

Tanzania Report: Fungai Dengu

Dates: 29/02/20 to 07/03/20

Location: Muhimbili National Hospital, Dar es Salaam, Tanzania

Purpose: Building Research Capacity for Children's Surgery – Oxford Tanzania Global Surgery Collaborative

Oxford Team: Professor Kokila Lakhoo (Paediatric Surgeon), Harry Jackson-Smith (Medical Student), Miss Evelyn Thangaraja (Foundation Year 2 doctor), Miss Roba Khundkar (Plastic Surgeon), Miss Riana Patel (Core Surgical Trainee)



**GLOBAL SURGERY,
ANAESTHESIA &
OBSTETRICS**



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1. Background

1. 1 The Global Situation

Over the last decade there has been increasing attention and acceptance of the field of Global Surgery. This emerging field within Global Health transcends clinical, epidemiological, systems and health-economics research concerning surgical disease and is embedded within a policy and advocacy agenda centred on achieving surgical equity. Global Surgery is a field encompassing anaesthesia, obstetrics, children's surgery as well as what we traditionally refer to as 'Surgery'. It can be defined as a multidisciplinary field aimed at "providing improved and equitable surgical care to the world's population, with its core tenets as the issues of need, access and quality". Although the landmark publication of the Lancet Commission in Global Surgery (LCGS) catalysed a global response to the "5 key messages" that emerged from the commission and have served as a call to arms for surgical care providers, academics, policymakers and Governments, children were not directly addressed. In fact, in a follow up to the commission, it was found that 1.7 billion children lack access to safe, affordable, timely surgery; most of them residing in low and middle-income countries (LMICs). Within these countries, the demographic balance is such that a large proportion of the population can be categorised as children. Looking closer at access to surgery, within LMICs, the majority of children that lack access to surgery are under the age of 5¹. The scale of this problem can be appreciated when we consider that surgical disease accounts for more childhood mortality than Human immune deficiency viruses (HIV), Tuberculosis (TB) and Malaria *combined*¹. Scaling up Children's surgery is, therefore, an essential and indivisible aspect of improving access to safe surgery globally. The positive societal impact of addressing childhood surgical disease is potentially huge and far-reaching, as it would not only reduce the death and disability related to Congenital anomalies, childhood malignancies, acute presentations and injuries but have a significant socio-economic impact in societies comprising mostly children that are unable to fulfil their potential due to this surgical burden of disease.

1. 2 The Local Situation in Tanzania

Tanzania is a large East African country with a population of 56 million (2018) and one of the fastest-growing economies on the continent (estimated 7% GDP growth/year). Despite this growth and multiple advances, there are several challenges, the Human Development Index (HDI) is just 0.40 suggesting that significant progress is still required and the healthcare system requires major financial investment. In terms of surgical care, the ratio of physician SOA (Surgeon, Obstetrician and Anaesthesia) providers per 100,000 population in Tanzania is 0.46, well below the recommended 20 SOA workforce/100,000 population proposed in the Lancet Commission^{2,3}. Furthermore, the Infant mortality rate is 43/1000 live births, and mainly due to lack of specialist neonatal services, neonatal resuscitation and infant infections training³. The Paediatric surgical services are limited, with just 5 fully trained specialist paediatric surgeons serving a population of 56 million people and consequently, the majority of children are assessed and surgically managed by non-specialists with limited resources and no access to diagnostic imaging²⁻⁴.

Oxford-Tanzania collaboration: Local Leadership

Over the last 20 years under the leadership and stewardship of Professor Kokila Lakhoo, a relationship between Oxford and Tanzania, initially with KCMC and latterly with MNH has flourished into fruitful clinical and research collaboration⁵. In a model of collaboration that is LMIC lead and driven, paediatric surgical services have been greatly advanced by the strengthening of this relationship. We travelled to Tanzania in the first, primarily research themed visit to MNH to develop a strong research base and increase the skills base to exploit a rapidly growing research

institution. In this report, I will summarise our activities and explore how this can be developed in the future.

2. Activities

2.1 Research workshop

The primary reason for the visit to Tanzania was to conduct a research workshop for interns, registrars and residents at MNH to increase the knowledge and skills in the department regarding surgical research. The research infrastructure at MNH is substantial. We had an overview of the Institutional Review Board (IRB) process covering the critical steps required to gain research approval including obtaining research ethics, ensuring data sharing and management systems are in place as well as maintaining local leadership in project coordination. Dr Faraja Chiwanga (Head of research at MNH) outlined the importance of taking an evidence-based approach to clinical care and therefore robustly building this evidence. She emphasized the necessity to prioritise patient safety and re-iterated the requirement to adhere to the local legal requirements which exist to safeguard the right of potentially vulnerable patients. She also described the seed-funding application process open to residents and registrars (up to £30,000/year), protected academic time (25% of the clinical time) and resources (such as REDCap training) available at MNH. At the heart of her message was a plea for co-design, so-leadership and co-authorship of research activities as an essential component of scaling local skills and research capacity.



Figure 1: Miss Roba Khundkar facilitating research session **Figure 2: Mr Fungai Dengu facilitating research session**

The interactive workshops began with an exercise on designing clinical research questions for interventional studies. Miss Roba Khundkar facilitated a vibrant and illuminating session covering the key concepts that underpin formulating good research questions. This session was critical in establishing the fundamentals of conducting clinical research and was greatly enriched by the numerous MMed projects being designed at the time of the workshop.

Following an excellent presentation by Dr Thomas on his MMed project presentation by the outcomes of definitive management of Hirschsprung's disease, we were able to immediately put into practice what we had just covered earlier that morning. After a robust critique (and defence) of the proposed project, we moved onto a discussion about translating research to the clinic. I discussed the importance of translational research being locally driven and led, highlighting the excellent work being done by innovative companies like 54gene™ in Nigeria. This African owned and run biotechnology company has been able to draw 5.4 million UDS in series A funding to biobank

samples from Africans who represent less than 2% of the biobank samples that currently drive medical discovery workflows. We emphasised the value of good tissue handling, data security and infrastructure investment to be able to leverage off this wealth of biological data for the betterment of patient care.

We focused the final part of the session on the concept of randomised clinical trials and their importance in establishing reliable evidence. There is often disagreement about the role of the RCT in clinical medicine, particularly in certain environments, however as we hope to scale up surgical research capacity in Africa, the ability to generate high-level evidence is paramount. We concluded the research session with a final Dr Mungeni on his MMed dissertation assessing surgical site infections (SSI) in patients undergoing open gastrointestinal (GI) surgery. During the lunch break, we had one to one sessions reviewing and discussing MMed projects with the surgical trainees.

2.2 Point of Care Ultrasound Project

One of the key objectives of the visit to MNH was the establishment of a research collaboration that would facilitate a pipeline of research projects at various stages of execution and development. My primary focus was on an early-stage pilot project for the use of point of care ultrasound in the assessment and management of paediatric surgical patients.

There are several challenges to children accessing safe, affordable and timely surgery such the lack of surgical care providers and poor healthcare infrastructure, but the paucity of essential diagnostic imaging has dramatically undermined the development of stronger systems even when personnel and resources are invested.

Rationale

The lack of accurate diagnostics to facilitate children getting the right surgery at the right time in the right facility has major implications for safe decision making ensuring we have resilient healthcare systems. Point of care ultrasound (POCUS) using a pocket-sized device that plugs into any mobile device or tablet, supported by innovative artificial intelligence and stored on digitally secure image management systems is an exciting development in global health. The versatility, affordability and applicability of this technology in a resource-poor environment make it a uniquely capable of catalysing a transformation of surgical care in Africa.

Key themes of the project

The key themes of our project are diagnostic safety and efficiency, reducing healthcare costs and deepening the skills base. Children presenting with suspected surgical pathology are challenging to diagnose and treat efficiently in all healthcare settings, however, in LMICs this is an order of magnitude more complex given the lack of basic imaging. Surgical pathology in this context is associated with high levels of morbidity and mortality, particularly when diagnoses are delayed or erroneous. Intervening in the patient pathway at this critical point of diagnosis and assessment can alter the trajectory of the patient and have a major impact on their health-related and financial outcomes. We will determine the cost-benefit of our intervention, looking broadly at the system and on an individual level for families and patients, who are often faced with large healthcare-related bills created by inefficiency in the healthcare system and associated with little overall benefit to the patient. At the core of the proposed intervention is the development of a training programme in POCUS for LMIC surgeons and healthcare providers that forms the basis of rapid expansion in clinical services and procedures that can be delivered safely.

POCUS groundwork at MNH

Dr Godfrey Sama, the lead researcher for the collaboration at MNH, arranged several extremely productive meetings with key departments involved in the care pathway of children at MNH. This began with a meeting in the Radiology Department where Dr Lilian Matiku (Radiology Resident) explained, from the perspective of a training radiologist, the opportunities and possible pitfalls of POCUS training for surgeons. We discussed the perception of POCUS for surgeons and practical aspects to dealing with more complex scans. She outlined the billing for patients (i.e. patients are expected to pay before attending the radiology department) and the electronic referral system. We discussed the scope of pathologies that would be reasonable to expect surgeons to detect using POCUS and issues around quality control, monitoring and reporting. At MNH, ultrasound scans on children are often (as is done in many centres in the UK) by training grade radiologists or ultrasonographers under the auspices of responsible Radiology Consultant on-call typically non-resident out of hours. In cases of uncertainty, the Consultant will re-scan or provide support for the individual performing the scan. Pathways to accreditation and validation represent a major challenge and this was flagged as an important area to consider if quality control and therefore safety is to be maintained.

Further meetings were held within the Pathology and Adult General Surgery departments. In the Pathology department, serendipitously I was able to discuss the role of POCUS with a Pathology senior resident who is responsible for performing fine needle aspirations (FNAs) and core biopsies of lesions that are often marked by radiology and then performed blindly by the pathologist using the radiological marker and anatomical landmarks to navigate. This approach has several limitations, including poor diagnostic yield, inadvertent iatrogenic injury and low reproducibility. Their department has submitted a business case for an ultrasound machine and this is currently being reviewed. Adult general surgery services were very keen to be involved in POCUS planning, especially in view of a brief presentation by Dr Babueddy on the reliability of Focusses Assessment with Sonography for Trauma (FAST). The appetite for upskilling surgeons in the ability to use ultrasound is evident and we expect to move onto adult services once we have established a strong programme in paediatric POCUS.

2.3 Stakeholders meeting



Figure 3: Professor Kokila Lakhoo discussing the role of GICS and establishment of the Oxford-Tanzania Research collaborative



Figure 4: Dr Zaitun Bokhary outlining progress at MNH in Paediatric Surgery

The week came to a crescendo on Thursday morning when the key stake-holder meeting for paediatric surgical services across Tanzania took centre stage. This event was the culmination of 20

years of work for Professor Lakhoo and ushered in a new generation of healthcare professionals focused on children's surgery and how to improve the situation in Tanzania. Representatives from across the country attended the private sector, public sector and university representatives sharing their experiences and ideas on how to scale up surgical services for children. Training and education were a key focus with a lively debate around the structure and accreditation of specialist training in Paediatric Surgery. Dr Faraja reiterated the points she had made to the surgical department at our workshop to the wider surgical community in attendance and the meeting was well attended by the hospital hierarchy including the Executive Director Professor Laurence Museru, who has been credited with a dramatic and positive transformation of the clinical services at MNH in his tenure. The meeting concluded with a call for collaboration, regular meetings and coordinated approach to tackling the remaining challenges. It was a meeting filled with optimism, ambition and energy backed with high-level support from the key institutions; a recipe, we hope, for lasting success.

Discussion & Personal Reflections

Tanzania is a country progressing at a rapid rate, shaping its health system and society in a climate of rapid technological advancement. MNH is a national hospital in the cosmopolitan commercial capital Dar es Salaam, where leadership, progress and excellence is expected. I believe that under the current leadership of Professor Museru, this vision is being fulfilled. Although several challenges remain, we witnessed a hospital and surgical department on the rise, growing in personnel, increasing operative activity, improving outcomes and focused on training.

KidsOR

It would be impossible to reflect on this visit without highlighting the massive impact of KidsOR in Tanzania. Their investment in the refurbishment of two dedicated children's operating theatres has helped catalyse the drive to improve children's surgery in Tanzania and across the globe. This exemplary tripartite Private(Charity), Public, Academic partnership has delivered *for patients*. Patients have access to excellent facilities, waiting lists have been slashed, surgeons are being trained, research is being conducted. All facilitated by the beating heart of the service, the operating theatre. I was struck by the pride of the department, the sense comradery and professionalism afforded to healthcare workers (of all descriptions) by having a dedicated world-class theatre suite. It was evident that the healthy relationship between KidsOR and MNH has been a force for good and uplifted paediatric patients in Tanzania. I can only hope that this is replicated across the country and continent in similarly ambitious and committed hospitals.



Research capacity building – indivisible part of scaling up surgical care.

Research activity among busy clinicians is often viewed as an expensive luxury, with little end product and an unnecessary distraction for clinicians already overwhelmed by a huge burden of disease requiring urgent attention. However, it is becoming clearer (globally) that research is not a luxury, it doesn't need to be expensive, it is not a distraction. Research is in fact, an essential component of good clinical care and a necessary endeavour for institutions that care about providing the best care available for their patients. The surgical research infrastructure in Tanzania is growing, strategically well placed and benefiting from significant investment. The research skills-base requires urgent attention if we hope to capitalise on the increasing opportunities available. To improve research skills among surgeons, focused attention on the knowledge deficits and skills gaps are needed. The MMed surgical training system is uniquely well placed to be the bedrock of consolidating these skills. Surgical trainees are expected to complete a dissertation to obtain the MMed qualification, and this research project could serve as a practical application of fundamental research skills and act as the springboard for fruitful academic activity moving forward. I feel that any research training and capacity building that occurs should be based on this core research activity and leverage off the motivation of trainees to complete these projects and be successful. A strong system of training could use this as an opportunity to inculcate critical thinking, research methodology and academic writing. I maintain that building research capacity through training people to think critically and understand how to design, organise and deliver robust research studies is “an indivisible and indispensable” part of scaling up surgical care globally.

Finally, it was my pleasure to accompany Professor Lakhoo on this visit to Tanzania and I sincerely thank Dr Zaitun Bokhary and Dr Godfrey Sama for hosting us at Muhumbili National Hospital.



Please find attached:

Appendix 1: Timetable for Research Workshop.

Appendix 2: Timetable for National Stake-holders meeting.

Appendix 3: Feedback from Research workshop.

References

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