INVITED EDITORIAL

The career and realisations of a global surgeon

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36-year-old Miriam told me she first noticed a change in her right breast two years ago. There was a firmness in the upper outer portion of her breast. She thought nothing of it, since it was not stopping her from going about her daily work. Faced with the demands of caring for five children, in addition to the daily two-hour commute from her village to sell cassava roots in the nearby township of Ijebu-Jesa in Osun State, Nigeria, taking time out to have her breast examined was not an option. While there was a women's health clinic at the local community centre, the resident doctor had recently left for the United Kingdom (UK), and Miriam was not sure if they would see her for this problem. Visiting a private doctor would cost her two months' worth of income. Almost no one she knew had health insurance; in fact, most had not heard it existed.[1]

In the last year, however, things had become progressively worse. Her right breast was now larger, with a tender, hard lump occupying most of the normal breast tissue, about to break through the skin. The skin itself had changed, resembling more of an orange peel, and her right arm was swollen down to her fingers. In conjunction with these changes, she was now increasingly tired, which meant that the two-hour commute from her village took more than three hours, and tending her crops was more difficult. She saw her local healer, who prescribed her some herbal leaves to apply to the affected breast. This temporarily helped to ease some of her pain. As I sat opposite her in our stiflingly warm outpatient clinic room (the electricity was down due to local government restrictions), she told me, "The hospital is the place you go to die. All of my family members who came here did not leave, but now I have no other option. The pain is too much and I cannot work."

I began to counsel her on our next course of action. We discussed the reason for the swelling in her arm was because the cancer had now spread out of the breast. We would need to operate to remove the breast and lymph glands under her arm to help her pain. I gave her a list of materials she would need to collect prior to her operation, including bandages, dressings, suture material, intravenous lines, and bags of saline solution, amongst other supplies. These items were all the patient's responsibility to source from the local market and pay for out of pocket. Invariably, they were imported from India via Lagos, with local production of such items being almost non-existent. If an item was not available, she would have to travel to the nearest largest town, Ibadan (an additional two to three hours by road), at an even greater cost.

That evening, I reflected on Miriam's condition, and recalled a conversation with my mentor surgeon, T. Peter Kingham. It was September 2017, and we sat in a plush Upper East Side office in Manhattan, New York at Memorial Sloan Kettering Cancer Center. I had just begun my time as the inaugural Global Cancer Disparities Fellow after qualifying as a general surgeon in New Zealand. He told me, "Global surgery research can only be done in the field; you have to go out there and experience it first hand. You're going to love West Africa. There has been an outbreak of Ebola in North Nigeria, but we don't think it will travel. Just remember to take your malaria prophylaxis, and make sure your medical evacuation insurance is up to date."

I also reflected on how starkly different things would have been for Miriam in New Zealand. She would, at least, have access to a staging computed tomography (CT) scan to rule out distant metastases (not just spinal and chest X-rays), as well as a tissue biopsy of the breast to allow molecular profiling with hormone receptor status. These investigations would have enabled the commencement of neoadjuvant therapy to help downstage her disease and potentially offer a cure. Unfortunately, the CT scanner in the university hospital closest to Miriam's home was defunct because of technical issues, and no technician was available for more than six months. Prior to her symptoms becoming unbearable, Miriam would have been able to see a primary health care physician without devastating financial costs. As far as surgery was concerned, her team would be able to get as many supplies as needed "off the shelf." I contemplated her statement that the "hospital is the place that you go to die," and how, in many respects, from my experience of sub-Saharan Africa, she was probably correct. Regrettably, patients with cancer often delay seeking help until they are very symptomatic and cannot work. As a result, their disease process is so advanced that management goals shift from curative to palliative, and many, as Miriam pointed out, do not leave the hospital.

Miriam's case highlights some of the many challenges and inequities faced by patients with surgical problems in low and middle-income countries (LMICs) compared to patients living in high income countries (HICs). For most people, the surgical operation is the easiest part of the equation, even allowing for the risks associated with delayed presentation and advanced stage. However, it is only one factor in the total solution. In these settings, there are multiple issues that contribute to adverse, inequitable health outcomes, such as: a lack of universal health care, or insurance, leading to catastrophic financial costs; poor access to primary health care services with screening for early stage disease; shortages of health care workers, with a "brain drain" to more affluent areas of the world; a dearth of ancillary services such as pathology and radiology; and challenges associated with health literacy and a distrust of service providers.[1–5] Providing surgical care in these settings clearly requires a holistic, horizontal approach that strengthens the health system as a whole, working with local providers and ministries rather than targeting a particular disease process. The advantage of this approach is that it has the potential to provide benefits for a broad spectrum of health problems and lead to more sustainable change. Whilst, in the last two decades, the global surgical field has been focused in many ways on defining the extent of the burden of surgical disease, there is now movement to improve global surgical outcomes through collaborative research, defining guidelines, and measuring outcomes. GlobalSurg (initially set up by UK medical students) and the National Institute for Health and Care Research

(NIHCR) Global Health Research Unit on Global Surgery are examples of this type of collaborative network, with over 5000 clinicians in over 100 countries.[6]

It would appear that the situation faced by Miriam is likely to become more common, with a steady shift in the burden of disease in LMICs from communicable to non-communicable disease (NCD), in particular, cancer.[7,8] According to recent International Agency for Research on Cancer Global Cancer (GLOBOCAN) estimates, by 2030, 75% of new cancer cases will be within low and middle-income countries.[9] In sub-Saharan Africa, despite the fact that cancer burden is predicted to double by 2030, the entire region accounts for <1% of worldwide medical cancer expenditures.[10] NCDs threaten to overwhelm fragile health systems in these settings and lead to dramatic rises in health and social care costs in the near term.[11,12] In the region, out-of-pocket health expenditures are a major contributor to poverty, and a lack of adequate social protection (such as health insurance) has the potential to drive families and individuals further into poverty. The severe drain on services, health budgets, and resources as a result of the global coronavirus disease 2019 (COVID-19) pandemic has further compounded the problem and disproportionately affected these fragile systems.[13]

The world has recently been shocked by the untimely death of a colossus and major global health pioneer, Paul Farmer. Farmer was the co-founder of Partners In Health, a non-profit organization that provides free medical care in low-income countries including Haiti, Peru, and Rwanda. He has immeasurably changed the health outcomes for millions of patients around the world through a systems-based approach focused on addressing inequities. Farmer's life work, captured in the Netflix documentary film *Bending the Arc*, began as a medical student in Haiti. Farmer and his family spent his teenage years travelling in a mobile home, mostly in Florida, where he worked picking oranges alongside Haitian migrant communities. As a student at Duke and Harvard, where he studied anthropology and medicine, he volunteered at a hospital in Cange, in central rural Haiti. During this time, he noted the harsh realities for the underprivileged when accessing health care. During the acquired immunodeficiency syndrome (AIDS) epidemic in Haiti, he went door to door delivering anti-retrovirals to underprivileged families. Over the years, he raised millions of dollars for an expanding network of health facilities.[14] He also inspired generations of medical students and health care professionals throughout the world, particularly through global health programmes established at Harvard Medical School and more recently, at the University of Global Health Equity in Butaro, Rwanda. There is no doubt that Paul Farmer's extraordinary life journey and career, starting as a medical student and motivated by a passion to help society's most vulnerable, exemplifies the sheer scope within which one can effect change on a global level.

Reflecting on my own journey into global health, I feel this was in part shaped by experiences during my childhood. Being born and raised in New Zealand, my parents always made me aware of the fact that I was very blessed to have seemingly limitless opportunities to succeed in life compared with others elsewhere in the world. This was brought home to me forcibly during trips that I made to India at an early age. There, I witnessed first hand how those in circumstances less fortunate than mine had to work much harder just to survive. The images and experiences of extreme poverty left a deep impression on me and a sense of social awareness. Inspired by the work of my grandparents in Fiji caring for the underprivileged, illiterate, and elderly, I chose to pursue a career within medicine. I hoped this would equip me with some skills to address these wider determinants of health. After completing my medical degree at the University of Auckland, I was fortunate to work with Professor Ian Bissett, Professor John Windsor, and Professor Papaarangi Reid. Together, we investigated the socially stigmatized condition of faecal incontinence, and we demonstrated up to 12% of New Zealanders are affected, and Māori disproportionately so.[15] My mentors encouraged me to pursue further postgraduate studies in public health, and during my surgical registrar years, I volunteered in the South Pacific. Through Memorial Sloan Kettering Cancer Center and the collective visions of New Zealander Sir Murray Brennan, T. Peter Kingham, and Professor Isaac Alatise, I catapulted from New Zealand to New York and West Africa to help their efforts in establishing a Global Cancer Disparities programme. I divided my time in Nigeria between operating with local surgeons; teaching medical students, residents and surgeons; and conducting research into novel risk factors for the development of breast and bowel cancer in the region. During my time, it was immensely satisfying to see a transition over a period of six months where patients like Miriam diagnosed with breast cancer were able to get routine molecular analysis for receptor status on biopsies.[16] This would then allow treatment with endocrine or chemotherapy and ensure better clinical outcomes. Now, with a view to a future at the University of Auckland Surgical and Translational Research Centre (STaR) with Professor Ian Bissett and Professor John Windsor, we are looking to expand the Indigenous and Global Surgery Group. We welcome interest from medical students and junior doctors keen on pursuing a career in Global Surgery.

As I think back to my own time as a medical student, I wonder whether the gaps between HICs and the LMICs are narrowing compared to where things stood nearly two decades ago. It is with optimism that we look to the next generation of health care professionals, the medical students of today, to take up the challenge and continue to aspire to achieve equitable outcomes for patients across the globe. As the burden of surgical disease increases across LMICs, patients like Miriam will continue to require motivated health care professionals who focus on these wider determinants of health outcomes and are driven to address inequities.

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