ABSTRACT

Objective We aimed to examine the gender, geographical region and income group of the country of affiliation for editorial leadership (eg, editor-in-chief, section editor, associate editor) and advisors (eg, editorial board members) in top-ranked rehabilitation and sports science journals.

Methods A list of Scopus indexed, Q1 (25% top) rehabilitation and sports science journals, available under four different journal categories, was prepared based on the data from the Scientific Journal Rankings (SJR) website. The information for editorial leadership and advisors for these journals was obtained and their gender was determined through a multistep process. The country of affiliation of editorial leadership and advisors was used to categorise them to World Bank’s different geographical regions and income groups (for countries).

Results There were 7248 editors (35.7% leadership and 64.3% advisors) across 113 rehabilitation and sports science journals. Of all editors, 1792 (24.7%) were women. Women represented 24.5% of editorial leadership positions, 24.8% of advisory roles and 10.4% of editors-in-chief. Editors from South Asia (0.5%) and sub-Saharan Africa (0.6%) had the least representation, while those affiliated with institutions from high-income countries represented 93.5% of leadership roles and 93.1% of advisory positions. Moreover, editors affiliated with institutions from North America occupied almost half of all editorial roles.

Conclusions Women and researchers affiliated with institutions from low-income and middle-income countries are under-represented on the editorial boards of top-ranked rehabilitation and sports science journals indexed in the Scopus database. Editors are responsible for promoting research in their specific field, and therefore, the current leadership in rehabilitation and sports science journals should consider diversifying their editorial boards by providing equitable opportunities to women and researchers from a broader geographical distribution.

INTRODUCTION

Peer-reviewed publications are one of the most commonly assessed factors when being considered for promotion within academia. Such promotions may eventually help an individual obtain leadership roles (eg, editor-in-chief, associate editor) in scientific journals. Those in such leadership roles are responsible for disseminating knowledge and promoting scientific development within their field, as well as overseeing the selection of manuscripts, reviewers and future editors. Therefore, editorial roles within academic journals are considered to be prestigious positions demonstrating leadership and influence within the field. Further, the role of an editor or editorial board member also provides an opportunity for professional networking, intellectual growth, career development and mentoring of junior or early-career researchers within their field.

Diversity within editorial leadership roles (eg, institutional, geographic, socioeconomic status, gender and ethnicity) is important in order to promote the development of diverse and balanced perspectives, provide access to a wider pool of peer reviewers, ensure equity and fairness, and encourage submission from researchers of different backgrounds, resulting in publication of the highest quality research. In recent years, diversity in editorial leadership roles has received increased attention, particularly in terms of gender and geography (eg, Global South or low-income and middle-income countries). For instance, journals and publishers are now increasingly monitoring and reporting their diversity initiatives. Despite such efforts, women and researchers from Global South (a term commonly used to refer to low-income and middle-income countries from Africa, Asia and South America) are under-represented in the editorial leadership roles of journals from different fields. For example, women accounted for only 18% of the total editorial board positions (0% as editors-in-chief) in 14 selected sports science journals, but a separate analysis by the authors revealed that there were 12% of female editors-in-chief in 83 sports science journals covered by the Journal Citation Reports. Further, there were 20% (11%) as editors-in-chief female editors in international general surgery journals, 21% (12%) as editors-in-chief in neurology journals, 27% (19%) as editors-in-chief in dermatology journals, 30% in psychiatry journals, 35% (27%) as editors-in-chief in global health journals and 42% (41%) as editors-in-chief in women’s health journals.
In addition, studies have reported the under-representation of women as authors, reviewers, editorial board members and editors-in-chief in leading medical journals. Particularly in sports science, studies have shown under-representation of women as authors, conference speakers, research participants and in leadership positions, which reflects a wide gender disparity within the field.

The statistics describing the diversity of editorial positions according to geographical region and individual country economy are even more striking. For example, two separate studies found that 68% of the editors in global health journals were from high-income countries, especially North America, Europe and Central Asia. Only 33% of editors were based in lower-middle-income countries, with only one editor-in-chief from a lower-middle-income country. Further, less than 5% of editors were from low-income countries (0% editors-in-chief), with 11% of female editors from lower-middle-income countries.

In many research fields, there is an over-representation of men, majority ethnic groups and scientists from high-income countries as editors, peer reviewers and lead authors. Only few studies have analysed geographical diversity. Therefore, studies examining both the gender distribution and the geographical diversity of journal editors (leadership and advisors) are warranted.

Leadership roles are important for professional networking and career advancement, but women are often under-represented in such positions in the sports science field. While conducting this research, Martínez-Rosales et al published research examining the gender of the editorial leadership of selected sports science journals. As part of their project, it was recommended that large-scale analyses should be conducted in the future.

Diversity is a broad concept beyond gender alone, thus it is important to determine the geographical region and country’s income alongside the gender of editors of rehabilitation and sports science journals. To the best of our knowledge, no study has explored both the gender distribution and the geographical diversity of editors in rehabilitation and sports science journals. The reason behind examining both rehabilitation and sports science journals was that these journals have a significant overlap in their scope and publish similar content. In addition, rehabilitation and sports science journals are listed in the same category (eg, Physical Therapy, Sports Therapy and Rehabilitation) in the Scopus database. Therefore, the aim of this study was to examine the gender, geographical region and income group of country of affiliation for editorial leadership and advisors in a large sample of top-ranked rehabilitation and sports science journals. The findings of this study will assist stakeholders in understanding the present diversity across top-ranked rehabilitation and sports science journals and will inform strategies to improve equity and opportunity for women editors from low-income and middle-income countries.

METHODS

This cross-sectional study included the journals listed in the top quartile (Q1; the 25% of journals with the highest values) in the Scientific Journal Rankings (SJR; Scimago, 2020) under the subject category of ‘Sports Science’, ‘Physical Therapy, Sports Therapy and Rehabilitation’, ‘Rehabilitation’ and ‘Orthopaedics and Sports Medicine’. The Sports Science category consisted of 125 journals, with 31 journals listed as the top 25% journals (Q1). The Physical Therapy, Sports Therapy and Rehabilitation category consisted of 210 journals, with 51 journals listed in Q1. The Rehabilitation category consisted of 130 journals, with 31 journals listed in Q1, and the Orthopaedics and Sports Medicine category consisted of 288 journals, with 69 journals listed in Q1. The final list of journals was compiled by combining the journals from all four subject categories and removing the duplicates. In total, 121 journals were eligible for inclusion. Two journals (BMC Obesity and Joints) were excluded from the analysis as they were no longer in publication, while an additional five journals (Journal of Physiology, European Journal of Applied Physiology, Human Reproduction, Psychiatric Rehabilitation Journal and Neuropsychological Rehabilitation) were also excluded as they were not specific to sports science or rehabilitation. One journal (Clinics in Sports Medicine) only included information for the consulting editor and was also excluded. Therefore, 113 journals progressed to data extraction. The SJR was used as it covers all journals indexed in the Scopus database, which has a wider coverage as compared with the Web of Science database.

Data collection and extraction

The data extraction was performed independently by two pairs of authors (KA and IS and NA and IA) by reviewing the website of each journal. The role of editor was defined as (1) editorial leadership, which included editors-in-chief (ie, editors-in-chief, deputy editors-in-chief, co-editors-in-chief, assistant editors-in-chief), editors (ie, editors, deputy editors, senior editors), section editors (ie, section editors, special projects editors, specialty editors, special feature editors, reviewing editors/review editors, book review editors, statistical editors/consultants/advisors, ethics editors, commentary editors), associate editors (ie, associate editors, senior associate editors, junior associate editors) and assistant editors (ie, assistant editors, trainee assistant editors); and (2) editorial advisors, which included editorial board members, editorial board fellows, board members, editorial advisory board, journal advisors, advisory board (international/national), editorial board (international/national) and advisory editors. The contributing reviewers, social media editors, emeriti editors (emeriti editors-in-chief, emeriti editors, emeriti associate editors, emeriti section editors, emeriti assistant editors, emeriti editorial board members), podcast editors, managing editors, consulting editors, founding editors/chairs/directors, former/past editors, crosstalk editors, PEDro editors, digital editors, content officers, editorial assistants/coordinators and production editors were excluded from the analysis. For clarity, ‘editorial board members’ will be used for both the editorial leadership and the editorial advisors throughout this paper, unless otherwise specified.

We obtained data for gender (a sociocultural construct that categorises individuals on the basis of socially constructed masculine vs feminine differences) of the editorial board members. The gender of all editorial board members was determined by inspection of names of the authors followed by a search for information on the internet (eg, university web pages, ResearchGate, Google scholar, Twitter), including a combination of photographs and biographic details/profiles that used gender-specific terminology and pronouns (eg, he, she, him, her, male, female, man, woman). In addition, the country of affiliation of the editorial board member was determined by the information on the journal’s web page. The information extracted for gender was verified through the Genderize API and further checked through NameAPI.
One author of this paper (ARM) contacted the editor-in-chief or editor of each journal to check and confirm that the information extracted from the journal’s web page was accurate and up-to-date. The information provided by the editor-in-chief was considered valid and any outdated information on the web page of the journal was updated based on the feedback from the editor-in-chief. In cases where the editor-in-chief did not respond to the email, we relied on the information we extracted from the journals website. However, we could not verify the gender of 21 editors through any of the aforementioned approaches and they were, therefore, excluded from the final analysis. The details for geographical region and income group of the country of affiliation of the editorial board members were obtained from the World Bank Country and Lending Groups.

The information on country of origin of journals, SJR value (2020), h-index, current publisher, associated society or university or organisation, and journal’s publishing model was retrieved from the SJR’s website and verified from each journal’s information page. Journal impact factor (JIF) was determined from the Journal Citation Reports (2020). All data retrieved for the current study were completed between March and May 2020, and then updated between April and July 2021.

Journals were grouped into three categories: (1) sports (journals that are specifically related to sports science or sports medicine); (2) rehabilitation (journals that are specifically related to physiotherapy or physical rehabilitation sciences); and (3) sport-rehabilitation/combined (journals that cover both the sports science, sports medicine and rehabilitation sciences). With no mechanism to assess non-binary gender, gender was considered as binary in nature (male/man, female/woman) for the purposes of this study. The WHO income groups were (1) low income, (2) lower middle income, (3) upper middle income and (4) high income. The geographical regions specified by the World Bank were (1) East Asia and Pacific, (2) Europe and Central Asia, (3) Latin America and the Caribbean, (4) Middle East and North Africa, (5) North America, (6) South Asia and (7) sub-Saharan Africa.

Statistical analysis

Data were compiled in Microsoft Excel and analysed in SPSS V.26 (IBM). Means and SD were calculated for journal-based metrics (ie, JIF and SJR), and counts and percentages were reported for all other variables (eg, gender, editorial role, country, publisher). Gender distribution and editorial roles across different geographical regions and income groups (overall and by journal categories) were analysed using cross-tabulations or clustered bar charts, stratified for journal categories (ie, sports, rehabilitation and combined). Association between JIF and gender of the editors was determined through Pearson’s correlation coefficient. In addition, we used independent sample t-tests to determine whether the JIF differed between the male and female editors, with p<0.05 considered as statistically significant. The world map for overall percentage of editors and gender-based distribution of editors across the countries was prepared in the StatPlanet program (StatSilk, Australia)—an open-source, interactive mapping and visualisation software.

Ethical consideration

Because the information used herein was publicly available, an ethical review was not required for this study.

RESULTS

The majority of journals included in this study (78.8%) were subscription-based and had a publisher located in the USA or the UK (77.2%). The top three publishers were Elsevier BV (23%), Taylor & Francis (15.9%) and Springer Nature (15%) (online supplemental table S1). The mean SJR value for the journals included in this study was 1.4±0.7 (range 0.7–5.0) and impact factor was 4.2±2.5 (range 1.9–20.6) (online supplemental table S2). The 113 rehabilitation and sports science journals in Q1 (top 25%) of the Scopus database had a total of 7248 editors (35.7% editorial leadership and 64.3% editorial advisors). Based on the journals scope, 34.7% of the editors were from sports science journals, 59.9% from rehabilitation science journals and 5.4% from combined journals (those with an overlapping focus on rehabilitation and sports science). Overall, editorial leadership consisted of 2% editors-in-chief, 5.3% editors, 22.1% associate editors, 6% section editors and less than 1% assistant editors.

In terms of gender distribution, editorial leadership consisted of 24.7% female and 75.3% male editors (table 1). The geographical distribution for the editors’ country of affiliation demonstrated that 46.6% of editors were from North America and 34.1% from Europe and Central Asia, with only 0.6% from sub-Saharan Africa and 0.5% from South Asia. The country of affiliation was considered high income for 93.3% of editorial leadership, upper middle income for 6%, lower middle income for 0.8% and low income for less than 1% (n=1) (table 1). By geographical region, 5.6% of editors-in-chief from North America were women, followed by 11.1% from Europe and Central Asia, 26.7% from East Asia and Pacific and 33.3% from Latin America and the Caribbean. With a few exceptions, female editors held less than 30% of different leadership roles across all geographical regions (online supplemental table S3). The 10 countries with the most editors for rehabilitation and sports science journals were USA (41.8%), UK (11%), Australia (7.1%), Canada (4.9%), Germany (3.9%), Italy (3.3%), Switzerland (2.2%), Netherlands (2%), Sweden (1.9%) and China (1.9%) (online supplemental table S4).

Figure 1A–C shows the distributions of editors across different countries; the detailed list of countries with information on gender, geographical distribution and country’s income group is presented in online supplemental tables 3 and 4. The list of journals in each category and the gender and geographical distribution of editors is presented in online supplemental table S5. Journals with predominantly female editors had significantly higher JIF compared with journals with predominantly male editors (4.4±2.9 vs 4.1±2.4, p<0.001). Moreover, there was a positive association (r=0.053, p<0.001) between the percentage of women with editorial roles and the JIF. Editorial leadership roles were held by 24.5% female and 75.5% male editors, with a similar distribution to editorial board members (24.8% female and 75.2% male). By journal category, there were 28.9% female editors (both editorial leadership and advisors) in sports science journals, 23.1% in rehabilitation journals and 15.9% in combined journals. Editorial leadership roles were occupied by women in 28.8% of positions in sports science journals, 21.3% in rehabilitation journals and 31.7% in combined journals. The proportion of female editorial advisors in sports science journals was 28.9%, 24.1% in rehabilitation journals and 12.9% in combined journals (table 2).
the editorial roles, there were, overall, 10.4% female editors-in-chief, 15.5% editors, 27.5% section editors, 27.2% associate editors, 16.7% assistant editors and 24.8% editorial advisors. Across the journal categories, there were only 14.0% female editors-in-chief and 34.7% editors in sports science journals, 7.4% and 12.3% in rehabilitation science, and 16.7% and 23.3% in combined journals, respectively (table 2). The proportion of female editors across the geographical regions ranged from 2.7% (South Asia) to 37.8% (sub-Saharan Africa). By journal category, this ranged from 0% female editors (South Asia) to 45.8% (sub-Saharan Africa) in sports science journals, 3% (South Asia) to 45.8% (Latin America and the Caribbean) in rehabilitation science, and 0% (South Asia) to 50% (sub-Saharan Africa) in combined journals (figure 2A–D). In addition, based on the income group for country of affiliation, the proportion of female editors ranged from 2.7% (low income) to 25% (high income) (figure 2A–D).

Overall, 46.6% of the editors (43.5% in sports, 50% in rehabilitation and 29.3% in combined journals) were affiliated with an institution from North America and 34.1% (36.9% in sports, 31.2% in rehabilitation and 49.6% in combined journals) from Europe and Central Asia. Furthermore, 50.5% of the roles in editorial leadership and 44.5% of the advisory roles were occupied by editors affiliated with institutions from North America, followed by 30.9% of the editorial leaders and 35.9% of the editorial advisors from Europe and Central Asia. Across the journal categories, 43.5% of editors (46.6% leadership and 41.4% advisors) in sports science journals were from North America and 36.9% of editors (34.6% leadership and 38.4% advisors) from Europe and Central Asia, 50% of editors (53% leadership and 48.8% advisors) in rehabilitation journals were from North America and 31.2% (28.2% leadership and 32.7% advisors) from Europe and Central Asia and 49.6% of editors (33.3% leadership and 52.8% advisors) in combined journals were from Europe and Central Asia (figure 4A–D). Editors from South Asia and sub-Saharan Africa had the lowest overall representation. In total, 50% of editors-in-chief (49.1% in sports, 50.6% in rehabilitation and 50% in combined journals) and 45% of editors (25.5% in rehabilitation and 69.2% in combined journals) were from North America, whereas 37.5% of editors-in-chief (31.6% in sports, 40.7% in rehabilitation and 50% in combined journals) and 27.9% of editors (44.9% in sports, 25.5% in rehabilitation and 23.1% in combined journals) were from Europe and Central Asia. There were no editors-in-chief from Middle East and North Africa, sub-Saharan Africa and South Asia (figure 5A–D).

Overall, leadership roles were held by 93.5% of editors (95.1% in sports, 92.4% in rehabilitation and 93.7% in combined journals) and 93.1% of editorial advisors (95.1% in sports, 91.9% in rehabilitation and 89% in combined journals) from high-income countries (figure 6A–D). Specifically, 93.8% of editors-in-chief (89.5% in sports, 96.3% in rehabilitation and 100% in combined journals) and 92.5% of editors (95.9% in sports, 91.7% in rehabilitation and 100% in combined journals) were from high-income countries. No editors-in-chief were from low-income or lower-middle income countries and only 8 (2.1%) of editors were from lower-middle income countries (figure 7A–D).

**DISCUSSION**

This study examined the gender, geographical distribution and national income of the members of editorial boards of top-ranked (Q1) rehabilitation and sports science journals indexed in the Scopus database. In 113 rehabilitation and sports science journals, only ~25% of the editors were female, only ~7% of editors were from low-income and middle-income countries, and ~5% of editors were from Middle East and North Africa, Latin America and Caribbean, South Asia and sub-Saharan Africa. Only ~10% of female editors were editors-in-chief, with no editors-in-chief from low-income and lower-middle income countries, particularly countries from the Middle East and North Africa, South Asia and sub-Saharan Africa. In addition, there was a weak but significant association between the percentage of women with editorial roles and the JIF.

It is not surprising, but remains disappointing, that female editors (sports or rehabilitation or both) constituted only one-fourth of the editorial leadership and advisors, with only one-tenth of female editors serving as editors-in-chief. The under-representation of female editors has previously been observed on editorial boards of different specialties. Further, studies show that women have disproportionately low rates of contribution in the development of clinical guidelines, limited presence on steering or executive committees of clinical trials, limited presence in high ranking positions (eg, medical school professors,
Figure 1  
Further, it is known that women experience a lack of solicitations from editors to publish, bias in being displayed as a first or senior author when citing their work, and lower financial compensation in academia compared with men. Particularly in sports science, studies have shown an under-representation of women as authors (e.g., lead, senior) and in leadership positions, which reflects a wider gender disparity within the field. As observed in the current study, the under-representation of women in academia has also been observed in high-income countries, particularly those presumed to be more diverse and inclusive. There are many factors that may contribute to the advancement of scientific careers for women, including family opportunities (work-life balance), biases in hiring, tenure, promotion, scholarly recognition, sociocultural stereotypes, and lack of mentoring and role models. In addition, several underlying mechanisms for the lack of women in leadership roles have been presented in previous studies. These mechanisms include (1) demographic inertia (sports science is traditionally a predominantly male field); (2) the pipeline theory (a proportion of women are lost at each stage of their professional career, leaving very few women at the end of the pipeline); (3) the Matilda effect (unequal opportunities and recognition given to the same level skillset or merit); and (4) the glass ceiling effect (an invisible barrier that prevents women and minorities from achieving leadership positions).

The present study demonstrated that approximately 50% of roles in editorial leadership (including editors-in-chief) and advisors were occupied by researchers affiliated with institutions...
from North America, with few editors from other regions of the world, particularly South Asia and sub-Saharan Africa. Strikingly, no editors-in-chief were affiliated with institutions from the Middle East and North Africa, sub-Saharan Africa and South Asia. This trend was also observed for national income, with no editors-in-chief affiliated with institutions from low-income or lower-middle income countries. These findings are supported by two previous studies which examined the geographical distribution of editors in global health journals, and reported this disparity as occurring due to ‘colonial structures and power dynamics’. In addition, two studies from the radiology field also found that editorial roles are dominated by researchers from high-income countries, such as those in North America, Europe and Australia. Mohammadi et al observed an under-representation of editors from low-income and middle-income countries on the editorial boards of 37 international public health journals, with no editors-in-chief from low-income countries. Further, evidence shows that experts from high-income countries are valued more than researchers from low-income and middle-income countries, that most funding is spent in high-income countries, and that experts from high-income countries are over-represented on the advisory boards of major funding agencies. In addition, there is under-representation of authors from low-income and middle-income countries on research publications about low-income and middle-income countries (ie, parachute research), whereas authors from high-income countries, particularly male authors, have more publications in this area and are often cited more than the authors from low-income and middle-income countries. Furthermore, journals are biased toward institutions based in the USA with
a lower representation of minority scholars on editorial boards of journals.\textsuperscript{3} 59–61

Recently, there has been an increased focus on diversity and equitable opportunity for minority groups by journals and publishers.\textsuperscript{5} Examples of such include the PLoS Community Action Publishing Programme (a programme to reduce economic hurdles to publication and access to the published literature for authors from low-income and middle-income countries),\textsuperscript{8} the Athena Swan Programme in the UK (incentivises institutions to promote the advancement of women in science),\textsuperscript{62} #Lancet-Women (a theme issue on advancing women in science, medicine and global health)\textsuperscript{9} and Research4Life (facilitating training, access and dissemination of researchers from low-income and middle-income countries).\textsuperscript{8} 57 However, whether these programmes achieve the desired outcome is unclear and a matter for further investigation.\textsuperscript{57} Additionally, publishers are ensuring the diversity statistics of the journals’ authorship, editorship and readership are being published. One such example is a recent decision by Elsevier Publishers in 2021 to publicly report the country and gender of their editors, authors and journal visitors on the journal’s website (online supplemental figure S1). Recently, BMJ Open Sport and Exercise Medicine initiated a diversity and inclusivity programme to support authors from low-income backgrounds, and the British Journal of Sports Medicine initiated a Global Mentoring Programme.\textsuperscript{63} 64 Recent investigations have also shown that researchers from low-income and middle-income countries have limited training, infrastructure and research networks\textsuperscript{55} 57; thus, it would be important that these researchers are supported in order to achieve equity in science.

Researchers from low-income and middle-income countries and other marginalised groups may be supported in different...
ways. For instance, it is important that while considering diversity and inclusivity, two individuals from differing backgrounds are provided ‘equitable’ rather than the equal opportunities—the distinction of equitable and equal is important because of the power differential. The provision of equitable opportunities ensures that individuals from low-income and middle-income countries with a reasonable level of knowledge of the field should be given an opportunity to have a leadership role (ie, as student or junior editors) in a journal. However, provision of such roles to these individuals is not sufficient; the main focus should rather be capacity-building of these individuals so that they may later move to senior positions in the hierarchy of editorial leadership. Given the limited research training and facilities available, these researchers might not be many in number, but it may be possible that some may eventually get an opportunity to serve on the boards of top-ranked journals. Some journals (eg, *Journal of Physical Activity and Health*, *BMJ Open Sport and Exercise Medicine*) have added researchers from low-income and middle-income countries to their editorial board in order to improve diversity. However, one major driving factor for it may be the presence of editors from a similar geographical region or having networks (ie, students, coauthors) from that region. Another important issue is that while there are open calls for some prestigious positions such as the editor-in-chief, individuals for other roles in a journal may be chosen by the editor-in-chief. Thus, it is important that there should be more than one editor (eg, co-editor-in-chief or co-editor) in a journal—a way to provide opportunities for women

Figure 6 (A) Overall distribution of editors (leadership and advisors) across income group of countries (2021). (B) Distribution of editors (leadership and advisors) in combined journals across income group of countries (2021). (C) Distribution of editors (leadership and advisors) in rehabilitation journals across income group of countries (2021). (D) Distribution of editors (leadership and advisors) in sports science journals across income group of countries (2021).

Figure 7 (A) Overall distribution of editors with different roles across income group of countries (2021). (B) Distribution of editors with different roles in combined journals across income group of countries (2021). (C) Distribution of editors with different roles in rehabilitation journals across income group of countries (2021). (D) Distribution of editors with different roles in sports science journals across income group of countries (2021).
and editors from low-income and middle-income countries to hold leadership positions.

One more reason that may relate to the acquisition of editorial positions in a journal is the presence of research networks and co-authorship, particularly with famous researchers in the field. That is, if someone has worked with a group of famous researchers, then the individual is perceived to have a good reputation compared with one who has not (what is commonly referred to as the ‘halo effect’). As such, editorial roles in journals are extremely competitive positions where the credentials of the applicant (curriculum vitae, especially publication profile) are essential, but collaboration with authors from Western, high-income countries also plays an important role. For instance, a researcher with limited social media (eg, Twitter) reach or research networks would not know about some opportunities being advertised, or may be a less preferable option than a candidate from the networks of existing editorial board members, despite having a relatively similar set of credentials. Therefore, establishing research networks is also essential in gaining the recognition of individuals in leadership roles. Apart from this, there may be implicit biases impacting the selection of future editors for a journal—an editor thinks that the journal has to focus on a specific set of topics, specific geographical region, or employ individuals with a specific set of skills or achievements (eg, English as their first language, higher education (eg, PhD) from Western or high-income countries, publications in journals with high impact factors). Moreover, capacity-building should be addressed by offering researchers from low-income and middle-income countries (and other marginalised groups) training and mentorship and opportunities to be involved in collaborative research, which will help to improve skills and networking. Apart from these factors, publication profile itself is important in ensuring recognition within the field. However, individuals from low-income and middle-income countries (and other marginalised groups) may face barriers in developing their publication profile either due to a limited knowledge or due to the lack of funds to conduct or publish research. Evidence also shows that most research funding is spent in high-income countries. Therefore, it is important that the funding is directed to research in low-income and middle-income countries, both to support local researchers and to address research questions and health issues most relevant to the local population. Furthermore, while waivers for article processing charges are offered by many journals and publishers, researchers from low-income and middle-income countries may still not be able to publish in journals. For instance, a researcher from Pakistan, even after receiving a 50% fee waiver, will not be able to afford (out-of-pocket) the publication charges for an open-access article. Therefore, such authors should be encouraged (eg, by offering a complete waiver in the case of non-funded research) to be able to publish their research particularly if the quality and methodology of the research is robust. Moreover, these researchers often come from countries where English is a second language, so they should be offered support with grammar and language, which may come either from the editors, colleagues who are proficient English speakers, or specially dedicated organisations (eg, AuthorAID in the Eastern Mediterranean). Finally, researchers from low-income and middle-income countries should also be offered scholarship opportunities (eg, Masters or Doctoral) through an equitable approach. That is, their application should by no means be considered equally to that of candidates from high-income countries. It is suggested that such approaches and steps may prove useful in narrowing the gap in diversity and inclusivity for leadership roles in rehabilitation and sports science.

While the engagement in editorial roles demonstrates leadership and advancement in academic career, it also comes with the power to select specific papers for publication, reviewers and editors. In addition, editors have the power to select future editors or restructure the current editorial board. Therefore, under-representation of women and other minority groups (eg, persons of colour, Global South, low-income and middle-income countries) in leadership positions may eventually lead to the continuation of white, male and US dominance in research. Therefore, lack of diversity and inclusivity on editorial boards may potentially continue for years, further perpetuating the power imbalances in the field. In order to have a diverse and balanced share in contribution to science, there should be an equal representation of women, Global South, and low-income and middle-income countries (and other elements of diversity not covered in this paper). Doing so will not only extend and diversify the reviewer pool and authorship of the journal, but also lead to a wider range of topics being investigated, broaden the perspectives and improve the quality of the journal overall. This will also help researchers from minority groups to have their voices heard and ensure recognition for the work they perform with limited resources, which will eventually improve ‘equity’—a critical component for improving diversity and inclusivity.

Limitations

This study has a few limitations. First, the gender of the editors was dichotomised (ie, male/female), which may have been problematic. For instance, even after using several methods for determining the gender of editorial board members, we were unable to determine the gender of 21 editors. This is particularly relevant when names are unisex (eg, Ashwini, Misbah, Phoenix, Xiang). We also recognise that the binary gender classification used for the purposes of this study may not account for the proportion of editors that identify as non-binary. Second, it was assumed that individuals in editorial leadership are responsible for decision-making (eg, manuscript rejection/acceptance), whereas as editorial advisors are involved as reviewers, and invited or solicited authors. However, this might not be accurate for all journals (ie, some editorial advisors may be involved in making decisions for manuscript rejection/acceptance). Third, the information for the country of affiliation was extracted to determine geographical region and national income, but not their country of origin. For example, an editor originating from the Middle East might be working in North America and was classified as North American. Fourth, while we contacted 112 editors-in-chief, only 38.4% provided the required information, 10.7% replied to the email but did not provide the required information and 50.9% did not respond to our email. Moreover, a few editors reported in-house changes which were not updated on the website of the journal. Finally, this study covered only Q1 journals indexed in the Scopus database, thus the findings may not be generalisable to all rehabilitation and sports science journals. Nevertheless, this study covered a large number of rehabilitation and sports science journals, followed a multistep robust methodology, and focused on the geographical distribution of editors in addition to their gender, providing more insights to diversity and inclusivity in general. While this may be challenging, we recommend future studies examine the editorial roles for all rehabilitation and sports science journals indexed in Scopus or other databases (eg, Web of Sciences) and cover other aspects of diversity and inclusivity (eg, race, ethnicity, age, stage of career, educational level).
CONCLUSIONS
Lower representation of female editors and researchers affiliated with institutions from the Global South and low-income and middle-income countries in particular suggests that journal editors and researchers from high-income countries should consider providing equitable opportunities to under-represented, marginalised and minority scholars, as their inclusion will help journals to publish more broadly. Although several steps have been taken recently by various stakeholders to promote diversity and inclusivity in scientific publishing, the findings from the current study suggest that more work is needed towards diversity and inclusivity in the fields of sports science and rehabilitation. Expanding the diversity of editorial leadership and advisors across rehabilitation and sports science journals through more equitable representation of gender, geographical region and income group should be firmly prioritised.

What is already known?
- Female authors and editors are under-represented in sports science, sports medicine and rehabilitation, among other fields.
- Limited research suggests that there are very few editors from low-income and middle-income countries in health-related journals.

What are the new findings?
- Only 24.7% of editors in rehabilitation and sports science journals are women.
- Only 10.4% of editors-in-chief are women, and none of the editors-in-chief of rehabilitation and sports science journals are from low-income countries.
- Editors from low-income and middle-income countries occupy a marginal proportion of the editorial leadership roles in rehabilitation and sports science journals.

Twitter Aamir Raof Memon @DptAamir
Acknowledgements The authors would like to thank the editors-in-chief of journals who responded to our email inquiry and sent words of encouragement.
Contributors ARM contributed to study conceptualisation, data analysis and interpretation, and write-up and revision of the manuscript. IA contributed to data entry, data analysis and interpretation, and revision of the manuscript. NG contributed to data entry and revision of the manuscript. KT contributed to data entry and revision of the manuscript. All authors read the final draft of the manuscript and gave approval for its submission or publication.
Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.
Map disclaimer The inclusion of any map (including the depiction of any boundaries therein), or of any geographic or locational reference, does not imply the expression of any opinion whatsoever on the part of BMJ concerning the legal status of any country, territory, jurisdiction or area or of its authorities. Any such expression remains solely that of the relevant source and is not endorsed by BMJ. Maps are provided without any warranty of any kind, either express or implied.
Competition interests None declared.
Patient consent for publication Not applicable.
Ethics approval This study does not involve human participants.
Provenance and peer review Not commissioned; externally peer reviewed. All data relevant to the study are included in the article or uploaded as supplementary information. Further information is available on reasonable request.
Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation or adaptation and otherwise.

ORCID ID
Aamir Raof Memon http://orcid.org/0000-0002-4033-418X

REFERENCES


11 of 12
Original research


41 Brodieker NA, Casadevall A. Gender inequalities among authors who contributed equally. Elife 2019;8:e36399.


12 of 12