Contents lists available at ScienceDirect

Brain and Spine

journal homepage: www.journals.elsevier.com/brain-and-spine

Private healthcare initiatives in developing countries – Building sustainable neurosurgery in Indonesia and Pakistan

Tariq Khan [a], Eka Wahjoepramono [b], Petra Wahjoepramono [b], Russell Andrews [c,*]

[a] *Northwest General Hospital and School of Medicine, Peshawar, Pakistan*
[b] *Faculty of Medicine, Pelita Harapan University – Siloam Hospitals, Tangerang, Indonesia*
[c] *Nanotechnology & Smart Systems, NASA Ames Research Center, Moffett Field, CA, USA*

ARTICLE INFO

Handling Editor: Dr W Peul

Keywords:
Capacity development
Global neurosurgery
Healthcare financing
Health system strengthening
Low- and middle-income countries
Private sector healthcare

ABSTRACT

Introduction: Severe global shortages in neurosurgery, surgery, and healthcare in general have been documented, especially in low- and middle-income countries (LMICs).
Research question: In LMICs, how do we expand both neurosurgery and overall healthcare?
Material and methods: Two different approaches to improving neurosurgery are presented. Author EW convinced a private hospital chain that neurosurgical resources were important throughout Indonesia. Author TK established a consortium (Alliance Healthcare) to obtain financial support for healthcare in Peshawar, Pakistan.
Results: The expansion over 20 years in neurosurgery (throughout Indonesia) and in healthcare (for Peshawar and Khyber Pakhtunkhwa (KP) province, Pakistan) is impressive. In Indonesia, neurosurgery centers have expanded from one in Jakarta to over 40 throughout the islands of Indonesia. In Pakistan, two general hospitals, schools of medicine, nursing, and allied health professions, and an ambulance service have been established. Recently US$11 million has been awarded to Alliance Healthcare by the International Finance Corporation (the private sector arm of the World Bank Group) to further expand healthcare infrastructure in Peshawar and KP.
Discussion and conclusion: The enterprising techniques described here can be implemented in other LMIC settings. Three keys to success both programs utilized: (1) educating the community (population at large) of the need for surgery in particular to improve overall healthcare; (2) being entrepreneurial and persistent in seeking the community support and the professional and financial support needed to advance both neurosurgery and overall healthcare through the private sector; (3) creating sustainable training and support institutions and policies for young neurosurgeons.

1. Introduction

Two events in 2015 were transformative: one for global healthcare, the other for global surgery. The first was the United Nations (UN) "2030 Agenda for Sustainable Development" (United Nations, 2015); the other the Lancet Commission on Global Surgery 2030 report (Meara et al., 2015). The first set 17 sustainable development goals in many fields (goal #3 being concerned with healthcare); the other documented the detrimental effects of lack of adequate global surgery.

Since 2015 there have been numerous publications documenting global surgery needs in more detail (particularly in low- and middle-income countries – LMICs). One example is the World Health Organization (WHO) National Surgical, Obstetric, and Anesthesia Plan (NSOAP) that sets surgically related goals for a country to reach by 2030 (World Health Organization, 2017).

The question is: "How do we reach the surgery and healthcare goals for 2030?"

Two of our neurosurgical colleagues – one in Indonesia, the other in Pakistan – have implemented programs that offer insights into how we can expand both neurosurgery and overall healthcare in LMICs. Both are entrepreneurial private sector initiatives. The programs below have also been e-presented in the World Federation of Neurosurgical Societies (WFNS) Newsletter.

* Corresponding author.
E-mail addresses: tariq.k@nwgh.pk (T. Khan), ekabrain@gmail.com (E. Wahjoepramono), pet_op@hotmail.com (P. Wahjoepramono), rja@russelljandrews.org (R. Andrews).

https://doi.org/10.1016/j.bas.2023.101729
Received 29 December 2022; Received in revised form 12 February 2023; Accepted 6 March 2023
Available online 9 March 2023
2772-5294/© 2023 The Authors. Published by Elsevier B.V. on behalf of EUROSPINE, the Spine Society of Europe, EANS, the European Association of Neurosurgical Societies. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

2. Methods and results

2.1. Indonesia (Eka Wahjoepramono)

When I started practicing neurosurgery in 1994, Indonesia was a developing country with no universal health coverage and had not invested a lot of resources in neurosurgery. Providing neurosurgery service was a great challenge, since Indonesia is an archipelago spanning more than 17,000 islands, with a disproportionate 50 neurosurgeons for 200 million citizens. The government was focused on building up general medical care in the population centers, which left little room for neurosurgery.

I understood that help from the private sector was needed to expand the profession. Neurosurgery as a profession cannot stand alone, as it needs the support of other specialists and specially trained nurses for a good outcome. The infrastructure and equipment we use are very costly. Indonesia did not have philanthropists who would invest in medicine, as government regulations are often complicated and many think healthcare is not a good investment.

In 1996, I approached a banker, Mochtar Riady, who founded the privately owned Siloam Hospitals (Formerly Siloam Gleneagles). Initially it was to become a cardiology center, but two of us neurosurgeon-entrepreneurs persuaded him to give neurosurgery a chance. One can appeal to these wealthy people (often the families of our patients) so they can see that participation in healthcare is not only a business investment but it also builds up honor and respect for their companies, and is a contribution to the nation as a whole.

Siloam Hospital was located in the suburbs of Jakarta, and we had to convince the founder that people will come from far away for high quality neurosurgery. So we did many things to make the public know we are here. We made international seminars involving the WFNS educational courses and the Asian Congress of Neurological Surgeons (ACNS), plus interviews and talk shows on neurosurgery to increase our presence in the media. We invited experts from abroad, initially from Canada and Japan, to come and perform difficult operations. We worked hard to increase the number of surgeries.

My main principle was that Indonesian neurosurgery must be on par with neurosurgery in advanced countries. We were determined to give the same quality service as our colleagues in Japan, Singapore, or America. To achieve this, I recruited four other neurosurgeons into my hospital, so each can develop their own subspecialties. This was unheard of in Indonesia at the time, where usually one surgeon will serve many hospitals to get a lot of cases. As our reputation grew, we started receiving complicated cases such as arteriovenous malformations, giant aneurysms, brainstem tumors, and others that were usually sent abroad for surgery.

We also took part in medical education, along with the founding of Universitas Pelita Harapan Medical School in 2001. All our team took time to teach medical students in pre-clinical and clinical settings. We gave them a taste of neurosurgery to encourage them to pursue further education. We provided public education seminars and lectures together with our students.

In 2006, the Siloam Hospitals group started to expand. The group's founder determined that Indonesia needed more hospitals, especially in remote places. I saw this as a chance to expand neurosurgical service in Indonesia and talked with management to equip the new hospitals for neurosurgery. We started recruiting surgeons, preferring those who came from the same area as the new hospital, so they would be happy to return and serve their own birthplace instead of going to the capital. We gave them a starting wage so they could survive and be encouraged to develop their centers. If they need to perform complicated operations, they will consult with the group, and our subspecialty neurosurgeons will fly to their area with specialized equipment to perform the operation in their center. This increases the confidence of our younger colleagues until they can perform the operation independently, and also increases the public trust in our team. We only require their dedication – to work only in the Siloam Hospital. If there are no other neurosurgeons in their area, they may also work in the public hospitals.

Learning from a patient with a brainstem cavernoma whom I operated on who did not have any money or insurance, I created the Indonesia Brain Foundation – a charity to help fund underprivileged patients. For these cases, the doctors' fees are waived. In 2015 the hospital started cooperating with government insurance. The program reimbursed a small amount of money, so we made it work by reducing our pay and using our private equipment. By doing this we could provide better service to the country and the population.

Indonesian public welfare system also improved with the introduction of the Badan Penyelenggara Jaminan Sosial (BPJS) payment scheme in 2014. Although the BPJS has limited coverage, we are able to provide basic neurosurgery using this scheme. We loaned equipment such as high-speed drills, surgical microscope, and microsurgery tools to the public hospital to expand its neurosurgical capabilities. Patients who could not afford private care were referred to the public hospital to be operated by our team. This sort of public-private partnership appears successful and has been tried out in several hospitals of our group.

By 2022 the Siloam group had more than 40 hospitals, and our team had 31 full-time neurosurgeons working nationwide (Jakarta Globe, 2022) (Fig. 1). We are still expanding, especially in the eastern part of Indonesia, where the healthcare infrastructure is still underdeveloped. I encourage our younger colleagues to sub-specialize, and many are pursuing their doctorates as well (Wahjoepramono, 2015). Our university is the first private university in Indonesia to have medical specialization education and is hoping to open a neurosurgery program soon. The public hospital performed more than 150 surgeries this past year (under partial COVID conditions).

In LMICs we must look for opportunities to grow, take calculated risks, and help each other so we can move forward. We need to have good communication with hospital stakeholders. It is crucial to be communicative and open to suggestions. We need to talk to and convince other medical/surgical specialties, nurses, and hospital administrators to try our proposals. We need to be present at every step of the way: in the Radiology Department while our CTs and MRIs are interpreted, at the pre-op clinic to make sure pituitary hormones were checked, at surgery to communicate with our Anesthesia and Intraoperative Monitoring colleagues, in the ICU and the wards post-op, at the Pathology Lab while processing the specimens, and so on.

While our group has opened neurosurgery in 40 hospitals, the government is opening neurosurgery in many more, to be staffed by 20-plus new neurosurgeons per year. We believe our next step is to open a neurosurgical education program, to provide more young neurosurgeons for our country, and to keep public interest in neurosurgery alive by giving public lectures and interviews.

Having a solid team helps us to increase subspecialty skills, while increasing our bargaining power and attracting more patients. I believe that this is a good way to develop neurosurgery in Indonesia so we can serve more patients. We hope to recruit many new neurosurgeons to our team in the coming years, as well as deepen each member's expertise by subspecialization – to keep on leading the future of neurosurgery in Indonesia.

2.2. Peshawar, Pakistan (Tariq Khan)

After neurosurgical training in Ireland, I returned to Peshawar to my parent institution, Lady Reading Hospital, in January 1990 as the second neurosurgeon in the Khyber Pakhtunkhwa (KP) province of Pakistan. At that time there were fewer than 30 neurosurgeons for a population of 150 million in Pakistan. We were given eight beds with our patients spread all over the hospital and only two days a week to operate. Lacking a CT scan the first year, for head injuries I did exploratory burr holes under local or no anesthesia. The hospital was very much helped by donations of disposables and instruments from Belfast and Cork in Ireland. By the mid 1990s we had operating microscopes plus intensive care and improved

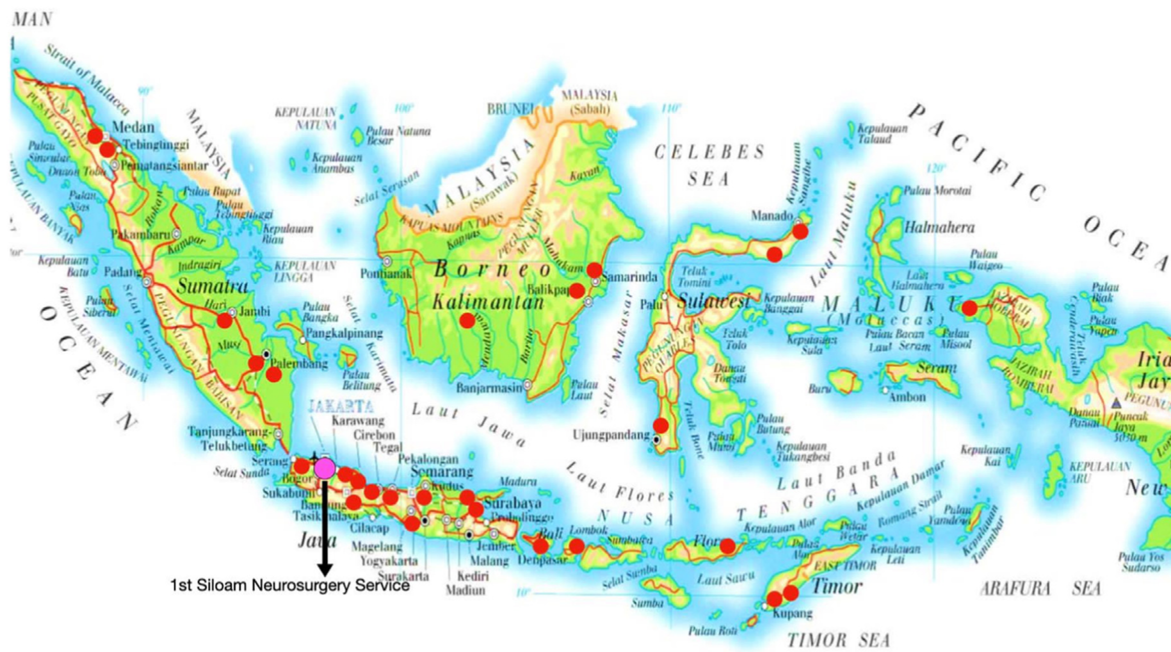

Fig. 1. Location of Siloam hospitals in Indonesia with staff Neurosurgeons – 2021.

anesthetic services so that we could do brain tumors and other complex surgeries.

In 1997 a new hospital, Hayatabad Medical Complex, was commissioned and I was asked to start a new Neurosurgical Department there. Since by this stage I was an approved supervisor for Fellows of Neurosurgery for the College of Physicians and Surgeons of Pakistan, I was able to train a number of young neurosurgeons. There are about 75 trained neurosurgeons now in KP province and nearly 500 in the whole country – roughly 1 neurosurgeon for 500,000 population in both KP province (40 million population) and the entire country (220 million population).

In 1997 I also realized that prevention of head and spine injuries was essential for quality, full-service neurosurgical care – so we started a Head Injury Society in Peshawar. I convinced people in the community of the importance of prevention. We started regular public awareness events, e.g., walks, seminars, and poster competitions. As a part of their curriculum, the College of Home Economics made it mandatory for students to visit school children and make them aware of trauma prevention. At my request the Pakistan Society of Neurosurgeons started these awareness programs as part of their Annual Conference. The International Committee of the Red Cross started a rehabilitation unit for spinal cord injury patients, a facility that was later turned over to the KP provincial government.

In 2001 the provincial government enforced new rules that would not help poor patients who came to the public hospital to get free medical treatment. Along with many senior colleagues we had to bid goodbye to the public sector with a heavy heart. We wanted a state-of-the-art setup that could not only care for the patients who could afford to pay but also care for those who could not afford to pay. We also wanted to train young doctors and allied specialties, so that we could improve healthcare in the province and the country.

We set up Alliance Healthcare in 2005. Getting like-minded people together was a difficult task and getting money together was even more difficult. The ten initial shareholders pooled our resources together. We approached different banks for a loan, but most banks were very skeptical since no doctor groups had previously developed a big hospital in this region. Finally one of the banks loaned us 500 million Pakistan rupees (about US$6 million at that time). Many years later a former CEO of the bank told me that he informed his staff that giving us a loan was a big mistake – we would never be able to repay. We not only repaid that loan but later we received more loans. The bank showcases us as a triple A customer.

Our first hospital, state-of-the-art Northwest General Hospital with all specialties, became functional in 2008 (Fig. 2). This hospital initially had 130 beds and that were ultimately increased to 300 beds. The hospital organization was nominated as the fastest growing company in the Arabia 500 Competition held in Dubai under the auspices of Harvard University.

In 2012 we were approved by the College of Physicians and Surgeons of Pakistan for training in most specialties. The following year we were approved by the Pakistan Medical and Dental Council for residency training in all specialties.

In 2015 four Bachelor of Science (BS) programs were started in Nursing, Anesthesia, Medical Laboratory Technology, and Radiology since there was a dearth of four-year BS-trained people in these disciplines. Along with this a five-year program in Doctor of Physical Therapy was also launched.

The Northwest School of Medicine was inspected and approved for 100 students per year by the Pakistan Medical Commission, beginning with the 2016–2017 session. Reinspection in November 2021 resulted in approval for an additional 50 students per year. We have been approved by the Higher Education Commission to establish Northwest University of Health Sciences and are on the verge of approval from the provincial cabinet. This will be a first of its kind university of the health sciences in the private sector of KP province.

Another 300 beds have been added in the second hospital. These beds are not-for-profit and are run through our endowment fund, to which both the company and shareholders contribute regularly. This was seen as a very successful model and has been studied by a group at Harvard University. This not-for-profit hospital is making a big contribution to healthcare in Peshawar and KP province.

Regarding medical education, we have joined hands with the only public sector medical university of the province to start a bachelor's program in Aesthetic Technology to share our infrastructural and other resources as our commitment to build a strong, reliable health system. This will expand to other disciplines as well. A Masters in Neurosurgery has been initiated as a joint venture with the public sector medical university as well. We are in the process of establishing collaborations with the three public tertiary care hospitals of the city to provide joint training

Fig. 2. Northwest general hospital – Neurotrauma Conference 2009.

opportunities to our residents and undergraduate medical students, through electives and other placements.

Although the government has established an excellent network of ambulance services, our hospital added to that with our own ambulance service in 2017, staffed by paramedics trained in basic life support and equipped with life-saving drugs and equipment (including transport ventilators). In addition, we have a campaign to make people aware of this ambulance service for transporting acutely ill patients to hospital.

To raise public awareness about neurotrauma prevention, we partnered with ThinkFirst International (Youngers et al., 2017). The first joint awareness seminar with about 1000 participants was held in Peshawar during the International Conference on Recent Advances in Neurotraumatology (ICRAN) in November 2019; this event was widely reported in the media throughout Pakistan. We also received the 2019 ThinkFirst International Chapter of the Year Award.

The private sector is estimated to provide 70% of healthcare services in Pakistan; KP province has roughly 1/3 the number of doctors and nurses as the Pakistan national average. In 2015 KP province was the first in Pakistan to launch the Sehat Sehulat Program, Pakistan's health insurance initiative to improve access to quality healthcare for underprivileged groups (International Finance Corporation, 2022). Alliance Healthcare hospitals pioneered participation in the Sehat Sahulat Program insurance scheme paid by the government (Sehat Insaf Card). We have adopted a public sector owned Basic Health Unit providing primary care to local communities. Our junior consultants from different specialties visit the facility to provide services and offer referrals to our main hospital if needed. We have equipped the Basic Health Unit with an ultrasound as well.

The International Finance Corporation (IFC – the private sector arm of the World Bank Group) has recently invested US$11 million in Alliance Healthcare to expand Northwest General Teaching Hospital, including 200 additional beds and 50 additional outpatient rooms for patients covered by the Sehat Sehulat program, as well as 50 beds and expansion of the diagnostic services in Northwest General Hospital, and an eight-story dormitory for medical students. The IFC noted "Northwest General Hospital … comprises quality care from highly trained professionals and access to high-grade medical facilities and equipment … leveraging the private sector's knowhow and capacity will help lay the groundwork for a more efficient, accessible, and equitable healthcare system for all" (International Finance Corporation, 2022). Alliance Healthcare anticipates achieving Joint Commission International accreditation soon as well as being listed on the Pakistan Stock Exchange in a few years.

For over 25 years now, I have dedicated myself to improving both neurosurgical care and general health care for the people of Peshawar and the KP province. Thanks to the many others who have shared this vision, we have made significant progress.

3. Discussion and conclusions

Despite the apparent differences between the programs of Eka Wahjoepramono in Indonesia and Tariq Khan in Pakistan, some similarities are apparent:

1. They both are local, private-sector efforts – not the result of collaborations initially with international organizations or high-income country institutions.
2. They both began with physicians forming a group to address their region's healthcare needs.
3. They both started with sustained efforts to inform the community of the importance of surgery/neurosurgery.
4. They both demonstrated perseverance in obtaining funding for their program.
5. They both nurture future generations of medical doctors and neurosurgeons by increasing interest in medicine in general and neurosurgery in particular, as well as increasing education and training opportunities for physicians, nurses, and allied health professionals.

There are challenges and limitations to private sector initiatives like we have described in Indonesia and Pakistan:

1. Cost of care is a major limitation to initiating a private sector neurosurgery program in an LMIC. Some LMICs are handicapped by existing private sector healthcare that is resistant to serving those patients who are unable to pay handsomely for neurosurgical care. In these situations, a neurosurgeon working in conjunction with colleagues in other specialties, nurses, hospital support staff, and hospital administrators can hopefully convince both government officials (e.g., Ministry of Health) and leaders of the existing private sector healthcare of the economic benefits of close collaboration both between the public and private sectors and among the private sector stakeholders.
2. Establishing harmony between the public and private sectors can also be challenging when one expands a private sector healthcare initiative. The public sector (and/or other private sector healthcare providers) may perceive you as a competitor rather than a collaborator. The severe lack of surgical care in particular in virtually all LMICs should be made clear to all stakeholders. Providing excellent care to all citizens will benefit all healthcare sectors; healthcare is not a zero-sum game.
3. Geographic aspects can complicate private healthcare initiatives, especially for resource-intensive specialties like neurosurgery. Establishing quality neurosurgical care in smaller cities and remote areas is particularly challenging. Recruiting neurosurgical trainees from these more rural areas – and providing them close support when they return to their home region after completing training – is important to avoid rural-to-urban "brain drain", as has been demonstrated in Indonesia to be possible.
4. A private sector neurosurgery initiative must be tailored to the situations of the particular LMIC or location involved. There is no "cookbook" formula for expanding neurosurgical care that will work everywhere. We hope that our description of two very different initiatives in two very different settings will help make other neurosurgeons aware of the challenges and possibilities of building sustainable neurosurgical care in LMICs – and that such programs can evolve and grow over decades.

The "take home message" is that these programs in Indonesia and Pakistan should inspire neurosurgeons elsewhere to be entrepreneurial, innovative, and dedicated in their pursuit of better neurosurgery and improved healthcare for the residents of their city, region, or country.

Declaration of competing interest

We have no conflicts of interest apart from the relationships described in the manuscript.

References

Globe, Jakarta, 2022. Jakarta Gov Anies Baswedan Welcomes Siloam Agora Hospital in E Jakarta. Jakarta Globe. May 31.
International Finance Corporation, 2022. Private sector role in reviving our healthcare system. Expr. Tribune (Pakistan) 15. December.
Meara, J.G., Leather, A.J.M., Hagander, L., et al., 2015. Global surgery 2030: evidence and solutions for achieving health, welfare, and economic development. Lancet 386, 569–624.
United Nations, 2015. Transforming Our World: the 2030 Agenda for Sustainable Development. United Nations, Geneva, Switzerland, p. 41.
Wahjoepramono, E.J., 2015. Neurosurgery in Indonesia. Int. Neurosci. J. 1 (1), 77–78. Mar 1.
World Health Organization, 2017. Surgical Care Systems Strengthening: Developing National Surgical, Obstetric and Anaesthesia Plans. World Health Organization, Geneva, Switzerland, p. 57.
Youngers, E.H., Zundel, K., Gerhardstein, D., et al., 2017. Comprehensive review of the ThinkFirst Injury Prevention Programs: a 30-year success story for organized neurosurgery. Neurosurgery 81, 416–421.