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Internationalization of researchers in Oral Pathology/ Oral Medicine area from Latin America

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The aim of this study was to evaluate the internationalization of researchers in Oral Pathology (OP)/Oral Medicine (OM) in Latin America (LATAM). This scientometric study was conducted with public domain data from eight countries (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay), collected from January to July 2025. The Scopus database was the source for collecting the variables. Student's *t* test and Mann−Whitney *U* test were performed to analyze the mean and median citations of scientific articles classified as having international collaborations and open access (OA) publications. Binary logistic regression was performed to predict the probability of international collaboration and OA status based on citation counts. International collaborations were present in 27.4% of the publications, and 39.9% of the scientific articles were published under OA. Publications with international collaborations received significantly more citations than noncollaborative articles ($P < .001$). OA showed no association with the mean/median citations. International collaboration is the main driver of scientific impact in LATAM OP/OM, while OA status shows no independent benefit for citations. The low prevalence of collaborative articles reveals structural barriers that limit regional science, suggesting that strategic networking is more critical for visibility than publication accessibility alone. (Oral Surg Oral Med Oral Pathol Oral Radiol 2026;000:1−8)

Scientific internationalization has become a defining feature of contemporary research ecosystems. Academic landscape has transitioned from individual and institutional research toward a collaborative, global model of knowledge production. International collaboration is increasingly recognized for its capacity to foster scientific excellence, enhance visibility, and improve citation metrics. In the health sciences, such collaborations have been fundamental in addressing global challenges and accelerating innovation.[1-3]

In dentistry, studies have highlighted rising trends in authorship globalization and collaborative networks.[3-6] In Oral Pathology and Oral Medicine (OP/OM) specifically, Brazil alone produced 4,979 publications between 2014 and 2023 with a 63% increase from the previous decade and garnering 65,137 citations.[7] Brazilian OP/OM researchers who hold national productivity scholarships published 77.6% of their scientific articles in international journals, with internationally co-authored publications receiving significantly more citations than domestic-only ones.[8]

There is a complex interplay between local research capacity, international collaboration, and institutional support that characterizes scientific internationalization in emerging research economies.[9] The Brazilian experience in scientific internationalization offers valuable

Statement of Clinical Relevance

International research collaboration in Oral Pathology and Oral Medicine is associated with higher citation impact, reinforcing the importance of global scientific networks to enhance knowledge dissemination, evidence quality, and the clinical relevance of research produced in Latin America.

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insights into the challenges and strategies relevant to Latin America (LATAM) research communities, though broader evaluations across the region remain scarce. To date, no study has systematically assessed the internationalization patterns of OP/OM researchers across multiple LATAM countries. Therefore, the objective of this study is to analyze the internationalization of OP/OM researchers from LATAM.

METHODS

This is a cross-sectional scientometric study conducted between January and July 2025. The countries included were Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay. All data were obtained from publicly accessible sources and institutional repositories. Therefore, ethical approval was not required.

The identification of researchers in OP-/OM-affiliated area was carried out through multiple strategies. As per previous reference,[10] government websites and directories of postgraduate programs in each country were consulted to identify registered or affiliated researchers. Additionally, focal researchers from each country were contacted to provide the names of other potential OP/OM researchers. To complement these efforts, a search was conducted in the Scopus database, applying filters by institutional affiliation to identify any remaining researchers not captured in the previous steps.

After finalizing the list of researchers for each country, data collection was conducted using the Scopus database (https://www.scopus.com/), chosen for its broad coverage of indexed journals and publications. For each identified researcher, all affiliated scientific articles were retrieved and classified by country based on institutional affiliation. The following variables were extracted from each scientific article: year of publication, number of citations, and open access (OA) status. To assess internationalization, the authorship of each article was examined and categorized as either including or not including at least one foreign coauthor. In cases where multiple authors were affiliated with the investigated countries, classification was based on the institutional affiliation of the first and corresponding authors.

Data extraction was performed independently by two researchers (ST and LFRS). The articles were saved into Scopus lists and subsequently exported to Microsoft Excel spreadsheets, where duplicates were identified and removed. Statistical analyses were performed using IBM Statistical Package for the Social Sciences (SPSS) Statistics for Windows, 27.0. Descriptive analysis was performed with absolute and relative frequencies (n; %) for categorical variables and with measures of central tendency and dispersion (mean, standard deviation, median, interquartile range) for continuous variables.

The normality of citation distributions was assessed using the Kolmogorov−Smirnov test, which indicated non-normal distributions ($P < .05$). Comparisons of mean citation counts between publications with and without international collaboration, as well as between those with and without OA status, were initially performed using independent samples t tests. This approach is supported by the Central Limit Theorem, which ensures the normality of sample means for large sample sizes. To reinforce the robustness of the findings, nonparametric Mann−Whitney U tests were additionally conducted.

Binary logistic regression models were employed to predict the probability of international collaboration and OA status based on citation counts. In the first model, the dependent variable was the presence of international collaboration (yes/no); in the second, it was OA status (yes/no). In both models, the number of citations was treated as a continuous independent variable. Model accuracy was assessed using the Hosmer−Lemeshow goodness-of-fit test. Results were reported as odds ratios (OR) with corresponding 95% confidence intervals and P values. A significance level of 5% ($P < .05$) was adopted for all analyses.

RESULTS

Our search identified 8,040 publications published between 1947 and 2024, authored by 128 researchers across eight LATAM nations. Brazil contributed the largest share of publications (77.1%; n=6,196). Subsequent contributions originated from Argentina (6.9%), Mexico (5.3%), Chile (5.1%), Uruguay (2.8%), Ecuador (1.1%), Peru (1%), and Colombia (0.7%). International collaborations were present in 27.4% of the publications, and 39.9% of the scientific articles were published under OA. Table I displays the country-

Table I. Country-level distribution of publications with international collaborations and open access status

	Publications	*International collaboration publications*	*Open access publications*
Country	*N*	*N* (%)	
Argentina	553	97 (17.5)	118 (21.3)
Brazil	6,196	1,352 (21.8)	2,475 (39.9)
Chile	411	184 (44.8)	237 (57.7)
Colombia	53	19 (35.8)	22 (41.5)
Ecuador	91	65 (71.4)	49 (53.8)
Mexico	426	206 (48.4)	171 (40.1)
Peru	85	65 (76.5)	34 (40.0)
Uruguay	225	214 (95.1)	101 (44.9)
Total	8,040	2,202 (27.4)	3,207 (39.9)

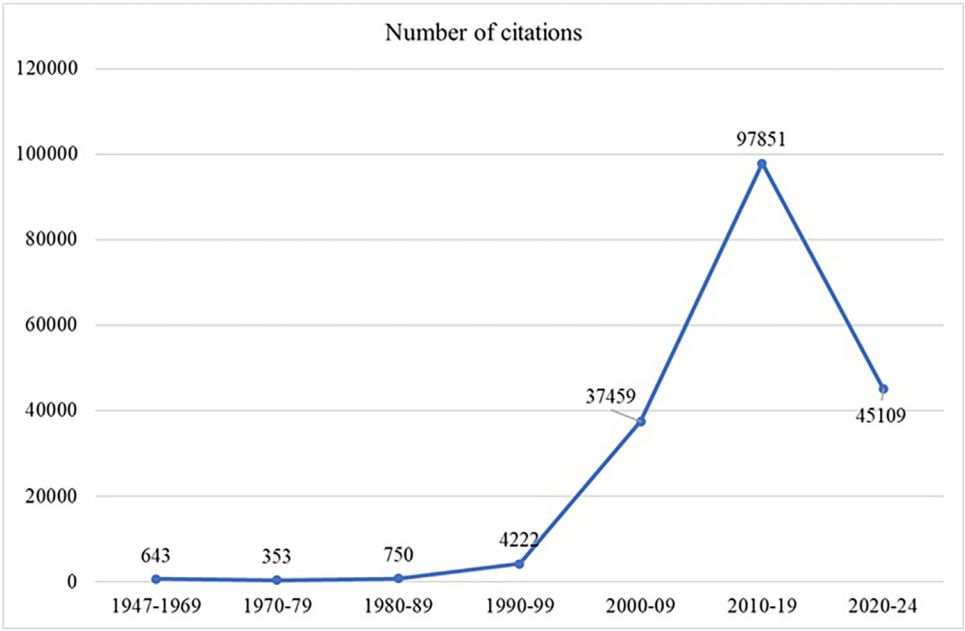

Fig. 1. Time series of citations by decade.

Table II. Citation metrics by publication type and country

	Total of citations		*International collaboration publications*		*Open access publications*	
Country	N	*Mean ± SD*	N	*Mean (SD)*	N	*Mean (SD)*
Argentina	10,499	18.99 ± 79.08	4,131	42.59 ± 181.09	3,638	30.83 ± 125.2
Brazil	156,868	25.32 ± 214.63	78,944	58.39 ± 456.3	59,044	23.86 ± 180.4
Chile	6,576	16.0 ± 41.91	3,319	18.04 ± 56.27	3,365	14.20 ± 24.60
Colombia	306	5.77 ± 7.24	161	8.47 ± 8.96	112	5.09 ± 7.13
Ecuador	1,011	11.11 ± 24.68	923	14.20 ± 28.07	555	11.33 ± 24.45
Mexico	7,178	16.85 ± 24.46	3,938	19.12 ± 26.33	2,415	14.12 ± 21.48
Peru	1,319	15.52 ± 24.69	1,149	17.68 ± 27.55	371	10.91 ± 10.76
Uruguay	2,630	11.69 ± 19.15	2,429	11.35 ± 18.80	1,231	12.19 ± 24.09
Total	186,387	23.18 ± 189.9	94,994	43.14 ± 360.6	70,731	22.06 ± 160.7

SD, standard deviation.

specific distribution of publications with international collaborations and OA availability.

A total of 186,387 citations were identified across the analyzed publications. The temporal distribution of citations reveals exponential growth in scientific impact over recent decades (Figure 1). While publications from 1947 to 1999 collectively accumulated fewer than 6,000 citations, the 2010-2019 period alone generated 45,109 citations. Most strikingly, publications from 2020 to 2024 (spanning just 5 years) account for 97,851 citations, more than half of the total (52.5%).

Publications with international collaborations exhibited substantially higher mean citation counts across all countries compared to overall averages (Table II). For instance, Brazil's collaborative scientific articles received 130% more citations on average (58.39 vs 25.32). Conversely, OA availability did not uniformly enhance citation impact, with countries like Chile and Mexico showing lower means for OA publications. The publication of international collaboration and OA practices has surged since the 1990s (Figure 2). International collaborations rose from 0.4% of publications in 1990-1999 to 19.3% in 2010-2019, before moderating to 14.2% in 2020-2024. Conversely, OA availability grew steadily, accelerating from 0.2% (1990-1999) to 17% (2020-2024).

As presented in Table III, publications involving international collaborations received significantly higher citations than noncollaborative scientific articles ($P < .001$). Conversely, OA status showed no statistically significant association with citation impact,

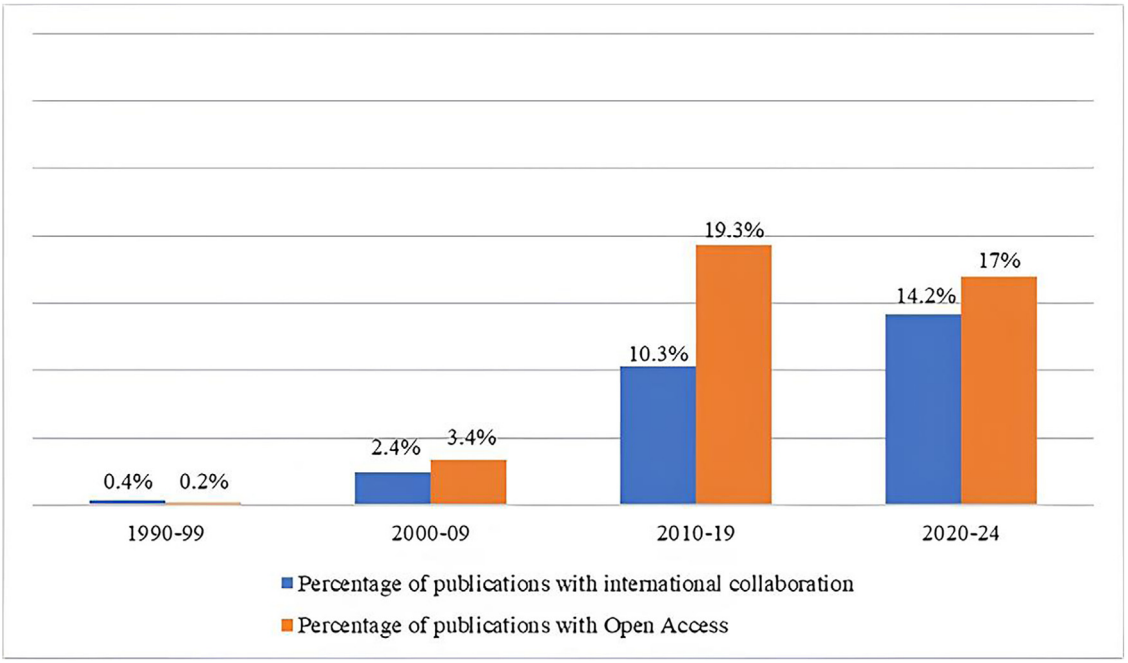

Fig. 2. Percentage of publications with international collaborations and open access by decades.

Table III. Comparison of citation impact for publications with international collaborations and open access status

Citations	*Mean ± SD*	P *value*	*Median (IQR)*	P *value*
International collaborations		<.001*		<.001†
Yes	43.14 ± 360.61		10 (4-24)	
No	15.65 ± 21.60		9 (3-23)	
Open access publications		.694		.185
Yes	22.06 ± 160.70		8 (3-20)	
No	23.93 ± 207.15		9 (3-22)	

SD, standard deviation; *IQR*, interquartile range.
*Significant statistical association with Student's *t* test.
†Significant statistical association with Mann−Whitney test.

Table IV. Predictors of citation impact by binary logistic regression analysis of publications with international collaboration and open access status

Variable	*β*	*OR (95% CI)*	P *value*
International collaborations	1.114	3.04 (2.87-3.23)	<.001*
Open access publications	0.409	1.50 (1.43-1.57)	.668

OR, odds ratio; *CI*, confidence interval.
*Statistical association by binary logistic regression.

whether measured by means (P = .694) or medians (P = .185). Binary logistic regression analysis (Table IV) further quantified these relationships. Publications with international collaborations showed a 204% increase in the odds of high citation impact (OR = 3.04, 95% CI: 2.87-3.23; P < .001) compared to noncollaborative publications. In contrast, OA status did not independently predict citation impact (OR = 1.50, 95% CI: 1.43-1.57; P = .668), reinforcing findings from univariate analyses.

DISCUSSION

In this study, we evaluated the extent and impact of internationalization among OP/OM researchers in LATAM. Our findings indicate that cross-border collaborations drive scientific relevance far more than OA practices alone. However, even though international collaborations have contributed to an increased chance of citations, the percentage of articles with contributions from foreign countries and published in OA is still noticeably lower than expected.

Brazil's scientific dominance in OP/OM reflects broader LATAM disparities in research investment, postgraduate infrastructure, and internationalization policies that have been well described in the literature.[7,10-18] Although an exponential growth in publications was observed across the region from the 2010s onwards, this progress has been uneven, shaped by contrasting national contexts, ranging from funding cuts and researcher emigration to limited incentives and concentration of output within universities.[11,19-25]

In our study, internationalization was assessed through publications in collaboration with foreign countries, and such publications were associated with a higher average number of citations. This result is consistent with previous studies conducted with Brazilian researchers in OP/OM.[7,8,16] These findings may be

explained by factors such as increased international visibility, broader access to scientific networks and diverse databases, and the combination of complementary methodological expertise among international groups. Multicenter publications also tend to be more valued by higher-impact journals, which favors their dissemination and, consequently, the number of citations received.[26-29]

However, we identified that the proportion of collaborative publications varied from 17.5% (Argentina) to 95.1% (Uruguay), with a total percentage of 27.4%, a value below expectations. In contrast, a study analyzing the indexed scientific output of Argentina researchers in the health field revealed that 43% of publications involved collaborations with foreign authors.[30] A bibliometric study based on Scopus data[11] identified Ecuador as the LATAM country with the highest number of publications featuring international coauthorships, and Uruguay as the country with the greatest scientific impact. However, a limitation of this study is that it assessed science across all fields (arts, humanities, technology, and industry), and local factors such as geographical dimensions and the size of the scientific community were not controlled as potential confounders in the analysis.

The absence of an association between OA publications and increased citation counts contradicts previous findings that identified a significant correlation between the adoption of open science practices and higher citation rates.[1,28,31-35] However, there is evidence showing that OA does not necessarily lead to increased citation numbers. A study that evaluated articles from journals in dentistry found that less than half (45.8%) were freely available, a prevalence higher than that observed in our study but still indicative of the low presence of indexed scientific articles in this model, and through multivariable logistic regression, it identified that OA was not associated with citation levels.[36]

A bibliometric study on international collaboration networks[37] identified findings similar to those of our study, showing that even with the increase in OA publications, these were not responsible for the significant rise in citation counts. The observed metric growth was concentrated in publications involving foreign collaborations, particularly with countries from the Northern Hemisphere, and in journals with higher impact factors (IFs). Previous research has identified that the IF predicts the number of citations in publications.[38]

Researchers tend to submit their manuscripts to higher IF journals that require APCs for the OA publication model, which in most cases cannot be covered by local funding policies.[39,40] A study conducted with researchers in OP/OM[41] reinforces this information, showing that even though researchers are familiar with OA policies, 88.2% stated that APCs are inappropriate, and fewer than 30% receive grants or institutional funding. In most cases, the fees are paid out of the authors' own resources. While the IF was not individually mapped in this study, international partnerships often facilitate access to high-impact journals. This synergy between collaborative networking and journal prestige is a decisive factor in increasing the visibility of LATAM research and overcoming regional citation gaps.

The findings regarding the behavior of LATAM publications reflect less a failure of the OA model and more the asymmetries of the national scientific ecosystem,[40] stemming from communities with few professionals, insufficient financial resources,[42] and limited application of scientific findings to local development.[37] As highlighted by analyses of LATAM health and clinical research, persistent low investment in research and development as a share of GDP, limited access to cutting-edge technologies, underdeveloped research infrastructure, and unequal participation in global networks hinder regional scientific visibility and excellence.[43,44]

Although South America journals have recently made efforts to achieve internationalization,[9,45] it is important to note that publications affiliated with the LATAM researchers in this study may be underrepresented or hosted in repositories not included in internationally recognized databases, which undermines the original mission of OA.[46] The limited reach of regional scientific literature influences discussions about infrastructure and difficulty in accessing local knowledge, perpetuating inequalities in the global circulation and internationalization of knowledge.

Although this study reveals crucial patterns in the internationalization of OP/OM researchers in LATAM, its limitations require caution in generalizations. Reliance exclusively on the Scopus database may underrepresent nonindexed regional journals, especially in countries with lower production. Furthermore, the definition of "internationalization" restricted to foreign coauthorship ignores dimensions such as participation in research networks, editorial policies, or educational exchanges. Additionally, it was not possible to categorize the specific countries involved in each collaboration or to differentiate the impact between single-country and multi-country partnerships. Such granular analysis would be essential to distinguish the effects of South-South vs South-North collaborations, representing an important limitation and an opportunity for future bibliometric investigations.

Another limitation involves the difficulty of precisely identifying all OP/OM researchers in LATAM. Variations in professional registration, different nomenclatures for the specialty across countries, and the lack of a unified regional database may have led to

an underestimation of the total number of professionals in the field.

International collaboration is an influential variable in metric impact, but its regional asymmetry reflects structural disparities. The lack of association between OA and citations suggests that visibility requires strategies beyond free availability, such as indexing in qualified databases and editorial professionalization. To democratize the benefits of internationalization, we suggest that LATAM science policies should foster South-South networks to reduce dependence on extra-regional partnerships, systematically finance translations, submissions, and publication fees (OA) for peripheral countries, and adopt alternative metrics that value the social impact of the knowledge generated, aligning scientific excellence with local relevance.

CONCLUSIONS

The presence of international collaborations significantly increases the impact of citations in publications by researchers. On the other hand, OA status did not demonstrate a consistent or significant association with citation metrics. However, the prevalence of articles from foreign collaborations and OA publications remains lower than expected in most countries, reflecting regional inequalities in research infrastructure, funding, and institutional support.

DECLARATIONS OF 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 article. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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