

Original Article

Language and style: A barrier to neurosurgical research and advancement in Latin America

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Received: 09 August 17 Accepted: 06 September 17 Published: 27 December 17

Abstract

Background: The neurosurgical burden in Latin America is understudied and likely underestimated, thus it is imperative to improve quality, training, and delivery of neurosurgical care. A significant aspect of this endeavor is for Latin America to become an integral aspect of the global neurosurgical community, however, there is a paucity of ideology and literature coming from Central and South America. We sought to explore neurosurgical dialogue originating from Latin America as well as barriers to the advancement of neurosurgery in this region.

Methods: We conducted a systematic literature review exploring research originating in Latin America in three international neurosurgical journals – Journal of Neurosurgery, Surgical Neurology International, and World Neurosurgery. We utilized PubMed search algorithms to identify articles. Inclusion criteria included publication within the three aforementioned journals, author affiliation with Latin American institutions, and publication within the specified time frame of January 2014 to July 2017.

Results: There were 7469 articles identified that met the search criteria. Of these 7469 articles, 326 (4.4%) were from Latin American nations.

Conclusion: Our data suggests a relatively low percentage of neurosurgical research originating from Latin America, suggesting a significant lack of participation in the global neurosurgical community. Barriers to global scientific communication include language, rhetorical style, culture, history, biases, funding, and governmental support. Despite challenges, Latin America is making strides towards improvement including the development of neurosurgical societies, as well as international collaborative training and research programs. We consider our report to be a valid initiation of discussion of the broader issue of neurosurgical communication.

Key Words: Capacity, communication, development, Latin America, neurosurgery

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| Access this article online |
| Website: www.surgicalneurologyint.com |
| DOI: 10.4103/sni.sni_294_17 |
| Quick Response Code: |
|  |

INTRODUCTION

The field of neurosurgery became evident across Latin America throughout the latter half of the twentieth century.^[10] Influences from the United States and Europe, with Latin American trainees, helped spark the development of neurosurgery across Central and South America.^[10] Currently, in Central America alone, there

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How to cite this article: Ashfaq A, Lazareff J. Language and style: A barrier to neurosurgical research and advancement in Latin America. *Surg Neurol Int* 2017;8:308.

<http://surgicalneurologyint.com/Language-and-style-A-barrier-to-neurosurgical-research-and-advancement-in-Latin-America/>

are roughly 200 neurosurgeons for a population of over 44 million people spanning 7 nations; this carries a ratio of 1 neurosurgeon per 200,000 people.^[10] Despite a significant shortage, neurosurgery in Latin America continues to grow and develop.

As is the current state of healthcare in all low-and-middle-income countries (LMICs), neurosurgery in Latin America faces vast public health challenges including lack of resources, funding, healthcare access and delivery, and governmental support.^[9] These issues are further compounded with challenges of food acquisition, nutritional deficits, water resources, and energy which affect the population, as well as medical infrastructure. In addition, the neurosurgical burden in LMICs is substantial. Neural tube defects alone can account for 17–70% of neonatal deaths in the developing world, and is attributed to 40,000 deaths worldwide annually.^[11] The rate of central nervous system trauma is also considerably high in LMICs, ranging from 200–600 per 100,000 annually.^[12] To date, there are no major epidemiological studies that denote the incidence of brain or spinal cord cancers or tumors. As such, the neurosurgical burden of the entire region of Latin America remains highly underestimated.

Given the significant neurosurgical burden in LMICs, it is imperative to improve the quality, training, and delivery of neurosurgical care. To improve research and advancement, Latin America must become an integral contributor in the global discussion of neurosurgery. To date, there is a paucity of literature originating from Latin America and relatively few papers in the indexed literature that express the opinion and experience of neurosurgeons from LMICs, reflecting a general lack of participation within the international neurosurgical research community. Part of the issue can be related to the intrinsic environment of contemporary surgical dialogue, with its emphasis on technical developments and ideologies that originate from high-income countries (HICs). Hence, there are barriers and difficulties when a surgeon from Latin America attempts to forward a critical comment about an experience regarding almost any aspect of surgical care.

We sought to explore the extent of neurosurgical dialogue originating from Latin American institutions by analyzing indexed literature from international neurosurgical platforms. Our interest was centered on the sheer number of studies from Latin America. Through this study, we attempt to initiate discussion and elucidate barriers regarding international neurosurgical communication.

MATERIALS AND METHODS

To contextualize the volume of neurosurgical research originating from Latin America, we conducted a systematic literature review using PubMed to identify

publications from the following international journals for neurosurgical research – “Journal of Neurosurgery,” “World Neurosurgery,” and “Surgical Neurology International.” Inclusion criteria included publication within the three aforementioned journals, author affiliation with Latin American institutions, and publication within the specified time frame. A search criteria filter was utilized to isolate articles from January-01-2014 to July-31-2017. We utilized the PubMed search algorithm (“(NAME OF JOURNAL)[Journal]) AND NATION[Affiliation]”) to identify publications fulfilling our criteria. The search criteria “NAME OF JOURNAL” was replaced with the name of the specific journal, and “NATION” was replaced with individual Latin American nations. The primary measure was the number of publications originating from Latin America.

RESULTS

In total, the number of publications from “Journal of Neurosurgery,” “World Neurosurgery,” and “Surgical Neurology International” within the timeframe was 7469 articles. Of these 7469 articles, 326 (4.4%) were from Latin American nations.

The sub-stratification of publications from individual Latin American nations is as follows: Brazil (164; 50.3%), Mexico (57; 17.5%), Argentina (35; 10.7%), Grenada (20; 6.1%), Chile (15; 4.6%), Colombia (10; 3.1%), Puerto Rico (8; 2.5%), Bolivia (4; 1.2%), Haiti (3; 0.9%), Costa Rica (2; 0.6%), Guatemala (2; 0.6%), Peru (2; 0.6%), Uruguay (2; 0.6%), Nicaragua (1; 0.3%), and Venezuela (1; 0.3%). These results are summarized in Figure 1.

DISCUSSION

The present study suggests an overall low percentage of neurosurgical research originating from Latin America compared to the rest of the world. This data insinuates a relatively low epistemological spread of ideas from Latin America. Furthermore, these results suggest that the Latin American neurosurgical community has been slow in integrating into the global realm of neurosurgical research and innovation, and more importantly advocate for improvements to a process that must be dynamic, given the sheer volume of surgical burden in the developing world.

If we agree that an integral part of surgical care is the communication between members of the surgical team, be it confined to the operating room or extended to the global realm, it is reasonable to suggest that an insufficient bidirectional flow of ideology is a barrier to the progression of surgical care. Given the paucity of neurosurgical literature originating from Latin American nations, a reasonable explanation for this phenomenon can

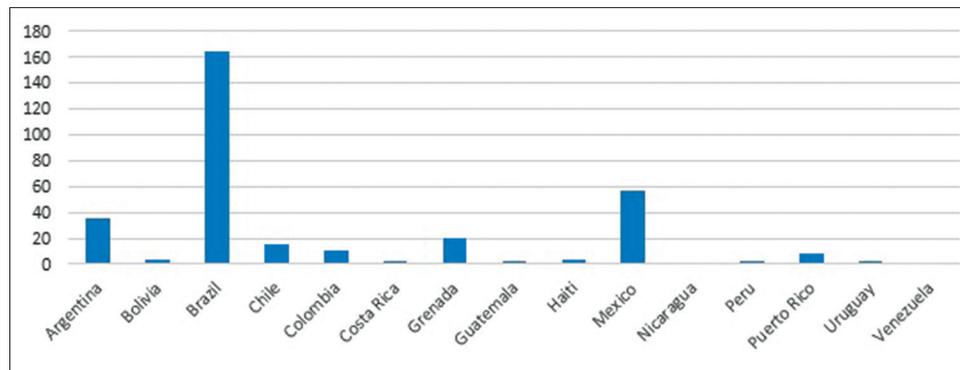


Figure 1: Number of publications from Latin American nations

be attributed to language. It is generally well recognized that language can pose a significant barrier to the transfer of scientific knowledge, and even translations can lose their original splendor when transitioned to an entirely different semantic, syntactic, and cultural context.^[1,8]

The role that language plays in hampering communication is frequently obviated by the assumption that all academicians have a working command of English, which of course is not the case. A study by Hanauer and Englander in 2011 showed that Mexican researchers have more difficulties in writing research manuscripts in English rather than Spanish.^[3] Another study from Spain regarding international environmental policy found that 54% of protected-area directors identified language as a barrier to global science.^[1] Furthermore, it has been reported that Spanish speaking researchers have rhetorical styles that are different than researchers for whom English is the native language.^[13] Vocabulary alone cannot be attributed to this phenomenon, but rather an amalgamation of vocabulary, style, rhetoric, implicit biases, and cultural factors. It is the sociological and cultural influences that affect the manner in which individuals choose to express their ideas.

Several solutions to the language and style issue have been suggested. One possibility is to allow authors to submit their research as a narrative, such as in the “Como lo hago yo” (How I do it) series published in *Surgical Neurology International*. This can be considered a fair alternative as aspects of research in clinical medicine and surgery can be considered closer to the social sciences rather than traditional biomedical science models. Publishing narratives would allow authors who are unfamiliar with the conventional style of a journal to have another avenue to present their findings. Another suggested solution is for encouragement of a bilingual system. In fact, certain Spanish journals now publish articles in both Spanish and English.^[8] In addition, the open-access movement and advancement of knowledge-sharing through the worldwide web has had positive outcomes on language barriers as certain journals now encourage authors to submit a version of their manuscript in the

native language as supporting material.^[8] While we are not advocating for a complete adherence to any of these models, we emphasize that there are alternatives for improving global communication on clinical surgery.

In addition to language, there are other factors behind the scant volume of research originating from Latin America. Physicians from Latin America identified lack of research infrastructure and training as a major barrier for local clinical investigation.^[2] These same physicians endorsed the creation of international North-American to South-American partnerships to allow Latin American researchers access to training and established research infrastructure. Lack of funding is also a major impediment as there is little financial incentive or financial support for research.^[2] Compounding this issue is the relatively low salaries of neurosurgeons across Latin America ranging from 7000 to 70000 US dollars depending on the location and public versus private practice.^[10] Financial incentive and proper support staff could potentially increase research activities among Latin American institutions.^[2] Regardless of individual nation, research capacity could significantly benefit from governmental monetary support and through long-term partnerships with international institutions.^[2]

Within the discussion of barriers to LMIC research, one cannot ignore historical context. A nation’s history can have incredible influence of culture on science, as well as global hierarchy. All nations in Latin America share a common history of colonial dominance, whose influence extended well beyond individual years of independence. This background has created biases in which similar ideologies are perceived as superior when coming from HICs compared to LMIC counterparts. For example, a study by Lazareff *et al.* published in a Mexican journal regarding the modification of a surgical technique for spasticity was never cited. However, when the same authors published a similar study regarding the same technique in an English journal, it was cited 44 times.^[4,5] Additionally, Meara and colleagues from Nicaragua have spearheaded the effort for improving surgical care, however, very few of the studies they cite are from LMICs.^[7] Ignoring and undermining such knowledge

will certainly dampen scientific visibility of research from LMICs, and can also cause biases worldwide in our understanding of clinical science. Certainly, part of the value of an idea is defined by its initial platform.

Despite these barriers, there is hope for the future of neurosurgical communication from Latin America. All countries in Central America alone have neurosurgery residency training programs and produce a total of 8–10 young neurosurgeons per year.^[10] Additionally, there are numerous Latin American neurosurgical societies that are growing and slowly becoming part of the global discussion of neurosurgery.^[6] As communication and technology advance in internet, telemedicine, and robotic surgery, there is potential to bridge the large communication gap between Latin America and the remainder of the globe.^[5]

Our study had several limitations. We acknowledge that the literature we reviewed came from only three journals. However, given the global neurosurgical focus, the authors felt this would best capture the discrepancy of Latin American studies. Additionally, the discussion topics brought forward in this report should be further explored with larger studies. We merely aimed to provide concrete examples of the scant bidirectional flow of neurosurgical research from Latin America to the remainder of the world.

CONCLUSION

Our data suggests a relatively low percentage of neurosurgical research originating from Latin America, suggesting a significant lack of participation in the global neurosurgical community. Several barriers exist and play a significant role in dampening global scientific communication. These barriers include language, rhetorical style, culture, history, biases, and many other factors. This issue is highly relevant, considering the substantial neurosurgical burden facing Latin America

and LMICs as a whole. In these settings, the voices of practitioners who perform surgical care must be heard. We consider our report to be a valid initiation of discussion of the broader issue of neurosurgical communication.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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