SPECIAL ARTICLE
JournalSection

Current Status of Global Neurosurgery in South-East Asia

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1 | INTRODUCTION

Evidence of neurosurgery dates to the bronze age with records of skull trephination; it is one of the youngest specialties, evolving rapidly over the last century (1). Although neurosurgery developed rapidly globally, education, training, and service delivery standards are heterogeneous worldwide. In a world with unequal distribution of wealth and natural resources, what can be done to improve the health care service delivery in resource-limited nations? Historical analysis shows that cooperation among species dominantly contributes to the evolution of life in its current forms. Events at any scale have global impacts, and collaboration among the population has been critical in the survival of our species at different challenging timelines in the Earth's history.

The recent pandemic is a testament to the power and need for global collaboration for improved health care in resource-limited nations? Historical analysis shows that cooperation among species dominantly contributes to the evolution of life in its current forms. Events at any scale have global impacts, and collaboration among the population has been critical in the survival of our species at different challenging timelines in the Earth's history. "What is Global Neurosurgery?" isbeautifully penned, and various authors have shared their ideas regarding global neurosurgery (2,3). The author presented a comprehensive overview of articles published about global neurosurgery. The true meaning is acquiring a real international stature like global organizations (UNESCO, UNICEF, WHO, etc.), aiming to provide similar support services in resource-poor setups. Therefore, do we imply globalizing neurosurgery where uniform training and neurosurgery services are provided worldwide when we talk of global neurosurgery? Like other global initiatives, global neurosurgery has different perspectives, and a clear definition is not yet established. Neurosurgeons-in-training traveling outside their countries for education often face limitations in accessing these opportunities (4). Should alleviation of these restrictions constitute an essential aspect of global neurosurgery in a literal sense?

2 | NEUROSURGERY ACTIVITIES IN SOUTH-EAST ASIA

South-East Asia comprises eleven countries with widely diversified and impressive cultures, demographics, and natural resources: Brunei, Myanmar, Cambodia, Timor-Leste, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam (5). One in twelve now stay in this region, and the area has emerged as one of global importance for health and socioeconomic concerns (6). Most nations in South-East Asia have their neurosurgical societies and training programs. The number of neurosurgery training centers varies widely in these countries: one in Cambodia, two in Malaysia, four in Myanmar, eight in Indonesia, ten in Vietnam and Philippines each, and eleven in Thailand for the total population of 655 million (7). The first neurosurgical boot camp was conducted in South-East Asia in February 2017 in association with the Myanmar Neurosurgical Society and Foundation for International Education in Neurosurgery (FIENS). It was attended by residents and faculty from seven countries (8). It highlighted that technology-driven boot camps are not a remote possibility, rather very much feasible in low-and-middle-income countries (8). It has been further stressed that volunteerism, philanthropy, and industry support are crucial for the successful conduct of boot-camp courses in low-and-middle-income countries. Since 1998, various training programs in association with international centers under the aegis of the Asian College of Neurological Surgeons (ACNS), World Federation of Neurosurgical Societies (WFNS), and FIENS are conducing to improve neurosurgical services in resource-poor settings in South-East Asia (7).

3 | THE BEGINNING

The thought process for global neurosurgery began with an important question, "What is the benefit of creating a community dedicated to global neurosurgery?". The answer to this question is realized by witnessing the benefits of the Lancet Commission on Global Surgery (2,9,10). Recent literature has been mentioned a lot of information about the global aspect of neurosurgery.

A symposium organized at the WFNS World Congress in Beijing, China 2019, attempted to address heterogeneity in the standards of neurosurgical services, training, and education in developed and developing countries (7). There has been a phenomenal increase in the number of articles published on global neurosurgery in the past few years. This phenomenon is like the birth of neurosurgery as a separate specialty to improve patients' quality of life suffering from brain disorders. The result of this endeavor is in front of all of us; Global neurosurgery is a stage in the evolution of neurosurgical specialty, where the focus has been shifted from individual learning to collaborative skills teaching to the population at large (4), aims to strengthen neurosurgery care services and to teach in countries with limited facilities. Global initiatives in Bolivia and Sub-Saharan Africa have shown better results in improving neurosurgical services in remote locations. The World Health Organization (WHO) released a list of seventeen sustainable development goals by 2030, of which two are related to neurosurgery education: two non-communicable diseases in the global burden of disease categories (i.e., neoplasm and neurological disorders) are of concern to neurosurgeons (11). Global neurosurgery is discussed in almost all major neurosurgery society meetings. The main priority areas include outreach and collaboration, education, and metrics and evaluation by SMART evaluation criteria (12).

4 | CHALLENGES

Efforts in global neurosurgery highlighted the burden of neurological diseases and limited resources in low-and-middle-income country groups (13,14). Davis et al. reported a 35.3% response rate in assessing global pediatric neurosurgery outreach status and concluded that coordinated efforts are essential to identify the barriers to success (15). Studies have reported editorial bias as a critical factor for the poor representation of low-and-middle-income countries in research publications despite having a high disease burden (16). It has been reported that 91.3% of the editorial board members in four major leading spine journals are from high-income countries, with only 1.3% from middle-income countries and none from low-income countries (16).

Between 2008 and 2018, 8144 articles were published and indexed in the PubMed database about traumatic brain injury (TBI), of which the WHO regions AMR-US/Can comprise 4183 articles (51.36%), almost 90 times lower than the ratio of AMR-US/Can were the ratios for AFR (1.15) and SEAR (0.46) (17). As a recent initiative, global neurosurgery has various models for training and experienced neurosurgeon performing surgeries in resource-poor countries. Yet, the demands are unmet due to inadequate rewards and funding (18,19). For genuinely global neurosurgery, different neurosurgical societies need to cooperate to promote education, training, funding, technological support, data collection and analysis, and information exchange as a single entity and offer uniform opportunities to neurosurgeons from resource-poor settings. Efforts should be made to make literature subscriptions accessible or affordable with funding opportunities for neurosurgeons in low-and-middle-income countries.

5 | TRAINING AND COLLABORATION

It is evident from recent publications that a large volume of literature on traumatic brain and spine injury is published from high-income countries (HICs) as compared to resource-poor countries, which usually have a high burden of diseases. As a result, scientific pursuits' research results and benefits are not translated to enhance patient care in resource-poor settings. It is the responsibility of the neurosurgical community in resource-rich countries to create and provide a platform through journals and other activities for the neurosurgeons in resource-poor setups to take active participation and translate benefits reaped from such activities at the ground level to improve neurosurgical services. Efforts to enhance journal publications from neurosurgeons in resource-poor settings in South-East Asia will enhance neurosurgery knowledge and benefit the global neurosurgical community. There is an unmet need for hands-on training, on-site training, and financial support for better patient care in these settings, which the global neurosurgery community can address.

The importance of training in improving neurosurgical services and how it can help mitigate the challenges of global neurosurgery is highlighted in the study by Punchak et al. (20). The training and curriculum of neurosurgery residencies in South-East Asia are heterogeneous. The central role of boot camps is to provide training and didactic teaching with a uniform surgical skill set as in the western neurosurgical curriculum to improve patient care (21). The Society of Neurological Surgeons (SNS) conducts accredited boot camps neurosurgery training to familiarize residents with basic sciences knowledge, clinical neurosurgery, and operative skills, which will be using throughout their career (21). In one survey, 83% of the faculty reported boot camps to be beneficial for surgical skill development, knowledge, and enhanced patient care (21). A significant advantage of these courses will be to strengthen the neurosurgical workforce in resource-limited settings. Accordingly, stakeholders in the global neurosurgery community can make training provisions via the boot-camps liaison with local neurosurgery societies and centers. Unprecedented participation in the regional organization of these courses will offer a notable advantage as many residents and faculty find it difficult to attend the courses organized in far-off places.

The first such neurosurgery boot camp took place in South-East Asia in February 2017 with attendees from Myanmar, Cambodia, Nepal, Singapore, South Korea, Thailand, and Vietnam with positive results and active participation of faculty and residents (8). Yet, this cannot

be called a true global neurosurgical effort as the impetus of organizing such boot camps lay heavily on the willingness of local neurosurgeons, the cooperation of interested international neurosurgeons, and industry support. In global neurosurgery, it should be one of the objectives to harness support from local neurosurgeons and industry partners in the conduct of such courses, as the same would be easier to perform.The importance of training in improving neurosurgical services and how it can help mitigate the challenges of global neurosurgery is highlighted in the study by Punchak et al. (20). The training and curriculum of neurosurgery residencies in South-East Asia are heterogeneous. Boot camps' central role is to provide training and didactic teaching with a uniform surgical skill set in the western neurosurgical curriculum to improve patient care (21). The Society of Neurological Surgeons (SNS) conducts accredited neurosurgery training boot camps to familiarize residents with the knowledge of basic sciences, clinical neurosurgery, and operative skills, which the resident will be using throughout his career (22). In one survey, 83% of the faculty reported boot camps to be beneficial for surgical skill development, knowledge, and enhanced patient care (21). A significant advantage of these courses will be to strengthen the neurosurgical workforce in resource-limited settings. Accordingly, stakeholders in the global neurosurgery community can make training provisions via the boot camps in liaison with local neurosurgery societies and centers. Unprecedented participation in the regional organization of these courses will offer a notable advantage as many residents and faculty find it difficult to attend the courses organized in far-off places. The first such neurosurgery boot camp took place in South-East Asia in February 2017 with attendees from Myanmar, Cambodia, Nepal, Singapore, South Korea, Thailand, and Vietnam with positive results and active participation of faculty and residents (8). Yet, this cannot be called a genuine global neurosurgical effort as the impetus of organizing such boot camps lay heavily on the willingness of local neurosurgeons, the cooperation of interested international neurosurgeons, and industry support. In global neurosurgery, it should be one of the objectives to harness support from local neurosurgeons and industry partners in the conduct of such courses, as the same would be easier to perform.

6 | CONCLUSIONS

In summary, the health sector is not untouched by the benefits arising from these collaborative practices. Resource-limited countries present unique challenges to humankind owing to different demographics, resource availability, health concerns, literacy, and poverty. Two million cases do not receive essential neurosurgical services in a year in low-and-middle-income countries. The populations in Africa and South-East Asia are especially at risk due to an inadequate number of neurosurgeons, neurosurgery facilities, training, infrastructure, and research opportunities (14). It is probably the result of global neurosurgery initiatives that the problems and possible solutions from these regions are discussed at length across the globe for the first time. Large-scale multinational and multilateral engagement of neurosurgeons, philanthropists, and industry support providers is paramount to the success of global neurosurgery facing these challenges (22). More articles on the outcomes of measures adopted by global neurosurgery from limited-resource countries will help formulate future strategies. It is indeed a matter of pride that neurosurgeons from developed regions have joined together to spread the benefits, love, and joy of neurosurgery to their brothers and sisters from underserved areas. Cooperation and coordination of various societies such as WFNS, ACNS, Neurosurgery Outreach Foundation (NOF), and FIENS would prove to be a landmark in making neurosurgery truly global.

REFERENCES

1. Papagrigorakis MJ, Toulas P, Tsilivakos MG, et al. Neurosurgery during the Bronze Age: a skull trepanation in 1900 BC Greece. World Neurosurg. 2014;81(2): 431-435. https://doi.org/10.1016/j.wneu.2013.01.044.

2. Benzel E. Global Neurosurgery. World Neurosurg. 2018;112: xx. https://doi.org/10.1016/j.wneu.2018.02.046.

3. Andrews RJ. What's in a Name? "Global Neurosurgery" in the 21st century. World Neurosurg. 2020;143: 336-338. https://doi.org/10.1016/j.wneu.2020.07.233.

4. Agrawal A, Shrivastava A, Mishra R, Raj S, Chouksey P. Letter to the Editor Regarding "What's in a Name? 'Global Neurosurgery' in the 21st Century". World Neurosurg. 2020;143: 644-645. https://doi.org/10.1016/j.wneu.2020.08.143. 2021. UNSD-SCaACCMUNSDMRF.

5. De Roodenbeke E, Preker AS. South and East Asia as a Global Center for Healthcare Innovation and Investment Opportunities. World Hosp Health Serv. 2016;52(2): 3.

6. Kato Y, Liew BS, Sufianov AA, et al. Review of global neurosurgery education: Horizon of Neurosurgery in the Developing Countries. Chin Neurosurg J. 2020;6: 19. https://doi.org/10.1186/s41016-020-00194-1.

7. Rock J, Glick R, Germano IM, et al. The First Neurosurgery Boot Camp in Southeast Asia: Evaluating Impact on Knowledge and Regional Collaboration in Yangon, Myanmar. World Neurosurg. 2018;113: e239-e246.

https://doi.org/10.1016/j.wneu.2018.02.001.

8. Meara JG, Greenberg SL. The Lancet Commission on Global Surgery Global surgery 2030: Evidence and solutions for achieving health, welfare and economic development. Surgery. 2015;157(5): 834-835. https://doi.org/10.1016/j.surg.2015.02.009.

9. Servadei F, Rossini Z, Nicolosi F, Morselli C, Park KB. The Role of Neurosurgery in Countries with Limited Facilities: Facts and Challenges. World Neurosurg. 2018;112: 315-321. https://doi.org/10.1016/j.wneu.2018.01.047.

10. Rosseau G, Johnson WD, Park KB, et al. Global neurosurgery: continued momentum at the 72nd World Health Assembly. J Neurosurg. 2020;132(4): 1256-1260. https://doi.org/10.3171/2019.11.jns191823.

11. Dewan MC, Zuckerman SL, Sivaganesan A, Chatterjee S, Figaji A, Bonfield CM. Addressing the Global Burden of Neurosurgical Disease Beyond the Operating Room: Comment on Recent Global Neurosurgery Article in Journal of Neurosurgery. World Neurosurg. 2019;122: 364-365. https://doi.org/10.1016/j.wneu.2018.11.134.

12. Dewan MC, Rattani A, Fieggen 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. https://doi.org/10.3171/2017.11.jns171500.

13. Davis MC, Rocque BG, Singhal A, Ridder T, Pattisapu JV, Johnston JM, Jr. State of global pediatric neurosurgery outreach: survey by the International Education Subcommittee. J NeurosurgPediatr. 2017;20(2): 204-210. https://doi.org/10.3171/2017.3.peds16433.

14. Xu B, Meng H, Qin S, et al. How international are the editorial boards of leading spine journals? A STROBE-compliant study. Medicine (Baltimore). 2019;98(5): e14304. https://doi.org/10.1097/md.0000000000014304.

15. Tropeano MP, Spaggiari R, Ileyassoff H, et al. A comparison of publication to TBI burden ratio of low- and middle-income countries versus high-income countries: how can we improve worldwide care of TBI? Neurosurg Focus. 2019;47(5): E5. https://doi.org/10.3171/2019.8.focus19507.

16. Park KB, Johnson WD, Dempsey RJ. Global Neurosurgery: The Unmet Need. World Neurosurg. 2016;88: 32-35. https://doi.org/10.1016/j.wneu.2015.12.048.

17. Almeida JP, Velásquez C, Karekezi C, et al. Global neurosurgery: models for international surgical education and collaboration at one university. Neurosurg Focus. 2018;45(4): E5. https://doi.org/10.3171/2018.7.focus18291.

18. Punchak M, Mukhopadhyay S, Sachdev S, et al. Neurosurgical Care: Availability and Access in Low-Income and Middle-Income Countries. World Neurosurg. 2018;112: e240-e254. https://doi.org/10.1016/j.wneu.2018.01.029.

19. Fontes RB, Selden NR, Byrne RW. Fostering and assessing professionalism and communication skills in neurosurgical education. J Surg Educ. 2014;71(6): e83-89. https://doi.org/10.1016/j.jsurg.2014.06.016.

20. Selden NR, Origitano TC, Burchiel KJ, et al. A National Fundamentals Curriculum for Neurosurgery PGY1 Residents: The 2010 Society of Neurological Surgeons Boot Camp Courses. Neurosurgery. 2011;70(4): 971-981. https://doi.org/10.1227/NEU.0b013e31823d7a45.

21. Selden NR, Anderson VC, McCartney S, Origitano TC, Burchiel KJ, Barbaro NM. Society of Neurological Surgeons boot camp courses: knowledge retention and relevance of hands-on learning after 6 months of postgraduate year 1 training. J Neurosurg. 2013;119(3): 796-802. https://doi.org/10.3171/2013.3.jns122114.

22. Haglund MM, Fuller AT. Global neurosurgery: innovators, strategies, and the way forward. J Neurosurg. 2019;131(4): 993-999. https://doi.org/10.3171/2019.4.jns181747.