

The Role of Neurosurgeons in Policy Development: Addressing Unmet Neurosurgical Needs in Low-and-Middle Income Countries

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Abstract:

Introduction: Global Neurosurgical (GNS) publications can be classified into two broad categories: 1) clinical research and 2) public health research. To date, most papers and manuscripts have been clinical in nature. However, over the past 5 years, the focus of GNS manuscripts have changed dramatically. A recent scoping review identified public health-oriented GNS manuscripts from 1999 to 2019 and categorized them by the WHO's six Health System domains (service delivery, workforce, infrastructure, financing, information management, and governance). The objectives of this follow-up study include: 1) updating the literature search done in the scoping review and 2) discussing the importance of comprehensive policy recommendations.

Methods: We searched three databases – PubMed/MEDLINE, CINAHL, and EMBASE – for GNS literature published from June 2019 (the end of previous search date) to December 2020. Afterwards, a title & abstract screening was conducted.

Results: A total of 246 references were found across the three aforementioned databases. After the title & abstract screening, 68 GNS manuscripts were identified. Although a full-text review was not conducted, this cursory search supports the notion that the GNS community is now shifting towards a more holistic, health systems-oriented approach.

One limitation to this search method is the exclusion of commentaries and policy briefs that discussed governance within GNS. For example, the study excluded the Comprehensive Policy Recommendations that have been released by the Program for Global Surgery and Social Change (PGSSC). The first set of recommendations were about head and spine injuries. The second set of recommendations – published at the end of 2021 – focused on policy related to the management of Spina Bifida and Hydrocephalus.

Discussion: The Comprehensive Policy Recommendations clearly highlight how neurosurgeons can influence policy development and implementation. While these publications are a step forward, it is not enough. Moving ahead, the GNS community should: 1) widely disseminate the document to all, 2) selectively distribute the document to Ministries of Health, and 3) conduct more policy-focused research. To adequately address the unmet neurosurgical needs in LMICs, collaboration is paramount. It is time for neurosurgeons to think beyond the operating room.

Keywords: Global Neurosurgery, Policy Research, Health Systems, LMIC, Commentary

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Introduction

Global Neurosurgery (GNS) entails “the clinical and public health practice of neurosurgery with the primary purpose of ensuring timely, safe, and affordable neurosurgical care to all who need it”¹ – especially those in low-and-middle income countries (LMICs), where neurosurgical inequities are most profound.² Publications in this field can be classified into two broad categories: 1) clinical, and 2) public health research. To date, most articles have focused on clinical research. For example, evaluating the outcomes for procedure A vs procedure B, or investigating how to improve clinical outcomes in low-resource settings. However, over the past 5 years, the focus of GNS manuscripts have changed dramatically.

A recent scoping review identified public health themed GNS manuscripts from 1999 to 2019 and categorized them by the World Health Organization’s Health Systems Building Blocks Framework.³ The six domains of this framework include service delivery, workforce, infrastructure, financing, information management, and governance. The trend in research output is shown below, with the addition of GNS publications from June 2019 (the end of previous search date) to December 2020 (Fig 1).^{1*} Although a full-text review was not conducted, this cursory literature search supports the notion that the GNS community is now focusing on a more holistic, health systems-oriented approach to addressing unmet neurosurgical needs.

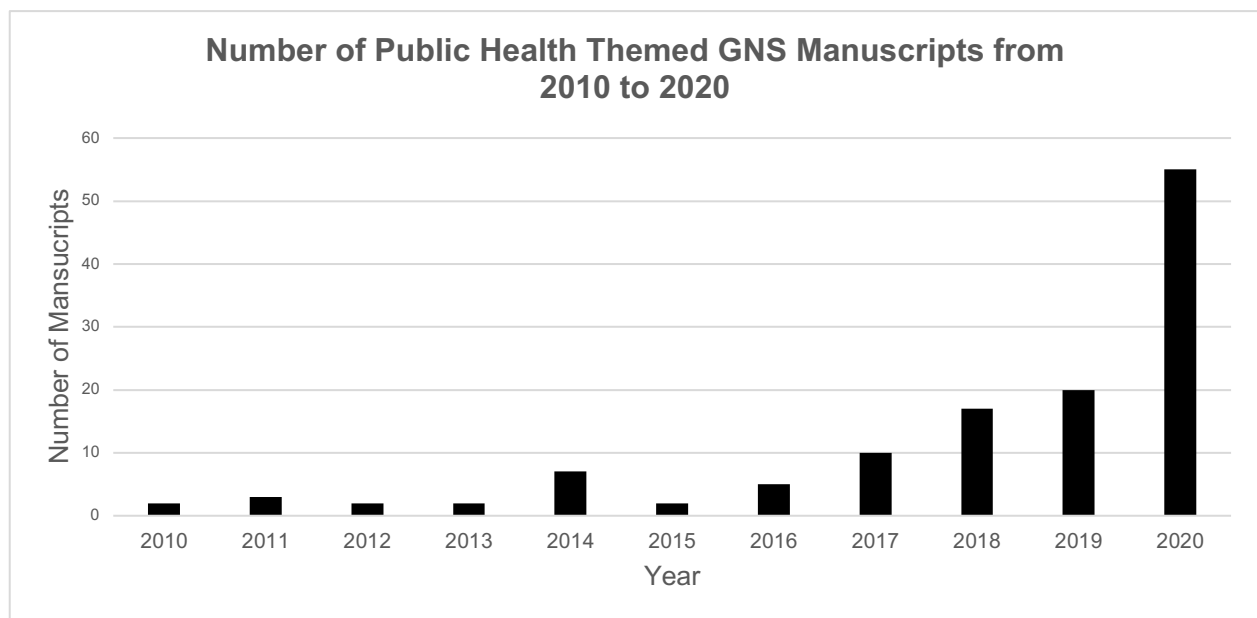


Figure 1: The trend in public health (system)-oriented GNS manuscripts from 2010 to 2020.

The prior review only analyzed “primary literature that used quantitative, qualitative, or mix-method reviews”.² Therefore, secondary literature that discussed governance within GNS (i.e. papers discussing governmental and non-governmental structures that exist to regulate neurosurgical systems), such as commentaries and policy briefs, was excluded during the selection process. With that being said, there have been significant publications about policies overseeing neurosurgical pathologies in low-resource settings. For example, the publication of the “Comprehensive Policy Recommendations for Head and Spine Injuries in LMICs” in March 2019.⁴ Neurosurgeons from across the world came together to work on this document. Using evidence-based research and consultation from an expert advisory group, the writers developed recommendations on how to manage head and spine trauma in LMICs, based on the six WHO health system domains, to address surveillance, prevention, pre-hospital care, surgical care, and rehabilitation needs.

Comprehensive Policy Recommendations: Spina Bifida and Hydrocephalus

Annually, there are more than 300,000 children born with neural tube defects worldwide.⁵ Of all neural tube defects, spina bifida (SB) is the most common pathology. In LMICs, the incidence of SB was estimated to be 1.13 cases per 1,000 livebirths.⁶ For context, in the USA, a high-income country (HIC), the incidence of SB is 0.36 cases per 1,000 live births.⁷ Common complications from SB include reduced mobility, orthopedic problems, gastrointestinal and urologic disorders, and hydrocephalus (HCP). Moreover, LMICs also share a disproportionate burden from new cases of pediatric HCP; it was estimated that the annual incidence of HCP in LMICs is 20 times that of HICs.⁸ The treatment for HCP includes the insertion of a shunt; however, shunt failures occur regularly – approximately 50% of shunts malfunction within 2 years of placement – and are often neurosurgical emergencies.

The “Comprehensive Policy Recommendations for the Management of Spina Bifida and Hydrocephalus”, published in December 2021, is designed to inform ministries of health (MOHs) on what policies may be useful in managing these two conditions. Over 50 individuals contributed to this document in some capacity (i.e. technical writing, research, or advising), and the advisory group consisted of practitioners from 17 countries (11 LMICs and 6 HICs).

These recommendations are based on the WHO health system domains and are further organized into six sections that span the continuum of SB/HCP care: 1) prehospital services, 2) surgical system strengthening, 3) rehabilitation, 4) transitional and follow-up care, 5) prevention, and 6) surveillance/screening. A specific recommendation includes targeting a ratio of 1 pediatric neurosurgical provider for every ~52,000 children.⁹ In addition, facilities should be arranged so that 80% of the SB/HCP population lives within one hour of a facility that can triage pediatric neurosurgical emergencies, such as acute shunt failures. Other recommendations include universal folic acid fortification, implementation of routine head circumference measurement, and promotion of national referral networks to expedite care.

Next Steps

The Comprehensive Policy Recommendations are clear examples of how neurosurgeons can assist in policy development. While these publications are a step forward, it is not enough. Moving ahead, the global neurosurgical community should:

- 1) ***Widely disseminate the document to all who can benefit.*** Social media (i.e. Twitter, Facebook, etc.) has been one of the greatest tools for the GNS movement. By using these platforms as a means for dissemination, these documents become more “visible” to the public eye. This increases the chance that these recommendations are incorporated into, or influence, existing and new health policies.
- 2) ***Selectively distribute the document to MOHs.*** Ministries of Health implement policies that shape how health systems function. Direct distribution to these organizations ensures this document is in the hands of the “target population”. Dissemination through social media represents a bottom-up approach (i.e. influencing individual neurosurgeons to advocate for policy changes); however, simultaneously utilizing a top-down approach may reap the most benefits (i.e. targeting policymakers in LMICs).
- 3) ***Conduct more policy-focused research.*** There is a glaring need for primary research into policies regarding GNS. Examples include analyzing the implementation of laws and evaluating the effectiveness of documents such as the Comprehensive Policy Recommendations. In reality, policies feed into every health system domain.

If the country’s strategic health plan does not account for pediatric, surgical, and rehabilitation services, where will children affected by SB/HCP go? How will neurosurgeons in LMICs afford to carry out essential operations, if policies aren’t in place to secure funding for training, equipment, and operating rooms? If the government-issued insurance does not cover SB/HCP, how will children and their families afford care?

It is time for neurosurgeons to think beyond the operating room. To adequately address the unmet neurosurgical needs in LMICs, collaboration is paramount. Neurosurgeons must work with other healthcare experts, public health researchers, and governmental and non-governmental organizations to engage in a more holistic approach to global neurosurgical conditions.

REFERENCES

- 1) WFNS Global Neurosurgery Committee. Global neurosurgery.WFNS Global Neurosurgery Committee. <https://globalneurosurgery.org>. Accessed November 5, 2021.
- 2) Dewan MC, Rattani A, Fieggan G, et al. Global neurosurgery: the current capacity and deficit in the provision of essential neurosurgical care. Executive Summary of the Global Neurosurgery Initiative at the Program in Global Surgery and Social Change. *J Neurosurg* 2018; 1-10.D
- 3) Ham EI, Kim J, Sidney U, Lartigue JW, Gupta S, Esene IN, et al. Cohesion between Research Literature and Health System Level Efforts to Address Global Neurosurgical Inequity: a scoping review. *World Neurosurg*. 2020. doi: 10.1016/j.wneu.2020.06.237
- 4) Park K, Khan T. Comprehensive Policy Recommendations for Head and Spine Injury Care in LMICs: Program'in'Global'Surgery'and'Social'Change, 2019.
- 5) Santos LMP, Lecca RCR, Cortez-Escalante JJ, Sanchez MN, Rodrigues HG. Prevention of neural tube defects by the fortification of flour with folic acid: a population-based retrospective study in Brazil. *Bull World Health Organ [Internet]* 2016;94(1):22–9. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4709794/>
- 6) Lo A, Polšek D, Sidhu S. Estimating the burden of neural tube defects in low– and middle– income countries. *Journal of Global Health*. 2014; 4(1): 1-9
- 7) CDC. “Spina Bifida: Data and Statistics.” CDC. September, 3, 2020. <https://www.cdc.gov/ncbddd/spinabifida/data.html>
- 8) Dewan, Michael C., et al. "Global hydrocephalus epidemiology and incidence: systematic review and meta-analysis." *Journal of neurosurgery* 130.4 (2018): 1065-1079.
- 9) Park K, Warf B “Comprehensive Policy Recommendations for the Management of Spina Bifida and Hydrocephalus in LMICs”. (2021). unpublished data.