were more likely to be MD psychiatrists while women were psychologists with a Ph.D. Women in editorial leadership positions were associated with fewer women in editorial* or advisory board positions. Women had half the mean number of publications than men, yet they served journals with the approximately same mean impact factor. Regression did not reveal gender as a significant correlate of the impact factor of journals.

Women represented approximately 30% individually and collectively across all four categories of the editorial board of psychiatry journals. Since our data comprised 68% ($n = 81$) of US and UK journals, it is interesting to compare the results. Studies have reported 42% women representation in academic psychiatry, but their numbers declined in subsequent hierarchical ranks. In the US, women represented 49% as assistant professors, 36% as associate professors, and 25% as full professors [7]. In the UK, similar statistics emerge for the percentage of women in senior academic positions in psychiatry: in 2017 women comprised 45.0% as junior and 29.9% as senior clinical lecturers, 37.4% as researchers and 24% as clinical professors [25]. Since selection to editorial board positions is mostly based on higher academic ranks and scholarly productivity, the gender the disparity observed in the field of psychiatry including academia and research may explain the disparity in the editorial board as comparable.

While some women may not have published as many articles as men because of family commitments [26] and an increased focus on teaching and clinical positions [8], they can still provide other skills and perspectives to the editorial positions. A more inclusive editorial board might attract broader diversity in research topics and perspectives, contributors, and methods [27].

Women in editorial leadership positions correlated with fewer women on editorial and advisory boards. Due to the cross-sectional nature of our study, we were not able to ascertain the career stage or the tenure of members on the editorial board. It is possible that these women leaders inherited male-dominant boards, or they are earlier in their careers than men on editorial boards. Although no inferences can
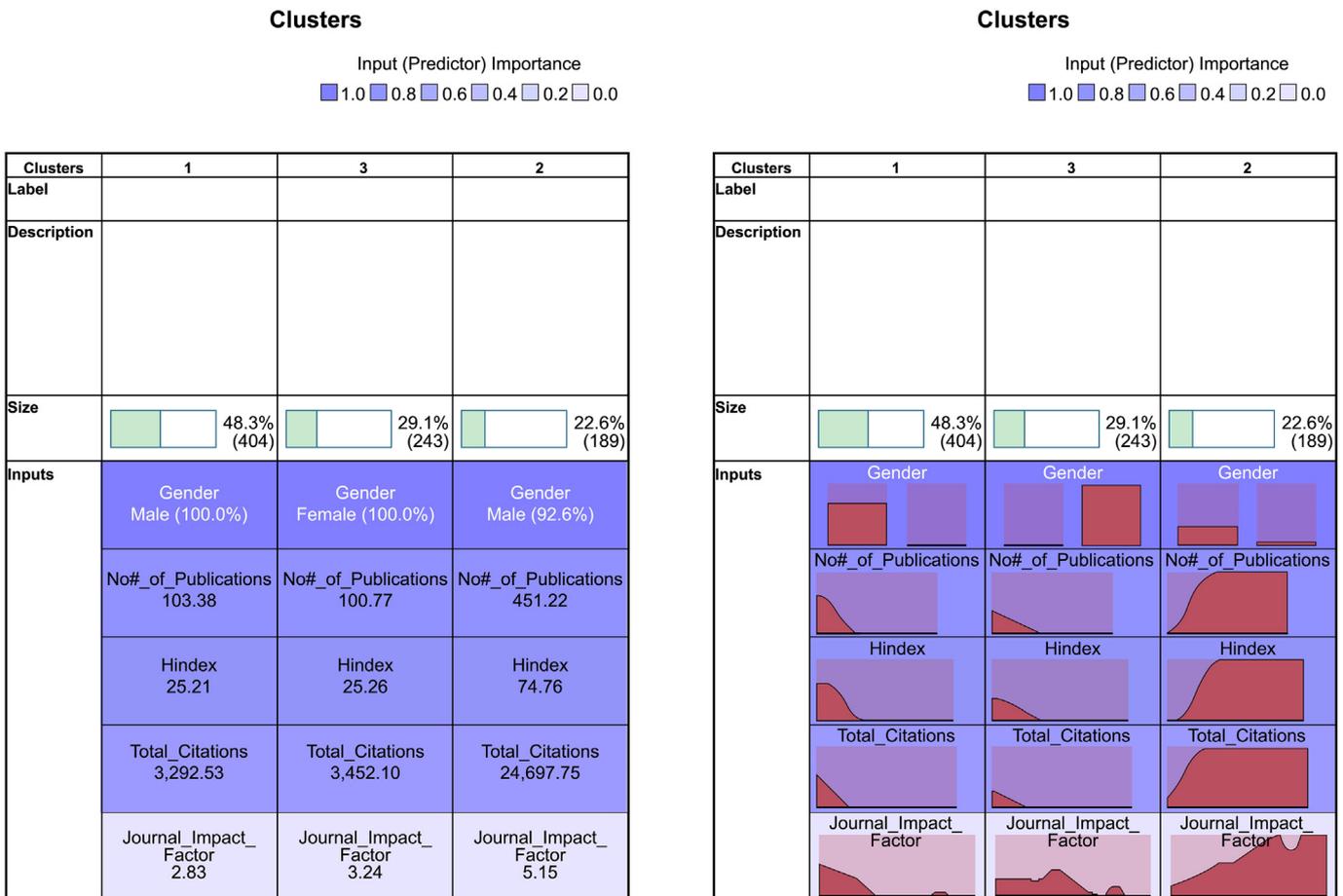

Fig. 4. Cluster analysis of journal editors based on their gender and research productivity. Average silhouette value = 0.7. This analysis revealed three clusters. The first cluster of *men with low research productivity* had mean number of publications (103.38), H-index (25.21), mean number of citations (3292) and journal impact factor (2.83). The second cluster of *women with slightly higher research productivity* had mean number of publications (107.7), H-index (25.26), mean number of citations (3452), however, they served journals with higher impact factors (3.24). The last cluster *editors with high research productivity* comprised of 92.6% men, with mean number of publications (451.22), H-index (74.76), mean number of citations (24,697.75) and mean journal impact factors of 5.15. This figure details the absolute and relative distribution of different variables in the cluster.

be made, it raises questions and highlights the importance of further studies, perhaps longitudinal, to explore the nature and trends of women representation and selection in psychiatry journals' editorial boards.

In an effort to bring gender parity, the importance of women leader role models and mentors cannot be understated [11,28]. Young women should have access to women mentors in leadership positions, those who can lead, encourage, inspire, and support them in regards to career advancement. Such women role models are also critical for guiding young women through unique challenges of balancing career and family commitments. It has been reported, "female protégées with female mentors were more likely to agree with the idea that their mentors served a role modeling function" [29]. It is also argued that with access to mentors, role models, and networks to information and support, women's chances of promotion increases [30].

In our study, we found that most male editors/members (65%) were MD psychiatrists, while a majority of females were psychologists with Ph.D. (58%). Women represented 21% and 41% among psychiatrists and psychologists, respectively. In both the US and the UK, countries that represented 68% of the journals in our data, the women psychiatrist to psychologist ratio was 1:4 [6,31–33]. This may suggest that the increased number of psychologists on the editorial board is simply due to 4 times as many women in the field of psychology than psychiatry. Furthermore, women in the editorial board published half the mean number of publications than men, but they are serving journals with approximately the same mean impact factor. It can be deduced that high impact factor journals selected productive researchers from among each gender in their editorial team and there seem to be some proactive measures in place, to improve gender parity, to select women despite being half as productive as men.

The present analysis revealed that the impact factor of a journal was mainly associated with the research productivity of its editors and not their gender. Our cluster analysis classified editors/members into three groups: a) men with low research productivity, b) women with slightly higher research productivity, and c) editors/members with the highest research productivity. Although the former two groups had comparable research productivity, higher impact factor journals seemed to favor the female gender. The group of editors/members with the highest research productivity comprised predominantly of men and around 8% women with double the research output of the former groups. This is an important finding revealing trends in the editor hiring process, taking the bigger picture, i.e. gender, profession, degrees, and research productivity indices into account. Albeit, this finding is rooted in comprehensive analyses, yet it should be generalized with caution keeping the limited ability of cross-sectional designs to establish inferences related to causality and temporality. We emphasize that, besides disparity in numbers, gender bias does not exist at the level of journals. And the gender disparity perhaps exists at the level of academic productivity as noted in previous investigations [34,35].

In conclusion, our study illustrates that besides gender disparity, gender bias does not exist at the level of journals with the following evidence: 1) the gender disparity in editorial boards is comparable to existing disparity in upper ranks of academic psychiatry and research, 2) women despite publishing half as many papers as men, served journals with approximately the same mean impact factor, and 3) impact factor of a journal was mainly associated with research productivity of its editors/members and not their gender. Moreover, women editors in leadership positions correlated with fewer women on the editorial and advisory boards, prompting further studies to explore trends in women representation and selection in psychiatry journals' editorial boards. Further efforts should be made to eliminate the barriers to women pursuing research and occupying upper ranked positions. Increased research productivity and female leader role models and mentors would help more women rise to higher academic ranks and editorial board positions, narrowing the gap in parity.

4.1. Implication for professional practice

Given the implication of editorial board position on journals on science, academic advancement, and networking, we believe gender disparity, even if it were proportional to upper ranks in academic psychiatry, should be eliminated to have each gender represent half the editorial board. Based on our findings, we recommend following approaches to tackle this gender disparity:

a) Journals should define policies for inclusion of a diverse editorial board. These policies should be merit based and highlighted while appointing editorial board members. Credentials of editors should be highlighted on the introductory pages of journals. This would tackle the misconception that journals are biased toward appointing male editors.

b) For early career female psychiatrists, workshops and seminars should be conducted to encourage them to join editorial boards of journals. The prestige and sense of accomplishment and the camaraderie associated with being part of an editorial board should be highlighted.

c) Encouragement for females should begin in their early careers; with guiding mechanisms in place to ensure their inclusion in research, practice and editorial tasks. Institutions should set aside resources and incentivized research spots for female psychiatrists, to ensure their inclusion in the research landscape.

4.2. Limitations

Our study has several limitations. Firstly, we began with 142 journals from JCR and only accepted journals in English and those that had a list of editorial team members on their websites. Secondly, we used a binary classification of gender to assign, through inspection and Internet searches, to the first name. Thus, those that didn't belong to this binary classification, e.g., transgender, a gender or others, may have been wrongly classified as male or female. Thirdly, there were repetitions of editors in our data, who were on the editorial team of multiple journals. This may have caused skewed results; however, because of the large sample size and only four repetitions (in Phase 2 data), it is unlikely to have significant influence. Fourthly, the data was gathered over four months in mid-2018, which gives a snapshot of that time. From the start of data collection, even between data gathering, to the publication of this manuscript, the online editorial board information could have changed at any time. The cross-sectional design of this study limits inferences related to temporality and causality, so it should be interpreted with caution. Fifth, because the data was gathered manually for each editorial board member, the potential for human error must be addressed. Finally, the authors did not take into account the heterogeneity in the subspecialty or niche of the journals, proportion of men and women working in different niches, and time (full time/part time/honorary) investment and financial compensation for editorial jobs.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.comppsych.2019.152119.

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