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Original Article

Global patterns of surgical research production: a bibliometric analysis of thoracic surgery literature

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ABSTRACT

Background: Scientific studies with comparable methodological quality may not achieve similar levels of publication visibility. This study aimed to assess whether publication visibility in the thoracic surgery literature varies across institutional and geographic contexts, using primary spontaneous pneumothorax (PSP) as a homogeneous clinical framework.

Materials and Methods: This descriptive bibliometric analysis included PSP-related publications indexed in the Web of Science Core Collection between January 1, 2000, and October 15, 2025. In total, 972 publications were analyzed. Author name origin and gender were inferred using the NamSor API (version 2). Author and institutional country income levels were classified according to World Bank definitions as high-income (HIC) or low- and middle-income (LMIC). Journal impact factor and quartile (Q1-Q4) rankings were obtained from the most recent Journal Citation Reports.

Results: Based on name origin, 73.9% of first authors were from high-income countries (HICs), while 26.1% were from low- and middle-income countries (LMICs). According to institutional affiliation, 83.4% of publications originated from HIC institutions and 16.6% from LMIC institutions. Overall, 95.2% of publications were published in journals based in HICs. Studies led by authors from high-income countries were associated with publication in higher-impact and higher-quartile journals ($p < 0.001$). Gender distribution was comparable across groups, and variations in impact factor were more strongly associated with institutional income level than with gender.

Conclusions: Despite comparable methodological characteristics, publications led by authors and institutions from high-income countries demonstrated greater publication visibility in the PSP literature. Greater transparency in editorial processes may help improve equity in research dissemination.

Keywords: bibliometrics, thoracic surgery, primary spontaneous pneumothorax, institutional affiliation, publication visibility

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Introduction

In recent years, increasing attention has been drawn to the observation that scientific studies of comparable quality and methodological rigor do not always receive comparable visibility. Two investigations requiring similar effort and precision may reach very different audiences, with one published in a high-prestige journal while the other appears in a publication of more limited reach. Such discrepancies may reflect not differences in scientific merit, but structural factors related to authors' geographic, institutional, or linguistic context [1,2].

Building on this observation, we aimed to examine whether editorial outcomes may be influenced by perceived prestige associated with an author's name origin or institutional affiliation, independent of the intrinsic quality of the research. Prior studies across multiple disciplines suggest that such factors can shape reviewers' and editors' perceptions of credibility, language proficiency, or institutional rigor, thereby influencing publication visibility and journal placement [2,3]. While some of these observations are based on a limited number of focused bibliometric analyses, they are consistent with a broader body of literature reporting similar structural disparities across different medical and scientific disciplines.

However, such biases have not been systematically characterized within the thoracic surgery literature. In this context, disparities related to income level, gender, and geography have previously been discussed in thoracic surgery literature [4,5]. Most existing analyses rely on heterogeneous datasets that combine multiple disease groups, surgical subspecialties, and publication types within a single framework. In contrast, the present study examines 25 years of thoracic surgery literature and focuses exclusively on publications addressing primary spontaneous pneumothorax (PSP), a homogeneous and well-defined clinical entity. This choice was intentional because PSP represents a universally recognized condition with relatively standardized treatment algorithms across countries and a straightforward reporting structure. As a result, the potential impact of disease-mix heterogeneity and clinical confounders was minimized, allowing a more objective assessment of whether the observed disparities arose from structural and systemic factors rather than clinical variability. By

intentionally selecting a homogeneous and clearly defined clinical subset, we sought to isolate the influence of structural inequities from that of scientific or methodological quality.

To address this gap, we conducted a comprehensive bibliometric analysis of articles published over the past 25 years in the field of PSP within the thoracic surgery literature. The study examined indicators such as author name origin, institutional affiliation, gender, and the income level of both the author's country and the publishing journal's country, as well as journal impact factor and quartile rank. The objective was to determine whether differences in visibility and journal prestige among studies with comparable methodological characteristics were more closely related to structural factors than to scientific merit. Accordingly, we proposed the hypothesis that when scientific productivity is equal, publication visibility should likewise be equal, and tested this assumption within a homogeneous subset of thoracic surgery literature focused on PSP.

Materials and Methods

This study was designed as a retrospective and descriptive bibliometric analysis encompassing publications in the field of PSP within the thoracic surgery literature. The analysis was conducted on articles published between January 1, 2000, and October 15, 2025, retrieved from the Web of Science Core Collection database. The search strategy was constructed to include only studies related to PSP that addressed management, treatment, or surgical approaches. All retrieved articles were systematically screened and classified according to predefined inclusion and exclusion criteria.

The inclusion criteria covered English-language articles with full-text access that addressed clinical management, treatment, or surgical approaches for PSP. Only articles published in journals indexed in the Web of Science Core Collection were included in the analysis. This approach aimed to ensure comparability across journals with standardized editorial policies, reliable citation metrics, and international visibility. It also sought to minimize methodological bias that could arise from including non-indexed or low-visibility regional journals. Letters to the Editor, editorials, commentaries, and other non-peer-reviewed opinion pieces were

excluded to maintain methodological homogeneity. The search was limited to studies published between January 1, 2000, and October 15, 2025, involving human subjects and written in English. Articles were filtered to include those whose title or abstract contained the terms “spontaneous pneumothorax” or “primary spontaneous pneumothorax,” together with at least one related term such as “management”, “treatment”, “surgery”, “VATS”, “videothoracoscopic”, “video-assisted thoracoscopy”, or similar expressions. Eligible publication types included clinical studies, reviews, case reports, observational studies, comparative analyses, randomized controlled trials, and general research articles.

Author name origin and gender were analyzed using NamSor API (v2), a machine learning-based software that predicts ethnic, geographic, and gender information from personal names. Direct API access (rather than the web interface) enabled automated processing of large datasets. The tool employs probabilistic modeling to infer the most likely country of origin and gender for each author. The accuracy and reliability of NamSor have been methodologically validated in independent peer-reviewed studies and the tool has been widely applied in bibliometric analyses addressing both gender and country-level representation [6-8].

All author-level analyses were performed using the first author. For each article, bibliometric variables such as title, publication year, journal name, impact factor (IF), quartile rank (Q), author names, total number of authors, institutional affiliations, gender, country information, and article type were systematically extracted. Country information was obtained through two complementary approaches: (1) name-origin-based country predicted by the NamSor API, representing the author’s perceived geographic background, and (2) institution-based country derived from the author’s affiliation, representing the actual location of their institution. Both were classified as high-income (HIC) or low-/middle-income (LMIC) according to the latest World Bank income classification [9]. Impact factor and quartile data were retrieved from the latest available Journal Citation Reports, and the journal’s country was likewise classified as HIC or LMIC. A summary of these key bibliometric variables is provided in Table 1.

Table 1. Descriptive characteristics of the full dataset (n = 972).

Variable	All Publications (n=972)
Number of authors	Mean±SD = 5.67±3.45
	Median (Min-Max) = 5 (1-29)
Sex of first author, n(%)	Male = 746 (76.7)
	Female = 226 (23.3)
First Author HIC/LMIC ratio (NamSor), n(%)	HIC = 718 (73.9)
	LMIC = 254 (26.1)
Institution HIC/LMIC classification, n(%)	HIC = 811 (83.4)
	LMIC = 161 (16.6)
Journal HIC/LMIC classification, n(%)	HIC = 925 (95.2)
	LMIC = 47 (4.8)
Impact Factor (IF)	Mean±SD = 3.44±6.31
	Median (Min-Max) = 2.3 (0-98.4)
Distribution of quartiles, n(%)	Q1 = 345 (35.5)
	Q2 = 296 (30.5)
	Q3 = 280 (28.8)
	Q4 = 51 (5.2)
<i>SD: standard deviation; Min-Max: minimum-maximum; HIC: high-income country; LMIC: low-/middle-income country.</i>	

A separate original article subset (OA subset, n = 568) was analyzed. This subset included only data-based primary research articles, such as retrospective and prospective randomized or non-randomized comparative clinical studies, and was designed to control for potential differences in methodological quality, allowing evaluation of whether visibility disparities persisted within a more homogeneous dataset (Table 2).

Table 2. Descriptive characteristics of the OA subset (n = 568).

Variable	Original Article (n=568)
Number of authors	Mean±SD = 6.15±3.29
	Median (Min-Max) = 6 (1-29)
Sex of first author, n(%)	Male = 439 (77.3)
	Female = 129 (22.7)
First Author HIC/LMIC ratio (NamSor), n(%)	HIC = 419 (73.8)
	LMIC = 149 (26.2)
Institution HIC/LMIC classification, n(%)	HIC = 477 (84.0)
	LMIC = 91 (16.0)
Journal HIC/LMIC classification, n(%)	HIC = 541 (95.2)
	LMIC = 27 (4.8)
Impact Factor (IF)	Mean±SD = 3.71±7.55
	Median (Min-Max) = 2.4 (0-98.4)
Distribution of quartiles, n(%)	Q1 = 225 (39.6)
	Q2 = 167 (29.4)
	Q3 = 154 (27.1)
	Q4 = 22 (3.9)
<i>SD: standard deviation; Min-Max: minimum-maximum; HIC: high-income country; LMIC: low-/middle-income country.</i>	

Study-level variables included study duration, sample size, number of centers, and number of countries. Comparative analyses were conducted to evaluate the association between the first author’s income group, defined either by name origin using the NamSor API or by institutional affiliation, and that of the publishing journal. These relationships were examined separately for the full dataset and for the OA subset. Cross-tabulations

were used to compare the proportions of HIC and LMIC authors publishing in HIC versus LMIC journals. Continuous variables, including journal impact factor, were compared using the Mann-Whitney U test, while quartile (Q) distributions were assessed using the Chi-square test.

Analyses based on author name origin and institutional affiliation for both the full and OA datasets are summarized in Table 3 (A-D).

Table 3A. Association between first author’s name-origin income group (NamSor) and journal income classification in the full dataset (n = 972).

Variable		HIC (n=718)	LMIC (n=254)	p
Journal income group, n(%)				<0.001 χ^2
	HIC	706 (98.3)	219 (86.2)	
	LMIC	12 (1.7)	35 (13.8)	
Impact Factor (IF)				<0.001M
	Mean \pm SD	3.69 \pm 7.04	2.72 \pm 3.38	
	Median (Min-Max)	2.4 (0-98.4)	1.8 (0.4-41.6)	
Distribution of quartiles, n(%)				<0.001 χ^2
	Q1	275 (38.3)	70 (27.6)	
	Q2	220 (30.6)	76 (29.9)	
	Q3	197 (27.4)	83 (32.7)	
	Q4	26 (3.6)	25 (9.8)	

SD: standard deviation; Min-Max: minimum-maximum; HIC: high-income country; LMIC: low-/middle-income country. Q: quartile, M: Mann-Whitney U test, χ^2 : Chi-square test. HIC authors consistently demonstrate higher impact factors and greater representation in Q1 journals compared to LMIC authors.

Table 3B. Association between first author’s institutional income group and journal income classification in the full dataset (n = 972).

Variable		HIC (n=811)	LMIC (n=161)	p
Journal income group, n(%)				<0.001 χ^2
	HIC	801 (98.8)	124 (77)	
	LMIC	10 (1.2)	37 (23)	
Impact Factor (IF)				<0.001M
	Mean \pm SD	3.73 \pm 6.84	1.97 \pm 1.4	
	Median (Min-Max)	2.4 (0-98.4)	1.6 (0.4-12.5)	
Distribution of quartiles, n(%)				<0.001 χ^2
	Q1	315 (38.8)	30 (18.6)	
	Q2	250 (30.8)	46 (28.6)	
	Q3	220 (27.1)	60 (37.3)	
	Q4	26 (3.2)	25 (15.5)	

HIC: high-income country, LMIC: low- or middle-income country, IF: impact factor, SD: standard deviation, Q: quartile, M: Mann-Whitney U test, χ^2 : Chi-square test. HIC authors consistently demonstrate higher impact factors and greater representation in Q1 journals compared to LMIC authors.

Table 3C. Association between first author's name-origin income group (NamSor) and journal income classification in the OA subset (n = 568).

Variable	HIC (n=419)	LMIC (n=149)	p
Journal income group, n(%)			<0.001 χ^2
	HIC	412 (98.3)	129 (86.6)
	LMIC	7 (1.7)	20 (13.4)
Impact Factor (IF)			0.006M
	Mean \pm SD	4.07 \pm 8.63	2.70 \pm 2.56
	Median (Min-Max)	2.4 (0-98.4)	1.9 (0.5-16.6)
Distribution of quartiles, n(%)			<0.001 χ^2
	Q1	179 (42.7)	46 (30.9)
	Q2	122 (29.1)	45 (30.2)
	Q3	111 (26.5)	43 (28.9)
	Q4	7 (1.7)	15 (10.1)

HIC: high-income country, LMIC: low- or middle-income country, OA: original article subset, IF: impact factor, SD: standard deviation, Q: quartile, M: Mann-Whitney U test, χ^2 : Chi-square test. HIC authors consistently demonstrate higher impact factors and greater representation in Q1 journals compared to LMIC authors.

Table 3D. Association between first author's institutional income group and journal income classification in the OA subset (n = 568).

Variable	HIC (n=477)	LMIC (n=91)	p
Journal income group, n(%)			<0.001 χ^2
	HIC	471 (98.7)	70 (77)
	LMIC	6 (1.3)	21 (23)
Impact Factor (IF)			<0.001M
	Mean \pm SD	4.02 \pm 8.17	2.05 \pm 1.64
	Median (Min-Max)	2.4 (0-98.4)	1.5 (0.5-12.5)
Distribution of quartiles, n(%)			<0.001 χ^2
	Q1	205 (43.0)	20 (22.0)
	Q2	145 (30.4)	22 (24.2)
	Q3	120 (25.2)	34 (37.4)
	Q4	7 (1.5)	15 (16.5)

HIC: high-income country, LMIC: low- or middle-income country, OA: original article subset, SD: standard deviation, Q: quartile, M: Mann-Whitney U test, χ^2 : Chi-square test. HIC authors consistently demonstrate higher impact factors and greater representation in Q1 journals compared to LMIC authors.

Beyond author-journal income associations, additional analyses were performed within the OA subset to examine whether study quality and design characteristics influenced publication visibility. Within this subset, study-level variables, including study type (retrospective, prospective, randomized, or non-randomized), number of centers (single-center, multicenter, or nationwide), geographic scope (national or international), total sample size, and study duration, were systematically

extracted. These parameters were used to assess whether differences in methodological scope or study complexity contributed to the observed disparities in journal visibility across author and journal income classifications. To account for potential confounding related to study quality, methodological variables were compared between groups within the OA subset. Descriptive and comparative statistics were applied as appropriate, and the results are presented in Table 4.

Table 4. Study-level methodological characteristics within the OA subset by author income group (n = 568).

Variable	HIC (n=477)	LMIC (n=91)	p value
Nature of the research, n(%)			0.746 χ^2
Retrospective	382 (80.1)	76 (83.5)	
Prospective	88 (18.4)	14 (15.4)	
Others	7 (1.5)	1 (1.1)	
Geographic scope, n(%)			0.808 χ^2
National	473 (99.2)	90(98.9)	
International	4(0.8)	1(1.1)	
Number of attending centers, n(%)			0.149 χ^2
Single-center	400 (83.9)	81(89.0)	
2-3 centers	24 (5.0)	6 (6.6)	
>4 centers	31 (6.5)	4 (4.4)	
Nationwide registry	22 (4.6)	0	
Number of patients			0.766M
Mean±SD	1702.33±13299.27	208.9±557.55	
Median (Min-Max)	92 (3-170846)	98 (3-4799)	
Study interval (years)			0.107M
Mean±SD	6.5±5.05	5.16±4.58	
Median (Min-Max)	5(1-30)	4(1-21)	
Randomization, n(%)			0.791 χ^2
Non-randomized	444(93.1)	84(92.3)	
Randomized	33(6.9)	7(7.7)	

HIC: high-income country, LMIC: low- or middle-income country, OA: original article subset, SD: standard deviation, M: Mann-Whitney U test, χ^2 : Chi-square test. No statistically significant differences were observed across any methodological parameters between HIC and LMIC groups.

Gender analysis was conducted on both the full dataset and the original article (OA) subset. The analysis examined the relationship between the first author’s gender, the income level of their affiliated institution’s country (HIC/LMIC), and the characteristics of the journals in which the studies were published. Gender inference was performed using the NamSor API (v2), which applies probabilistic modeling based on global name-gender databases. Predicted genders were categorized according to the author’s income group (HIC/LMIC) and journal-related parameters, including journal origin (HIC/LMIC), impact factor (IF), and quartile rank (Q1-Q4). Comparative analyses were then applied to evaluate potential differences in these variables across both datasets.

Associations between journal origin and author gen-

der were assessed using the Chi-square test, differences in impact factor were analyzed with the Mann-Whitney U test, and quartile distributions were compared using the Chi-square test.

For the OA subset, gender-related analyses were further expanded to include study-level methodological parameters, such as the nature of the research (retrospective, prospective, or other), number of participating centers, and study interval (years), to explore whether these factors influenced gender-based or income-based visibility patterns.

Results for the full dataset are presented in Table 5A, and those for the OA subset, including the additional methodological variables, are summarized in Table 5B.

Table 5A. Gender-based comparison of author and journal characteristics in the full dataset.

Variables		HIC (n=811)	LMIC (n=161)		p
Sex of first author, n(%)	Male 628 (77.4)	Female 183 (22.6)	Male 118 (73.3)	Female 43 (26.7)	
Journal origin, n(%)					<0.001 χ^2
	HIC	621 (98.9)	180 (98.4)	88 (74.6)	36 (83.7)
	LMIC	7 (1.1)	3 (1.6)	30 (25.4)	7 (16.3)
Impact factor (IF)					0.001K
	Mean \pm SD	3.94 \pm 7.64	3.02 \pm 2.59	1.88 \pm 1.16	2.2 \pm 1.91
	Median (Min-Max)	2.4 (0.2-98.4)	2.4 (0-19.3)	1.6 (0.4-5.7)	1.5 (0.6-12.5)
Distribution of quartiles, n(%)					<0.001 χ^2
	Q1	251 (40.0)	64 (35.0)	23 (19.5)	7 (16.3)
	Q2	182 (29.0)	68 (37.2)	31 (26.3)	15 (34.9)
	Q3	174 (27.7)	46 (25.1)	45 (38.1)	15 (34.9)
	Q4	21 (3.3)	5 (2.7)	19 (16.1)	6 (14.0)

HIC: high-income country, LMIC: low- or middle-income country, SD: standard deviation, M: Mann-Whitney U test, χ^2 : Chi-square test. Differences in journal impact factor and quartile distribution are primarily associated with institutional income level rather than gender.

Table 5B. Gender-based comparison of author, journal, and study characteristics in the OA subset.

Variable		HIC (n=477)	LMIC (n=91)		p value
Sex of first author, n(%)	Male 368 (77.1)	Female 109 (22.9)	Male 71 (78.0)	Female 20 (22.0)	
Journal origin, n(%)					<0.001 χ^2
	HIC	362(98.4)	109(100.0)	51(71.8)	19(95.0)
	LMIC	6(1.6)	0	20(28.2)	1(5.0)
Impact factor (IF)					<0.001K
	Mean \pm SD	4.24 \pm 9.15	3.29 \pm 2.95	1.93 \pm 1.27	2.51 \pm 2.55
	Median (Min-Max)	2.4(0.7-98.4)	2.4(0-19.3)	1.5(0.5-5.7)	1.55(1-12.5)
Distribution of quartiles, n(%)					<0.001 χ^2
	Q1	161(43.8)	44(40.4)	15(21.1)	5(25.0)
	Q2	106(28.8)	39(35.8)	16(22.5)	6(30.0)
	Q3	97(26.4)	23(21.1)	27(38.0)	7(35.0)
	Q4	4(1.1)	3(2.8)	13(18.3)	2(9.1)
Nature of the research, n(%)					0.186 χ^2
	Retrospective	293(79.6)	89(81.7)	57(80.3)	19(95.0)
	Prospective	72(19.6)	16(14.7)	13(18.3)	1(5.0)
	Others	3(0.8)	4(3.7)	1(1.4)	0
Number of attending centers, n(%)					0.145 χ^2
	Single	315(85.6)	85(78.0)	61(85.9)	20(100.0)
	2-3 center	18(4.9)	6(5.5)	6(8.5)	0
	>4 center	20(5.4)	11(10.1)	4(5.6)	0
	National	15(4.1)	7(6.4)	0	0
Study interval (years)					<0.051K
	Mean \pm SD	6.51 \pm 5.14	6.46 \pm 4.74	4.47 \pm 4.7	4.05 \pm 4.05
	Median (Min-Max)	5(1-30)	5(1-21)	4(1-21)	2.5(1-15)

HIC: high-income country, LMIC: low- or middle-income country, OA: original article subset, SD: standard deviation, M: Mann-Whitney U test, χ^2 : Chi-square test. Differences in journal impact factor and quartile distribution are primarily associated with institutional income level rather than gender.

Statistical Analysis

All statistical analyses were performed using SPSS software (version 28.0; IBM Corp., Armonk, NY, USA). The distribution of continuous variables was assessed using the Shapiro-Wilk test. Nonparametric tests (Mann-Whitney U and Kruskal-Wallis) were applied for non-normally distributed variables, while categorical variables were compared using the Chi-square test. A two-tailed p value of < 0.05 was considered statistically significant for all analyses.

Results

A total of 972 articles published between 2000 and 2025 were analyzed (Table 1). The mean number of authors was 5.7 ± 3.45 (median = 5). Among first authors, 76.7% were male and 23.3% were female. According to NamSor analysis, 73.9% of first authors originated from high-income countries (HICs) and 26.1% from low- and middle-income countries (LMICs). In terms of institutional affiliation, 83.4% were based in HIC institutions, whereas 16.6% were affiliated with LMIC institutions. The vast majority of publications (95.2%) appeared in journals originating from HICs. The mean impact factor (IF) was 3.44 (median = 2.3). Regarding journal quartile distribution, 35.5% of publications were in Q1 journals, 30.5% in Q2, 28.8% in Q3, and 5.2% in Q4. Detailed descriptive characteristics for both the full dataset and the OA subset are presented in Tables 1 and 2.

A similar pattern was observed in the subset of original research articles (OA subset, n = 568; Table 2). The mean number of authors was 6.1 ± 3.29 , with 84% of first authors affiliated with HIC institutions and 95% of studies published in HIC journals. The mean impact factor was 3.71 (median = 2.4).

These two tables show that research on PSP in thoracic surgery has been largely produced and published by high-income countries.

Figure 1 illustrates the global distribution of PSP-related publications and the publication-to-population ratio across countries.

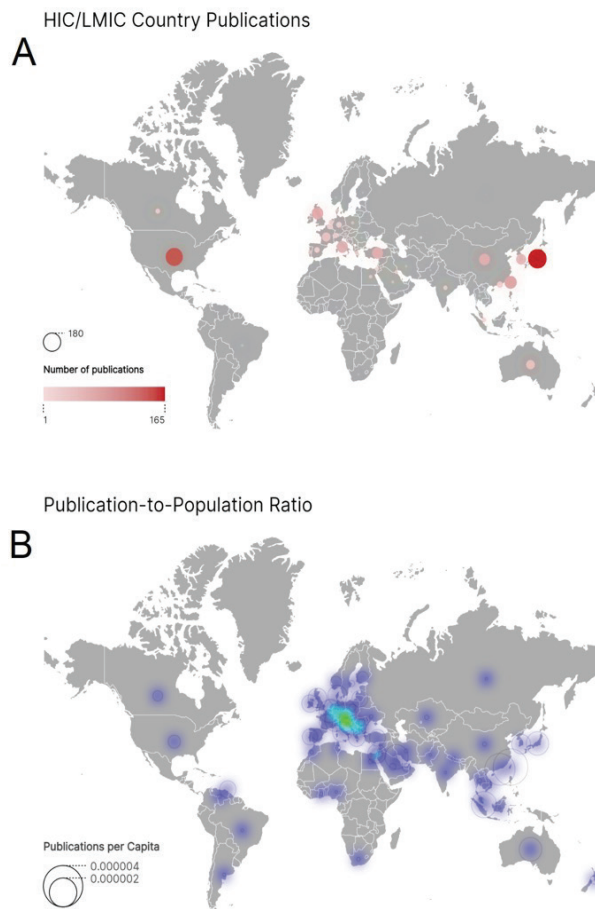


Figure 1. Global distribution of PSP-related publications by country (all data, n = 972). **(A)** Country-level distribution of PSP-related publications by institutional origin across all countries. Circle size and color intensity represent the absolute number of publications per country. **(B)** Publication-to-population ratio by country, expressed as publications per capita, illustrating normalized research output relative to population size. Larger circles indicate higher publication rates per population. Note: Map boundaries and country designations do not imply any opinion regarding the legal status of any country or territory or the delimitation of its frontiers.

The second main analytical component focused on the relationship between authorship origin, the author’s institutional affiliation (represented as an “institutional passport,” defined as the income-level classification of the country in which the author’s institution is located), and their association with the income level of the publishing journal. This analysis was conducted in four sequential stages, as detailed in Tables 3A-D.

The relationship between the income-level classification based on NamSor-based author name origin and the income level of the publishing journal was examined (Table 3A). In the full dataset (n = 972), the vast majority of articles by authors from high-income countries (HICs) were published in HIC journals (98.3%),

whereas only 86.2% of those by authors from low- and middle-income countries (LMICs) appeared in such journals ($p < 0.001$). Articles authored by HIC-origin researchers also demonstrated higher mean impact factors (3.69 ± 7.04 vs 2.72 ± 3.38 ; $p < 0.001$). The journal quartile distribution showed a similar difference: 38.3% of HIC-origin authors published in Q1 journals, compared with 27.6% of LMIC-origin authors. These findings are summarized in Table 3A.

The variable defined as the institutional passport, that is, the income level of the country in which the author's institution is located, was examined in relation to the income level of the publishing journal (Table 3B). In the full dataset ($n = 972$), 98.8% of articles from authors affiliated with institutions in high-income countries (HICs) were published in HIC journals, whereas only 77% of those from low- and middle-income country (LMIC) institutions appeared in such journals ($p < 0.001$). Publications originating from HIC institutions also had significantly higher mean impact factors (3.73 ± 6.84 vs 1.97 ± 1.40 ; $p < 0.001$). The journal quartile distribution supported this difference: 38.8% of articles from HIC institutions were published in Q1 journals, compared with 18.6% from LMIC institutions. These findings are summarized in Table 3B.

The NamSor-based author name origin income classification was assessed within the subset comprising only original research articles (OA subset) (Table 3C). In this subset ($n = 568$), 98.3% of articles authored by individuals from high-income countries (HICs) were published in HIC journals, compared with 86.6% of those by authors from low- and middle-income countries (LMICs) ($p < 0.001$). Articles authored by HIC-origin researchers also had significantly higher mean impact factors (4.07 ± 8.63 vs 2.70 ± 2.56 ; $p = 0.006$). The journal quartile distribution reflected the same trend: 42.7% of articles by HIC-origin authors were published in Q1 journals, whereas the corresponding rate for LMIC-origin authors was 30.9%. These findings are summarized in Table 3C.

The institutional passport variable was assessed within the subset comprising only original research articles (OA subset) (Table 3D). In this subset ($n = 568$), 98.7% of articles from authors affiliated with institutions in high-income countries (HICs) were published in HIC journals, whereas only 77% of those from low- and middle-income country (LMIC) institutions appeared in such journals ($p < 0.001$). Publications originating from HIC institutions again had significantly higher mean impact factors (4.02 ± 8.17 vs 2.05 ± 1.64 ; $p < 0.001$). The jour-

nal quartile distribution supported this difference: 43.0% of articles from HIC institutions were published in Q1 journals, compared with 22.0% from LMIC institutions. These findings are summarized in Table 3D.

Most studies were published in journals based in high-income countries (HICs), regardless of the first author's name-origin or institutional affiliation. These differences were consistently statistically significant across all comparisons ($p < 0.001$), highlighting a strong association between author income level and publication in higher-impact and higher-quartile journals. The association between author and journal income classification and the impact factor and quartile distributions for these four groups are summarized in Tables 3A-D and Figure 2.

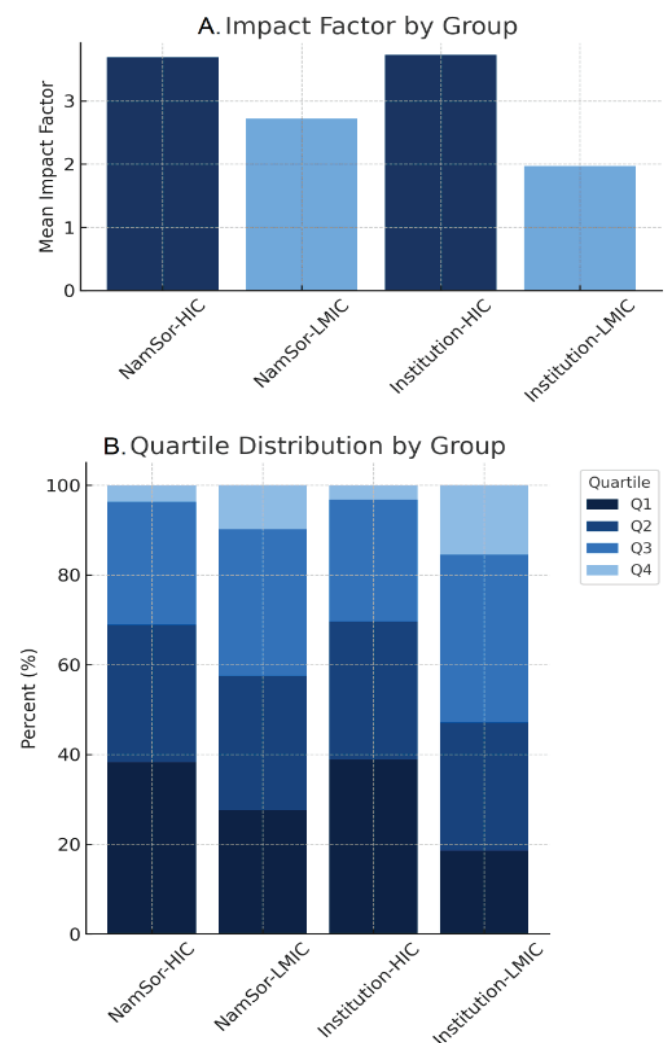


Figure 2. Impact factor and journal quartile distribution by author income classification. (A) Mean impact factor of journals publishing studies led by first authors from high-income countries (HIC) and low- and middle-income countries (LMIC), classified by both name-origin (NamSor) and institutional affiliation. (B) Distribution of publications across journal quartiles (Q1–Q4) for the same four groups.

The third main analytical component focused on methodological parity between HIC and LMIC studies (Table 4). These variables were compared between groups according to author income classification. These findings are detailed in Table 4.

No significant difference was found between HIC- and LMIC-origin studies in terms of study design; retrospective designs predominated in both groups ($p = 0.746$). The proportions of prospective, randomized, and non-randomized studies were also comparable ($p = 0.791$). There were no significant differences between groups in mean sample size ($p = 0.766$) or study duration ($p = 0.107$).

Similarly, no significant differences were observed in the number of centers ($p = 0.149$) or geographic scope ($p = 0.808$); most studies in both groups were single-center and national in scale.

In summary, the distribution of methodological parameters was statistically similar between studies originating from HICs and those from LMICs.

The fourth main analytical component focused on the gender distribution of first authors. According to the full dataset analysis presented in Table 5A ($n = 972$), the proportion of female first authors was 23.3%, and male authors 76.7%. Articles authored by women and men showed no significant difference in mean impact factor ($p = 0.001$, Mann-Whitney U), and the difference reflected income level rather than gender. The proportion of publications in Q1 journals was also comparable between female and male authors (34.9% vs 36.1%).

In Table 5B, which assessed only the subset of original research articles (OA subset, $n = 568$), the proportion of female authors was 23.4%. The proportion of female authors from HICs was 23.6%, and from LMICs 22.9%. Similarly, at the institutional level, the proportions were 23.9% for HIC institutions and 22.5% for LMIC institutions.

The quartile distributions by gender and institutional income level are presented in Figure 3, and the impact factor comparison (log-scale, median \pm SD) is presented in Figure 4.

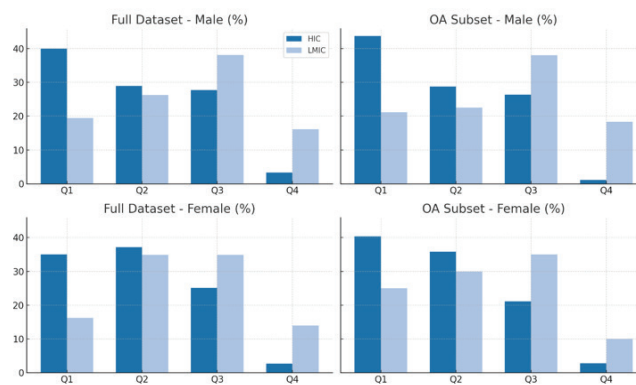


Figure 3. Percentage distribution of journal quartile ranks (Q1–Q4) stratified by gender and institutional income group for the full dataset and the OA subset. Each panel displays the within-group proportion (total = 100%). Across both datasets and genders, authors affiliated with institutions in high-income countries (HIC) are more frequently published in Q1–Q2 journals, whereas authors from low- and middle-income countries (LMIC) are over-represented in Q3–Q4 journals, indicating that visibility disparities are primarily income-based rather than gender-based.

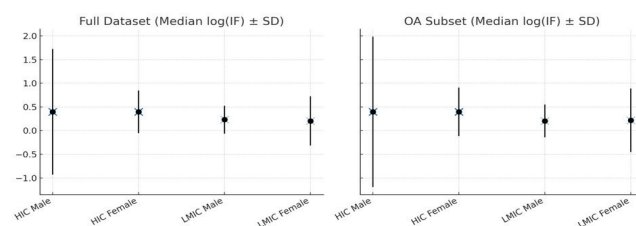


Figure 4. Impact factor (log-scale) by gender and institutional income level. Median journal impact factor is shown for each group, with SD represented as vertical error ranges. Values are plotted on a log10 scale. Across both the full dataset and the OA subset, HIC-affiliated authors have consistently higher median impact factors than LMIC-affiliated authors. The pattern is similar for male and female first authors, indicating that differences in journal impact occur primarily by institutional income level rather than gender.

Additional methodological variables were also evaluated in this analysis. There was no significant gender difference in study type (retrospective vs prospective; $p = 0.186$) or in the number of participating centers ($p = 0.145$). The mean study interval also did not differ significantly between genders ($p \approx 0.051$).

Across all analyses, income-based disparities were statistically significant ($p < 0.001$). Despite comparable methodological parameters between studies from high- and low- or middle-income countries, publications originating from HIC authors, institutions, and journals consistently demonstrated higher impact factors and greater representation in top-quartile journals. These findings quantitatively underscore the persistence of structural disparities in publication visibility, which will be further addressed in the Discussion section.

Discussion

This study demonstrates a marked visibility disparity among publications on PSP within the field of thoracic surgery, even when methodological characteristics are comparable. In both the full dataset and the subset of original research articles, authors and institutions from high-income countries were more frequently published in higher-impact journals and in upper quartiles compared with those from low- and middle-income countries. Importantly, this difference could not be explained by study design, sample size, number of participating centers, or prospective versus retrospective structure. These findings suggest that the observed disparity reflects structural factors embedded within editorial and publication processes rather than differences in scientific quality. In this study, publication visibility refers specifically to journal impact factor and quartile rank, rather than citation-based metrics.

In the existing literature, researchers from low- and middle-income countries have repeatedly been shown to be disadvantaged in terms of publication visibility within medicine and surgery. Bibliometric analyses across various disciplines have reported that journals and editorial decision-making processes are predominantly concentrated in high-income countries, which can influence publication acceptance and placement [1,2,4]. Moreover, even in international collaborative studies, leadership authorship roles are often shifted away from local researchers, thereby reinforcing a structural hierarchy [10-14]. However, because previous studies largely combined heterogeneous disease groups and broader surgical fields, it has remained unclear whether the observed disparities arise from clinical factors or from structural mechanisms within academic publishing. These patterns are consistent with findings from broader surgical and global health literature, where authors from high-income countries are more likely to publish in higher-impact journals and occupy leading authorship positions, independent of study context. This suggests that the observed disparities are not specific to thoracic surgery but reflect a wider structural phenomenon in academic publishing.

The choice of PSP in this study was intentional, as it represents a clinically homogeneous patient group with relatively standardized treatment approaches. PSP management is largely based on similar surgical decision-making algorithms across different countries and institutions, and published studies typically follow comparable methodological frameworks. This reduces the influence of disease severity, surgical indication variability, or clinical heterogeneity as factors that could affect publication visibility. Thus, the selection of a homogeneous clinical condition enabled a clearer assessment of whether the observed disparities stem from structural factors within

publishing processes rather than from differences in scientific quality or clinical complexity. In summary, analyzing a uniform clinical topic allowed the identification of a visibility gap rooted in systematic and structural barriers rather than methodological differences.

The analyses conducted within the subset of original research articles further support this structural disparity. Key methodological variables such as study design, sample size, number of participating centers, national versus international scope, and study duration did not differ significantly between studies originating from high-income and low- and middle-income countries. Likewise, the rates of prospective study design, presence of randomization, and likelihood of being conducted as a multicenter study were comparable across all groups. This indicates that the likelihood of publication in higher-impact journals cannot be explained by methodological quality or scope. Rather, studies of similar scientific caliber are exposed to different levels of visibility during the publication process. Therefore, the observed disparity arises not from research design but from structural factors embedded within the scientific publishing ecosystem.

To address the possibility that differences in publication visibility may be driven by methodological quality rather than structural factors, we performed a detailed comparison of study-level characteristics within the original article subset. No significant differences were observed between HIC and LMIC studies in terms of sample size, study design, number of centers, geographic scope, or randomization. These findings suggest that the observed disparity is unlikely to be explained by differences in methodological rigor, but rather reflects structural factors within the publication process.

The potential mechanisms underlying this visibility disparity have been clearly described in the literature. Journals and editorial boards located in high-income countries often operate with implicit biases when evaluating language quality, narrative fluency, and perceived “scientific authority” [2]. Studies originating from low- and middle-income countries, even when they exhibit comparable methodological rigor, are more frequently subjected to revision and resubmission cycles on the grounds of “language improvement” or “academic writing standards” [11]. Furthermore, the centralized structure of the publishing system continuously reproduces the visibility and network advantages held by high-income institutions; even within collaborative research projects, this often results in first or senior authorship positions favoring HIC researchers [10,12,14]. In other words, the publication process evaluates not only scientific quality, but also the institutional and geographic position of the researcher. Thus, the disparity observed is not the result of individual capability, but of entrenched structural power asymmetries [1].

The dominant structural position of high-income countries in scientific publishing is linked not only to the geographic location of journals, but also to how global knowledge production networks are organized. Fifty-year analyses of global health literature demonstrate that research collaborations are centered around high-income countries, while low- and middle-income countries occupy peripheral positions within these networks [15]. A substantial proportion of articles published in high-impact medical journals lack local authorship even when the data originated from LMIC settings [16,17]. In the global surgery literature, this structural pattern results in systematic shifts of leadership and senior authorship roles toward HIC researchers, a dynamic that becomes even more pronounced among women researchers [18]. The consolidation of senior authorship authority within high-income institutions limits academic recognition and career advancement opportunities for LMIC researchers [19]. Additionally, authorship contributions in high-impact journals have become increasingly unequal, reflecting a redistribution of visibility as a form of academic capital [20]. The ethical implications of these structural imbalances highlight that scientific publishing processes reproduce power relations as much as they disseminate knowledge [3].

In this study, approximately one quarter of first authors were women, which is consistent with prior reports of gender representation in cardiothoracic surgery [5]. However, our findings indicate that the primary determinant of publication visibility for women was not gender itself, but the income level of the country in which their institution is located. The literature shows that women researchers, particularly those in low- and middle-income countries, are structurally underrepresented in leadership and senior authorship roles [21]. In high-impact journals, women remain markedly less represented as senior authors, and research visibility is directly linked to academic advancement [22]. Furthermore, some fields have shown lower citation rates for women compared to men, even when scientific content is similar [23]. In our dataset, however, the association between gender and journal impact factor lost significance once institutional income level was accounted for. This suggests that gender inequality does not operate in isolation, but rather intersects with income-based structural power asymmetries within the global publishing system [24,25]. Therefore, efforts to improve the visibility of women researchers must address not only gender equity but also the systemic publication barriers faced by LMIC institutions.

The principal strength of this study is its systematic examination of visibility and authorship representation within a clinically homogeneous domain of thoracic surgery over a 25-year publication period. The selection of PSP minimized variation in disease characteristics and

treatment algorithms, allowing the observed disparities to be evaluated independently of clinical complexity. In addition, the use of two distinct income-related variables, author name origin and institutional country classification, demonstrated that the disparity operates not only at the individual level but also at the structural and institutional level. Finally, the methodological controls applied within the original research subset showed that the visibility gap cannot be explained by differences in study design or scientific rigor, supporting the interpretation that the disparity is rooted in the publishing process itself.

Several mechanisms may underlie the observed association between income level, gender, and publication visibility. Authors from high-income countries may benefit from greater access to research funding, established academic networks, and institutional support for manuscript preparation and submission. In addition, language proficiency, particularly in English, and familiarity with editorial expectations may further facilitate publication in higher-impact journals. Gender disparities may be influenced by differences in academic seniority, mentorship opportunities, and representation in leadership positions, which are known to affect authorship roles and publication outcomes. These factors likely operate together, contributing to structural advantages that extend beyond measurable study-level characteristics.

A formal multivariate regression model was not applied in this study. The primary outcomes were journal impact factor and quartile rank, which were analyzed directly in relation to author income classification using appropriate statistical methods. In addition, key methodological variables that could act as confounders, including study design, sample size, number of centers, and study duration, were systematically compared between groups, with no statistically significant differences observed. Together, these findings suggest that the observed disparities are unlikely to be explained by measurable study-level factors, but rather reflect structural determinants within the publication system.

Limitations of the Study

This study has several limitations. First, the analysis is based solely on published articles; because manuscripts that were submitted but rejected could not be examined, it was not possible to determine at which stage of the publication process the disparity arises. This suggests that visibility differences may occur not only during editorial decision-making, but also earlier, through strategic publication choices made by authors. Second, the study focuses specifically on the literature on PSP; although this choice increases clinical homogeneity, it may limit the direct generalizability of the findings to other areas of thoracic surgery. Third, as a bibliometric study, the analysis does not establish causality; the mechanisms under-

lying the disparity are inferred in relation to previously documented structural features of the publishing system. However, the methodological controls applied within the subset of original research articles strongly support that the visibility gap is not attributable to study quality.

Author name origin and gender were inferred using the NamSor API, which is based on probabilistic modeling. Although previously validated, this approach is subject to potential misclassification, particularly in cases of culturally overlapping or globally common names. Such misclassification may introduce a degree of classification bias; however, given the large sample size and the consistency of the observed patterns across both name-origin and institution-based analyses, the overall impact on the study findings is expected to be limited.

In conclusion, this study demonstrates that publication visibility in the thoracic surgery literature is shaped not only by scientific quality, but also by identity markers linked to institutional location and name origin. Even within a clinically homogeneous field such as PSP, institutions located in high-income countries benefit from an “institutional passport” that facilitates recognition and publication, while the geographic origin signaled by an author’s name can similarly function as a “name passport” influencing perceived authority and acceptance. In other words, the likelihood of publication and the level of journal visibility are affected not only by methodological rigor, but also by the position of the author and institution within the global publishing system. These findings highlight persistent structural power asymmetries in the circulation of scientific knowledge and underscore the need for more transparent, structured, and geographically balanced evaluation mechanisms.

Implementing genuine double-blind editorial models that systematically mask both author identity and institutional affiliation, supported by technical systems that automatically remove metadata and institutional identifiers, may help reduce these disparities. In addition, regular reporting of the geographic and income-level composition of editorial boards and reviewer pools could increase transparency and encourage greater global diversity in decision-making. Such transparency would make structural imbalances visible and, over time, support more inclusive publishing policies.

Furthermore, for researchers in low- and middle-income countries, language barriers may contribute to reduced publication visibility. Independent, application-based language support programs, operating outside of editorial decision-making and managed according to objective, equitable criteria, could improve manuscript clarity without influencing acceptance decisions. Establishing a designated Authorship Equity Editor role within journals may also help ensure that reviewer assignments

and revision communications are conducted with attention to geographic representation and structural fairness.

Finally, current article processing charge (APC) models create a strongly asymmetric cost burden: researchers at high-income institutions with subscription agreements often pay little or nothing, the lowest-income countries receive full waivers but publish infrequently, while the financial cost falls disproportionately on productive researchers in intermediate-income countries who lack institutional coverage and must pay APCs out of pocket. Revising APC support mechanisms to reflect institutional resource levels and individual funding availability, rather than broad country-income classifications, may promote more equitable financial access to publication.

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Ethics statement

This study was a descriptive bibliometric analysis based exclusively on publicly available, aggregated publication metadata retrieved from the Web of Science Core Collection. No human participants were recruited, no patient-level or private data were accessed, and no intervention, interaction, or identifiable personal information was involved. Therefore, institutional ethics committee approval and informed consent were not required for this type of study.

Authors’ contribution

OY: conceived and designed the study, performed data acquisition and statistical analysis, interpreted the results, drafted the manuscript, and approved the final version. MI: contributed to study design, data interpretation, critical revision of the manuscript, and approval of the final version. EE: contributed to data collection, data analysis, manuscript drafting, and approval of the final version. RE: contributed to data extraction, literature review, manuscript drafting, and approval of the final version. MK: contributed to data validation, methodological review, critical revision of the manuscript, and approval of the final version. TD: contributed to literature review and approved the final version. AY: contributed to study supervision, critical revision of the manuscript for important intellectual content, and approval of the final version.

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