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Working in low- and middle-income countries: Learning from each other

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1. Introduction

Access for all people and communities to high-quality health services by 2030 remains a global commitment (Elliott, 2022; Meara et al., 2015). There is a common belief though, that the simple coexistence of infrastructure, medical supplies and health care providers is not enough. Improvement in health care quality is more important for timely, equitable, integrated and efficient care, especially in low-and middle-income-countries (LMICs) where the quality of care is documented as suboptimal (Berendes et al., 2011).

Working in LMICs can be challenging but at the same time extremely rewarding. European surgeons who visit these countries often take their annual leave to visit, work in compromised environments with limited resources, and can be presented with pathologies and infrastructure outside their comfort zone. Benefits are plentiful both to the visiting surgeon and the hosts with regard to the exchange of information, long term planning and avoidance of brain drain.

This article highlights some of the rewards and challenges of partnering with LMICs with regard to equipment, training, and how surgeons from high-income-countries (HICs) might be able to help.

2. Low- and middle-income countries (LMICs)

The World Bank classifies countries for analytical purposes into four income groups: low (<$ 1,046), lower-middle ($ 1,046- $ 4,095), upper-middle ($ 4,096- $ 12,695), and high income (> $ 12,695). For this purpose, it uses gross national income (GNI) per capita per year, based on official data published by the countries. As of July 1st, 2021 (newest classification) there are 27 low-income countries and 55 lower-middle-

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Abbreviations:

EANS	European Association of Neurosurgical Societies
GNI	gross national income
LMIC	low- and middle-income country
NGO	non-governmental organisation
WFNS	World Federation of Neurosurgical Societies

income countries, 55 upper-middle-income and 80 high-income countries. (World Bank).

Many countries are making progress toward achieving Universal Health Coverage, with most LMICs being in the process of implementing strategies for essential healthcare (Reid et al., 2020; Kiendrébéogo et al., 2020). Data suggests that in many LMICs the quality of care is sub-optimal. Poor quality care costs lives, in quality of life and carries a high financial cost by wasting precious resources (Berendes et al., 2011).

Of course, as surgeons we cannot directly affect the financial state of these countries, but indirectly we may help those colleagues who struggle to provide the best care they can for their patients in other ways. Training a high-quality health workforce, fostering excellence across all health facilities, ensuring safe and effective use of medicines, devices and other technologies, familiarising with effective use of health information systems and developing financing mechanisms for continuous support adapted to the local needs are some of the actions needed (Johnson, 2013; Ozgediz et al., 2005).

3. Infrastructure

One of the largest challenges is the hospital infrastructure in which the surgeons work. Often there is outdated equipment, equipment that does not work or has not adequately been maintained, and no financial support to bring about change (Diaconu et al., 2017).

Without adequate help from an already impoverished government, the status quo is unlikely to change. This leads to frustration from an already exhausted workforce. On average, almost 50% of health care financing in low-income countries comes from out-of-pocket payments, as compared with 30% in middle-income countries and 14% in high-income countries (Diaconu et al., 2017). When payments from general government expenditures, social (public) health insurance and prepaid private insurance are combined, only 38% of health care financing in low-income countries is combined in funding pools, which allow the risks of health care costs to be shared across population groups, as compared with approximately 60% in middle-income countries and 80% in high-income countries (Mills, 2014).

This has led to limitations in providing emergency care and increased patient suffering. Better care is often provided by Non-Governmental Organisations (NGOs) as they are supported by charities. In one country where the lead author has worked, the spinal infection rate was 1% in the NGO and over 50% in the government hospital, the latter due to overcrowding, insect infestation and absent cleaning protocols. The NGOs tend to have less bureaucracy and are better staffed, but this is a generalisation and will depend on the country and ultimately the chief of the department as well as their influence with the politicians. A visiting surgeon from abroad brings the plight of the host country into the spotlight and can improve the profile of the unit. This simple act of just visiting a hospital should not be ignored.

4. Medical device equipment

It has been estimated that 40–70% of medical devices and equipment in LMICs countries are broken, unused or unfit for purpose; this impairs service delivery to patients and results in lost resources (Diaconu et al., 2017). Means of obtaining such equipment are often outside the tender processes we are used to in Europe. This means that the upkeep and maintenance contracts may not be in order, leading to the equipment being left to ruin.

LMICs particularly lack the regulatory authorities, or indeed the biomedical engineering capacity, to advise on what medical device equipment is suitable for use in harsh deployment settings: i.e., facilities with high temperature, fluctuating electricity, or no clean water supply (Diaconu et al., 2017). The problem is compounded by a mismatch in the supply of the device. Manufacturers are usually based in high-income countries, and it is not cost-effective to send service engineers to maintain the equipment, especially if no contract is in place. Training should be incorporated into any protocol if such equipment is to be donated. Often there is a lot of publicity surrounding the donation of equipment which suddenly stops when the reality of using the equipment occurs.

Implants are often bought by the patient's relatives or the patient themselves and may be of low quality. Occasionally, implants are low quality but still relatively expensive. Implant manufacturers tend not to invest in LMIC, despite the need especially in the trauma scenario, as the returns are not comparable to sales in the US or Europe. There is no immediate solution to this problem and a long-term solution should be sought if we are to support our colleagues effectively.

5. Taking equipment over

Taking equipment over can also be challenging. Anecdotally, according to a personal experience of the lead author, taking a high-speed drill system to an LMIC caused problems in the customs department of the airport and although it was used for fixation of spinal fractures, it was sad to see the same drill system gathering dust on the storage shelves in the operating theatre two years later.

If a surgeon can donate equipment, it would be wise to also bring government documentation allowing it to come into the country and to make sure that the equipment can be maintained appropriately and has the necessary disposable parts (i.e., drill head).

6. Training and brain drain

One of the greatest challenges facing LMICs is training and the retention of trained staff. This can be considered of utmost importance if we consider the existing neurosurgical workforce gap between LMICs and high-income countries (Dewan et al., 2019; Bogota Declaration, 2016). Basic training programs are available but post-graduate training is sparse and not always attractive. Surgeons have limited funds to attend such programs. Government salaries are modest and therefore surgeons will understandably supplement their income with private care or by leaving the host country and working abroad (Johnston et al., 2020; Hagander et al., 2013; Cometto et al., 2013; Saluja et al., 2020).

Supporting surgeons in their environment gives them kudos and recognition of their vocation to help their people and it should be encouraged. There are many reasons why surgeons living in LMICs would emigrate including lack of research funding; poor facilities; limited career structures; poor intellectual stimulation; threats of violence; and lack of good education for children in their home country (AHJr, 2003).

With the advance of the internet and webinars, there is more opportunity than ever before to deliver a high level of teaching from experts in their fields without travelling (Uche et al., 2022). This could be backed up with face-to-face meetings for practical teaching and hands-on training and be reciprocated to motivate and encourage surgeons who are dedicated to their host country. This may reduce the emigration of doctors to the most common countries such as the USA, UK, Germany, France and Australia.

Organising recognised training courses in host countries would enable surgeons in LMICs to gain certified recognition without having to spend money on travelling, visa arrangements and accommodation. One of the authors organised a basic surgical skills course in Guyana, recognised by the Royal College of Surgeons of England (Timothy and Van

Hille Phil, 2003). The course was prescriptive didactic teaching following a set of tested principles. Those that attended the practical course were awarded the same certification of Basic Surgical Skills by the Royal College of Surgeons of England as would those taking the course in the UK. Another author organised and supported a free scholarship for 2 LMICs applicants for the theoretical-and-practical (Cadaver Lab) Masters degree on Surgical Approaches to the Craniovertebral Junction with the acknowledgement of the European Associations of Neurosurgical Societies (EANS) and World Federation of Neurosurgical Societies (WFNS). The selection was made based on their geographical and meritocratic evaluation performed by the EANS Global and Humanitarian Neurosurgery Committee and WFNS Educational Committee (Visocchi, 2019). This builds on and complements previous experience during the Covid-19 pandemic when there was a great deal of interest in implementing the arrangements of webinars, including a growing number of LMICs speakers.

As the EANS delivers high-quality teaching in Europe, the Global and Humanitarian Committee encourages the EANS to deliver and extend this teaching to LMICs at a significantly subsidised cost; and to partner with the host's national societies. In an ideal world, surgeons from LMICs should also be given the equipment they have been trained with so as not to lose their newly acquired skills.

7. Political issues

In LMICs, political unrest may occur and often there are local politics which must be managed sensitively. For example, helping one surgeon or hospital may cause jealousy in another. According to a personal experience of the lead author in an LMIC institution, one incident happened where the surgical qualifications of the visiting surgeon became derecognised after a neighbouring hospital surgeon complained to the health board. This can be averted by being all-encompassing and ensuring all surgeons in the region are included, for example, organising a mini-conference before any surgeries. The sustainability of a program will be enhanced if the host surgeon has the 'buy-in' of his and her colleagues and if they feel included in the process.

It may also be worthwhile to have the details of your Embassy in the host country before arriving, in case of emergencies.

8. What happens if something goes wrong

As a visiting surgeon, you might be asked to operate on the more difficult cases which have been deemed inoperable, such as large intradural tumours, severely deformed spines, and some cases that would not have a good outcome even in a high-income country. It is unlikely you will have the resources to deal with the pathology and however tempting and humbling it might feel to be asked to take on a difficult case, sometimes it may be best to be honest and not operate if you feel uncomfortable. Consider the worst-case scenario, such as what may happen if the patient dies or becomes paralysed because of your intervention? Although it is highly unlikely that you would have a medico-legal challenge, it may be worth enquiring whether the host hospital would support you in an extreme event. Most patients are grateful that they are given a chance at surgery despite the potential complications.

9. Benefits of visitation

Despite the multiple challenges in visitations, the overall benefits to both the visiting surgeon and hosts are enormous. For the host LMIC, there is recognition of the work they are doing in demanding and unfunded environments and a real potential to improve the health of a local community by providing and sharing surgical skills.

For the visiting surgeon, there will be an exposure to pathologies rarely seen, but they will also learn skills that will help them when they return to their environments.

There is almost always an opportunity to learn some simple and low-cost solutions, tips and tricks adopted by neurosurgeons from LMIC for managing neurosurgical conditions. Often a visiting team of surgeons, nurses and anaesthetists can motivate and encourage collaboration and remind the team why they went into healthcare rather than navigate the increasing Western bureaucracy that we are exposed to.

10. Give a fishing rod, not the fish

We have daily challenges in our profession, but we have little idea of how our colleagues do deal with the lack of equipment, resources, and training, in their countries. The adage 'Give a man a fish, and you feed him for a day. Teach a man to fish, and you feed him for a lifetime' is probably outdated. Firstly, that it is discriminatory, and secondly that currently is slightly condescending to our colleagues who clearly have significant skills to be able to operate in LMICs and can also teach the EANS surgeons. A more fitting adage would be 'Fishing is a discipline in the equality of humans - for all humans are equal before fish.' - Herbert Hoover (adjusted from 'men' to 'humans). We have daily challenges in our profession, but we have little idea of how our colleagues must deal with the lack of equipment, resources, and training, in their countries.

The EANS Global and Humanitarian Neurosurgery Committee hopes to be the portal to contact should you be interested in becoming involved or have experience in working with LMICs that you could share (Marchesini et al., 2022).

11. Conclusions

Working in LMICs can be challenging but rewarding and can contribute to reducing the gap between high-income countries and regions with limited resources. Sharing skills and learning from each other is possible and helps to mitigate the lack of workforce, but the ultimate goal would be to provide an improved quality of life for patients in need. Several issues could hinder collaborations and direct involvement in global neurosurgery activities. However, these should be overcome in the global perspective of reaching universal health coverage. This may be achieved only by awareness of such issues and collaboration with member societies with the willingness to change.

Declaration of competing 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 paper.

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