Research article

Composition of the editorial staff of major spinal journals based on geo-economic background: A survey analysis

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A B S T R A C T

Background: The widespread absence of papers originating in low and middle income economies (LAMIE) across various scholarly disciplines has been widely acknowledged. One potential reason for this could be editorial biases against submissions from LAMIE. Although this bias has been observed in different academic areas, its extent in spinal research remains largely uninvestigated. This research endeavored to investigate the composition of editorial staff members (ESM) within major spinal journals and scrutinize the degree of international diversity represented among the ESM.
Methods: We pinpointed ten major spinal journals by referencing their presence in the Journal Citation Reports of 2021. Countries of the ESM affiliated with these journals were categorized according to World Bank classifications. Following this, we conducted a thorough analysis of the ESM compositions.
Results: A total of 982 ESM from 50 countries were identified. The United States exhibited the highest representation among ESM (395, 40.22%), followed by South Korea (57, 5.80%), Switzerland (53, 5.40%). When segmented by geographical regions, North America emerged with the highest representation, constituting 43.38% of ESM at 426, trailed by Europe & Central Asia at 31.16% (306), East Asia & Pacific at 17.92% (175). The majority of ESM, amounting to 87.98%, hailed from high income economies (HIE). There was an absence of ESM representation of low income economies. The relationship regarding the quantity of ESM in each country and its population failed to demonstrate significance ($p = 0.274$, $r = 0.281$). However, a notable positive correlation emerged when exploring the connection between ESM numbers and gross domestic product ($p = 0.033$, $r = 0.517$).
Conclusions: Major spinal journals exhibit a notable absence of international representation within their editorial boards, predominantly comprising members from HIE. This underscores a substantial underrepresentation of ESM originating from LAMIE within the sphere of spinal investigation.

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1. Introduction

Spinal diseases encompass a range of conditions that affect the vertebral column, leading to structural alterations or damage to the spinal cord and surrounding tissues [1,2]. These conditions, which include trauma, degeneration, infection, tumors, and scoliosis, often result in pain and disability, particularly when they exert pressure on the spinal cord or nerves [3,4]. Over the past few decades, significant advancements have occurred in spinal research [1,2,4,5]. The publication of research findings is integral to the progression of both clinical and foundational research, while also providing essential guidance for surgical interventions in the realm of spinal disorders [6–11].

The global output of spinal research has witnessed significant growth [3,12,13], but the contributions of different countries to this field may vary due to disparities in social, economic, and healthcare contexts [3,12]. Economies identified to be low and middle income (LAMIE), representing the majority of the world's populace, disproportionately shoulder the impact of spinal ailments [6]. For example, hospitalization rates due to low back pain in LAMIE range from 13.4% to 18.7%, resulting in substantial societal costs, such as the reported US$ 2.2 billion in annual costs in Brazil, with productivity losses accounting for 79% of the costs [14]. Overall, the clinical and economic impacts of spinal disorders is considerable within LAMIE. Despite these challenges, LAMIE only produce 16.02% of papers in major spinal journals [13]. It is reported that out of 6920 papers published worldwide in major spinal journals from 2009 to 2013, only 1 paper (0.01%) came from low-income economies (LIE), while 1108 papers (16.01%) were from middle-income economies [13].

Unfortunately, scientific publications predominantly emanate from high-income economies (HIE) and often fail to address the realities of LAMIE scenarios [8,15–19]. Health-related issues in LAMIE differ not only in terms of epidemiological characteristics and clinical manifestations but also regarding diagnostic modalities and therapeutic interventions, resulting in a scarcity of applicable information for these contexts [15,20]. The dissemination of data from LAMIE within medical journals is vital to tailor clinical recommendations to these unique settings.

Some studies have reported that scientists from LAMIE face formidable challenges in getting their work published in high-impact medical journals [7,21]. Manuscripts originating from LAMIE institutions frequently undergo more rigorous scrutiny than those from prestigious HIE institutions [22]. Authors from LAMIE often lack opportunities for peer review despite their high-quality studies [22]. A variety of factors including limited financial resources, the absence of outreach programs, inadequate mentorship availability, inadequate training in research methodologies, and a lack of statistical assistance collectively contribute to the relatively low proportion of publications from LAMIE [7,18,19,23–25]. However, the editorial discretion exercised by journals plays a pivotal role in publication success [26]. Numerous studies indicate that editorial bias is a significant factor contributing to the underrepresentation of LAMIE authors [18,19,21,27–32]. Editorial bias encompasses circumstances that influence the decision to accept a manuscript, either due to author-related factors such as their origin or characteristics, or related to their institutional affiliations [33–35]. Factors such as the country or continent of the article's origin, the academic institution responsible for its production, prior publication history with the journal, involvement with prominent corporate entities, or the authors' native language all contribute to the consideration of manuscript acceptance [35].

The composition of an editorial board is frequently used as a measure of the level of international diversity among ESM [18,19,23, 36]. A diverse group of ESM is more likely to provide a broad and balanced range of perspectives [9,17,37]. Research indicates that general medical journals typically exhibit significant underrepresentation of ESM from LAMIE (7.2%), with the majority of editors (92.8%) originating from HIE [23]. Additionally, a survey has shown that researchers from LAMIE believe that biased attitudes from ESM in HIE towards their work may result in the underrepresentation of publications by LAMIE authors [36]. This underrepresentation of ESM from LAMIE has been documented across various medical fields [9,16,17,24,26,38,39]. Such disparities in editorial board composition impede the visibility of studies from LAMIE. ESM may lack expertise regarding the socioeconomic burdens, medication shortages, and scarcity of screening measures and medical equipment experienced by a significant portion of the global populace [35]. Nonetheless, it's uncertain if this trend applies to major spinal journals. Therefore, this research endeavored to fill this research gap by examining the composition of the ESM in major spinal journals and evaluating the extent of global representation among ESM in the realm of spinal research.

Table 1
List of major spinal journals.

Rank	Journal title	Abbreviation	Impact factor
1	*Spine Journal*	SJ	4.297
2	*JOR Spine*	JS	3.757
3	*Journal of Neurosurgery: Spine*	JNS	3.467
4	*Neurospine*	NS	3.374
5	*Spine*	Spi	3.241
6	*European Spine Journal*	ESJ	2.721
7	*Spinal Cord*	SC	2.473
8	*Global Spine Journal*	GSJ	2.230
9	*Journal of Spinal Cord Medicine*	JSCM	2.040
10	*Clinical Spine Surgery*	CSS	1.723

2. Methods

The present study employed a cross-sectional design and did not involve human or animal subjects, rendering Institutional Review Board approval unnecessary. The research methodology aligns with established approaches in similar studies within other fields [9,16, 17,26]. We relied on information listed in the Journal Citation Reports (JCR) of 2021 to identify relevant subspecialty spinal journals. We conducted a comprehensive journal search within the JCR database, employing the keywords "spine" and "spinal." Subspecialty spinal journals possessing impact factors were included. Furthermore, we reviewed journal categories including "Orthopedics," "Surgery," "Clinical Neurology," and "Rehabilitation" in the JCR to identify additional potential journals. Ultimately, we selected ten high-impact journals for inclusion, which comprised the following: *Spine Journal* (SJ), *JOR Spine* (JS), *Journal of Neurosurgery: Spine* (JNS), *Neurospine* (NS), *Spine* (Spi), *European Spine Journal* (ESJ), *Spinal Cord* (SC), *Global Spine Journal* (GSJ), *Journal of Spinal Cord Medicine* (JSCM), and *Clinical Spine Surgery* (CSS) (Table 1).

We accessed the official websites of these selected journals on January 15, 2023. We retrieved and analyzed data on the count of ESM and the countries to which they belong. Geographical and economic data were acquired through the resources of the World Bank's official website, a globally recognized institution providing authoritative information on various countries [40]. Geographical distributions of the ESM were explored and grouped into seven geographic areas according to the World Bank's categorization. These groupings primarily align with administrative regions defined by the World Bank. We used a world map to visually depict the geographical distribution of editors. Countries were further categorized based on their economic statuses, as delineated by the World Bank, into LIE, lower middle income economies (LMIE), upper middle income economies (UMIE), and HIE.

We identified the main countries contributing a minimum of 1% of the editors worldwide to the spinal journals. The number of editors representing per country was normalized based on their population and gross domestic product (GDP), sourced from information available through the World Bank.

The analysis primarily relied on descriptive statistics, encompassing totals and ratios, as the overarching objective of the research was to analyze trends rather than to validate specific hypotheses concerning the significance of ESM across various countries. We conducted correlation analyses to assess the evaluate the association between the quantity of editors and population as well as GDP, utilizing Spearman's test of correlation. Statistical evaluations were conducted utilizing SPSS, version 25.0 (IBM Corp., Armonk, NY, USA). A significance level of $p < 0.05$ was established to determine the significance of all analyses.

3. Results

Altogether, 982 ESM were identified across the ten spinal journals, representing 50 countries. These countries consisted of 33 HIC, 12 UMIE, and 5 LMIE. The geographic distribution of ESM was visually depicted using a world map (Fig. 1). The United States contributed the largest number of ESM (395, 40.22%), followed by South Korea (57, 5.80%), Switzerland (53, 5.40%), Japan (52, 5.30%), the United Kingdom (48, 4.89%), and Italy (48, 4.89%).

Five of the ten journals, including SJ, JS, Spi, JNS, and CSS, are from the United States. Three journals, including SC, GSJ and JSCM, are from England. ESJ is from Germany. NS is from South Korea. The distribution of ESM by region varied across journals (Fig. 2). Regarding SJ, the ESM were from six areas. North America (NA) constituted the major area (83.82%), trailed by Europe & Central Asia
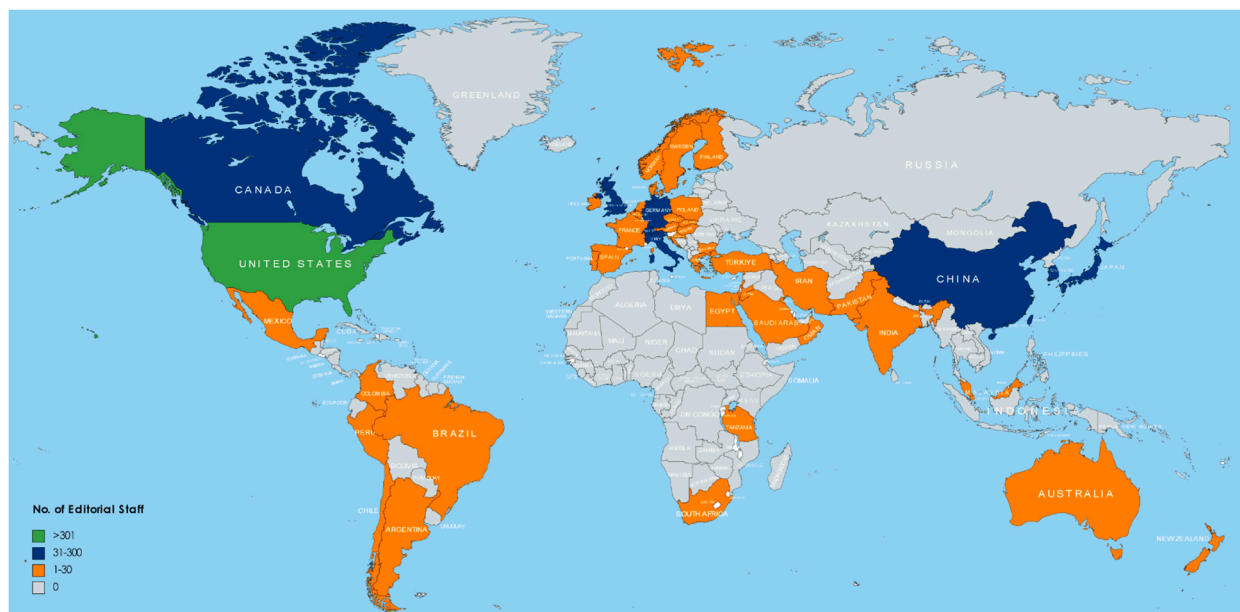

Fig. 1. Geographic distribution of editorial staff members worldwide.

(ECA) (8.09%), East Asia & Pacific (EAP) (4.41%), Middle East & North Africa (MENA) (2.21%), Latin America & Caribbean (LAC) (0.74%), as well as South Asia (SA) (0.74%). Concerning JS, the ESM were from three regions. NA was the major region (43.64%), followed by ECA (32.73%), and EAP (23.64%). About JNS, all the ESM were from NA (100%). Regarding NS, the ESM were from five regions. EAP was the major region (67.65%), followed by NA (19.85%), ECA (9.56%), SA (2.21%), and LAC (0.74%). Regarding Spi, the ESM were from four regions. NA was the major region (75.61%), followed by EAP (10.57%), ECA (9.76%), and LAC (3.25%). Concerning ESJ, the ESM were from seven regions. ECA was the major region (67.74%), followed by NA (13.87%), EAP (9.03%), LAC (4.84%), SA (1.94%), MENA (1.61%), and Sub-Saharan Africa (SSA) (0.97%). About SC, the ESM were from five regions. ECA was the major region (40.91%), followed by NA (31.82%), EAP (22.73%), SA (2.27%), and SSA (2.27%). Regarding GSJ, the ESM were from seven regions. NA was the major region (29.67%), followed by ECA (25.27%), LAC (15.38%), EAP (13.19%), MENA (10.99%), SA (4.40%), and SSA (1.10%). Concerning JSCM, the ESM were from three regions. NA was the major region (94.74%), followed by EAP (3.51%), and ECA (1.75%). About CSS, all the ESM were from NA (100%). In total, 43.38% of ESM were from NA, followed by ECA (31.16%), EAP (17.92%), LAC (3.56%), MENA (1.93%), SA (1.53%), and SSA (0.51%).

Fig. 3 displays the ESM categorized according to income groups. In the context of JNS and CSS, the ESM exclusively came from HIE. Regarding SJ, 97.79% of the ESM were from HIE, followed by LMIE (1.47%), and then UMIE (0.74%). Concerning SJ, 92.73% of the ESM were attributed to HIE, followed by UMIE (7.27%). For NS, 80.15% of the ESM were attributed to HIE, followed by UMIE (17.65%), and LMIE (2.21%). About Spi, 91.87% of the ESM were attributed to HIE, followed by UMIE (8.13%). In the case of ESJ, 87.10% of the ESM were attributed to HIE, followed by UMIE (10.32%), and LMIE (2.58%). Concerning SC, 88.64% of the ESM were attributed to HIE, followed by UMIE (6.82%), and LMIE (4.55%). When it comes to GSJ, 70.33% of the ESM were attributed to HIE, followed by UMIE (23.08%), and LMIE (6.59%). About JSCM, 96.49% of the ESM were attributed to HIE, followed by UMIE (3.51%). In total, 87.98% of the ESM were attributed to HIE, followed by UMIE (9.88%), and LMIE (2.14%). No ESM were attributed to LIE.

A total of 17 main countries were identified, with the majority of them located in ECA (9), followed by EAP (4), NA (2), LAC (1), and SA (1) (Table 2). Most of these main countries belonged to the HIE (13), while three were UMIE (3), and one was a LMIE (1). When the number of ESM were standardized by their respective countries' populations, Switzerland ranked highest (60.93), followed by the United States (11.90), and Greece (11.25). Considering GDP, Switzerland led the list (65.20), followed by Greece (55.49), and South Korea (31.69). The number of ESM from each country showed no substantial link with its population ($p = 0.274$, $r = 0.281$), but displayed a positive association with GDP ($p = 0.033$, $r = 0.517$).

The distribution of ESM from the main countries across journals is visually represented in Fig. 4. Several European nations, including France and Germany, boasted the highest number of ESM contributing to ESJ. The United States featured prominently in SJ, while South Korea, China, and Japan had a notable presence in NS.

4. Discussion

The overall contributions from worldwide researchers promote the progress of spinal research [12,13]. The growth in spinal research publications is a direct result of the dedication and work of researchers globally [10,41]. Notably, between 2004 and 2013, nearly 100 countries collectively authored over 13,000 papers in major spinal journals, underlining the global impact of spinal research [10]. Researchers publish their findings as an essential part of the research process, facilitating the dissemination of new findings, a crucial element for advancing both basic research and clinical practice [42,43]. The editorial boards, as the core of the
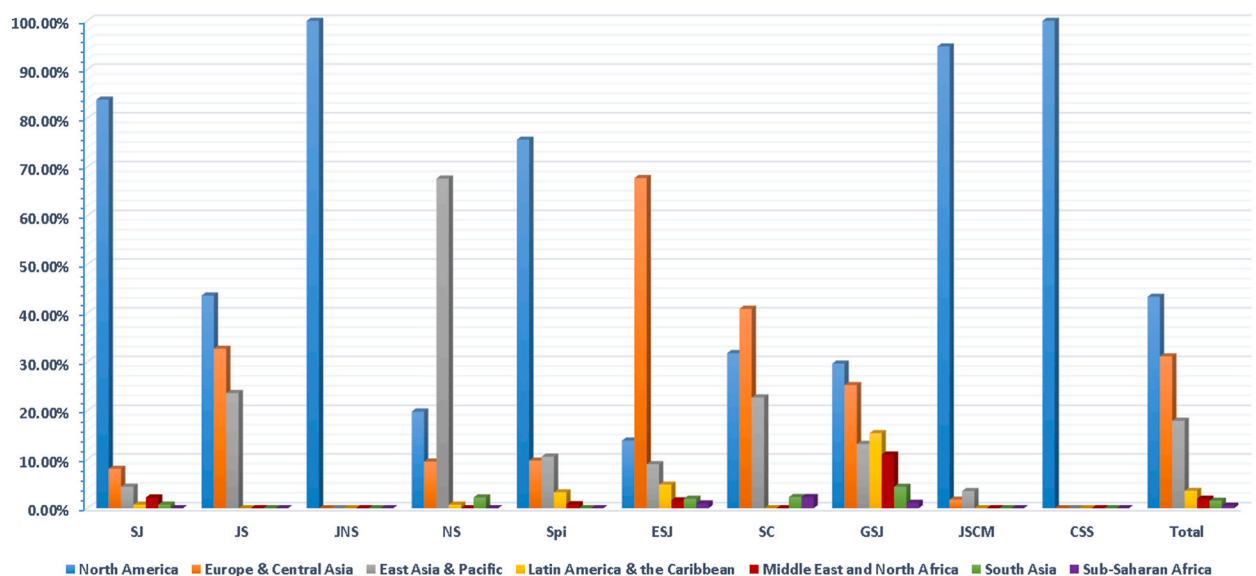

Fig. 2. Editorial staff members categorized based on geographic regions.
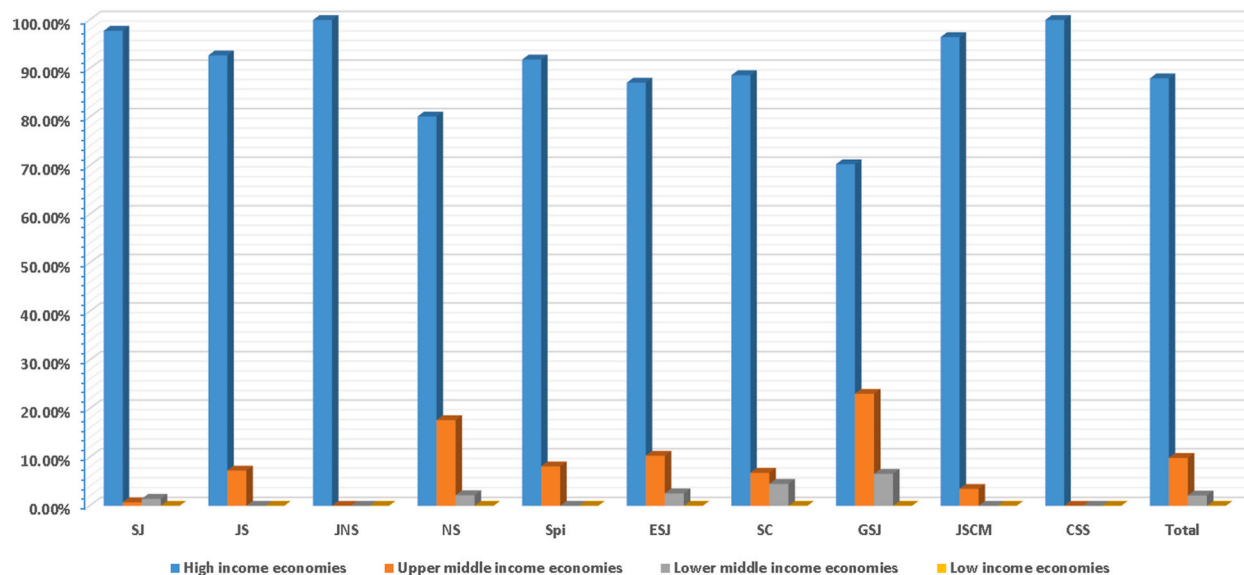
Fig. 3. Editorial staff members categorized based on income group.

Table 2
The main countries of editorial staff in major spinal journals.

Rank	Countries	Region	Income Group	No. of Editorial Staff	Percentage	No. per 10 Million Populations	No. per $ 1000 Billion GDP
1	United States	NA	HIE	395	40.22%	11.90	17.18
2	South Korea	EAP	HIE	57	5.80%	11.02	31.69
3	Switzerland	ECA	HIE	53	5.40%	60.93	65.20
4	Japan	EAP	HIE	52	5.30%	4.14	10.53
5	United Kingdom	ECA	HIE	48	4.89%	7.13	15.06
6	Italy	ECA	HIE	48	4.89%	8.13	22.86
7	Germany	ECA	HIE	45	4.58%	5.41	10.66
8	China	EAP	UMIE	42	4.28%	0.30	2.37
9	Canada	NA	HIE	31	3.16%	8.11	15.57
10	France	ECA	HIE	18	1.83%	2.67	6.13
11	Australia	EAP	HIE	18	1.83%	6.99	11.67
12	Netherlands	ECA	HIE	17	1.73%	9.70	16.70
13	Brazil	LAC	UMIE	14	1.43%	0.65	8.70
14	Turkey	ECA	UMIE	13	1.32%	1.53	15.95
15	India	SA	LMIE	13	1.32%	0.09	4.10
16	Spain	ECA	HIE	12	1.22%	2.54	8.42
17	Greece	ECA	HIE	12	1.22%	11.25	55.49

NA, North America; EAP, East Asia & Pacific; ECA, Europe & Central Asia; LAC, Latin America & Caribbean; SA, South Asia; HI, High income economies; UMI, Upper middle income economies; LMI, Lower middle income economies.

journals, wield significant influence over current publications and future directions [27,28,30,36,38,39]. A very low proportion of publications from LAMIE is evident in numerous medical journals [9,16,17,24,26,32]. Possible reasons include the lack of financial support, poor methodology and statistical analysis, and/or low levels of language competency [6,8,19,21,31,37]. Another possibility is editorial bias, which has been increasingly recognized across various research domains [6,8,9,16–19,24,29]. This suggests that manuscripts from LAMIE may encounter unfavorable treatment from journal editorial boards [23,24,30,36]. Diversity in ESM could broaden access to a more extensive pool of peer-reviewers and encourage submissions from investigators with different backgrounds [23,24,27,30–32,36]. Therefore, it is crucial to investigate whether such imbalances exist in the realm of spinal journals.

Our study revealed that ESM of the major spinal journals were predominantly affiliated with several HIE. The most notable contributors were the United States, South Korea, and Switzerland. Nearly seventy percent (66.50%) of all ESM are from the top six countries. This finding implies that a limited number of countries have a substantial influence on the policies and overall outlook of spinal journals, with the United States being the most dominant [8,9,16–19]. Meanwhile, it indicates that the underrepresented ESM from the other countries have very limited impact on these journals' publications [8,9,16–19,21,23,24,36].

ESM distribution globally is markedly uneven, as NA, ECA, and EAP regions collectively account for more than 90% of all ESM. This imbalance is likely due to the substantial research contributions from the six key countries predominantly located in these areas. Consequently, editorial boards must acknowledge and address this significant geographical imbalance [8,9,16–19].
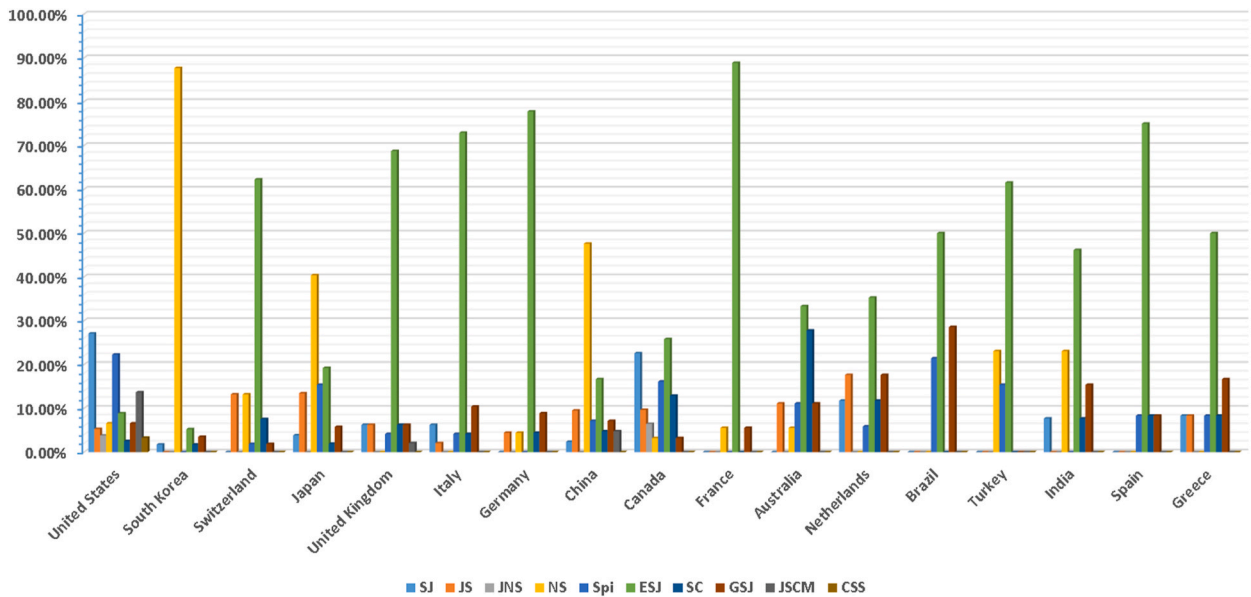
Fig. 4. Journal distributions of editorial staff members from the main countries.

In major spinal journals, close to 90% of ESM are linked to HIE, showing minimal participation from middle-income nations and a complete absence of contributions from LIE. Similar to various other research fields [8,9,16–19,21,23,24,36], the underrepresentation of editors from LAMIE is shown in major spinal journals. Despite LAMIE bearing a higher burden of spinal health conditions, the scant presence of editors from these regions in spinal journals is discouraging and may deter researchers in LAMIE from submitting their work to such journals [19,30,36]. Moreover, the number of ESM had a positive correlation with GDP, but not with population, suggesting that countries with higher GDP have greater representation among ESM. This disparity in representation may potentially hinder research on spinal conditions in LAMIE, despite the urgent need for such research [6,8,17–19,23,30–32,36]. Upon adjusting the count of editors from LAMIE against their population sizes, our study confirmed that their proportional representation diminishes further, a finding consistent with previous research [18,19].

Among the major spine journals, five journals (SJ, JS, Spi, JNS, and CSS) are affiliated with the United States, four journals (SC, GSJ, JSCM and ESJ) are affiliated with the Europe, and the other one journal (NS) are affiliated with South Korea. It is interesting to find that the highest percentage of the ESM in SJ, JS, JNS, Spi, and CSS are affiliated with NA, those of SC, GSJ and ESJ are from the Europe, and those of NS are from South Korea. Journals might exhibit a preference for selecting ESM based in their own geographical areas. This potential regional inclination warrants attention in discussions about the makeup of editorial boards [18,19].

While our study primarily focused on analyzing the composition of editors in spinal journals and unveiled the underrepresentation of ESM from LAMIE, it remains uncertain whether editorial bias exists in spinal research, despite the low percentage of ESM from LAMIE. There may be a myriad of reasons for the very low percentage of papers from LAMIE, including insufficient fundings, inexperienced investigators, poor unskilled English, and not enough outreach from the journal to the LAMIE community. Additionally, it is plausible that many studies conducted in LAMIE remain unpublished due to time constraints or lack of interest. Some of these studies may also be published in media outlets and go unreported in spinal journals. However, the diversity of ESM will likely promote diverse and balanced perspectives [18,19,30,36]. The imbalanced composition of editors possibly forms an inherent bias [9,16–19,23,24,30, 36]. Journals and the spinal research community must acknowledge the underrepresentation of LAMIE and actively work to mitigate any potential bias [6,18,19,30,36,37]. A well-balanced editorial board with a healthy representation from LAMIE is pivotal for the advancement of spinal research [17–19,30,36]. Recruiting more editors from LAMIE and rotating editors from different countries over time are some suggestions [9,16,18,19,24,30]. However, it should be acknowledged that the causes for the underrepresentation of LAMIE are multifaceted. Initially, the predominance of English in top spine journals necessitates a high level of English proficiency among ESM, posing a challenge for many editors from non-English speaking LAMIE [42–44]. Moreover, researchers linked to these areas might have limited exposure to the comprehensive experience typically needed to perform effective editorial work for prominent journals [34,42,43].

The underrepresentation of LAMIE has several implications that warrant consideration. Firstly, it could lead to an over-representation of disorders from HIE in journal publications, with fewer papers addressing healthcare issues in LAMIE [6,18,19,37]. Supporting this observation, a bibliometric analysis showed that from 2009 to 2013, HIE published 83.97% of papers in major spinal journals, while UMIE and LMIE combined only accounted for 16.01%. LIE contributed merely 0.01% [13]. Additionally, conditions such as traumatic spinal injury have a higher incidence in LAMIE compared to HIE, yet relevant research and data on spinal cord injury (SCI) are predominantly found in HIE [45–47]. This divergence in the occurrence, frequency, and causes of SCI in HIE compared to LAMIE underscores the need for tailored management and preventative strategies in LAMIE [45,48]. Researchers and editors should

actively work towards gathering SCI information and reporting corresponding studies in LAMIE, contributing to the development of cost-effective preventive strategies against SCI [49]. Secondly, insights from LAMIE researchers regarding novel technologies like artificial intelligence might be less represented, despite the growing interest in its potential applications in surgical services in LAMIE [50,51]. Therefore, studies from LAMIE holds promise for advancing the development and implementation of artificial intelligence within the sphere of spinal investigation. Thirdly, the primary source of evidence for preventing and treating spinal diseases is predominantly derived from HIE, and the applicability of resulting recommendations to LAMIE remains uncertain [52,53]. The limited research on the treatment and results of SCI in LAMIE individuals has created a data shortage for thorough comparisons. This lack of data hampers the establishment of guidelines to guide best practices in LAMIE [49,53]. Furthermore, clinical practice guidelines often recommend uniform approaches for assessing and managing low back pain, based on trials primarily conducted in HIE, even though HIE and LAMIE countries often have culturally diverse populations, posing unique challenges to guideline-recommended treatments [52].

The current study may have certain limitations that need to be acknowledged. Firstly, our selection of spinal journals was based solely on the JCR database, potentially excluding journals not listed on this platform. Moreover, our analysis did not account for unpublished spinal research or research published in media outlets. JCR was selected due to its meticulous and impartial approach in assessing the most prestigious journals globally, a widely acknowledged method in scientific journal evaluation. Secondly, our study focused exclusively on high-impact spinal journals published in English, thereby introducing potential language bias. Thirdly, while we employed a comprehensive search strategy to identify relevant spine journals, it is inevitable that some journals may not have been included in our analysis. Fourthly, the research presented here offers a cross-sectional snapshot without accounting for temporal changes. Finally, although our sample size was limited, it is worth mentioning that the ten high-impact spinal journals chosen for this research are viewed as a fair representation of prominent international journals within the spinal research domain.

5. Conclusion

Major spinal journals exhibit a notable absence of international representation within their editorial boards, predominantly comprising members from HIE. This disconcerting pattern underscores a pronounced underrepresentation of ESM hailing from LAMIE in the domain of spinal research. In order to boost the dissemination of research from LAMIE regions and promote greater diversity and varied viewpoints in spinal journals, it is advisable to incorporate editorial team members with affiliations in LAMIE.

Funding

Data availability statement

Data will be made available on request.

CRediT authorship contribution statement

Zhiwei Jia: Writing – original draft, Data curation. **Donghua Liu:** Writing – original draft, Formal analysis, Data curation. **Xingxuan Li:** Formal analysis, Data curation. **Tianlin Wen:** Writing – review & editing, Conceptualization. **Xiyan Zhao:** Writing – review & editing, Funding acquisition, Formal analysis, Conceptualization. **Wei Li:** Writing – review & editing, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2024.e28541.

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