

The burden of surgical conditions and access to surgical care in low- and middle-income countries

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Introduction

Surgery is an essential component of health systems but has generally been neglected within global public health. This is despite growing evidence documenting the cost-effectiveness of essential surgical care in low- and middle-income countries (LMICs).¹ The overall burden of disease that may be cured, palliated or treated with surgical intervention is large and (probably) rapidly growing, and this concept must therefore be revisited.

There are major gaps in knowledge related to surgery in LMICs. What exactly is the burden and distribution of surgical conditions in LMICs? What is the unmet surgical need? What resources (human, financial, physical) are required to improve access to surgical care? What impact would this have on global health disparities, and how does this compare with other interventions? How can essential surgical services be integrated into health systems' surveillance and evaluation? This paper outlines a research agenda and argues that enough is already known to justify accelerated action.

The global burden

The initial global burden of disease (GBD) study evaluated the causes and consequences of 109 conditions and was unique in estimating not only mortality, but also morbidity for designated conditions in disability-adjusted life years (DALYs). The GBD study has been updated, extended to 140 conditions, and allowed for estimation of burden by selected risk factors.²

To date, the GBD has not been approached by intervention category – in other words, the burden of disease avertable through specific interven-

tions. Surgery represents one of many possible interventions, such as vaccination, or antimalarial and antiretroviral chemotherapy. Estimates of the disease burden addressable by vaccination are coincidentally similar to current estimates for surgery. Quantification of the burden of disease avertable by surgery may allow for comparison with other priority health interventions in LMICs.

A first estimate suggests that 11% of the GBD can be treated with surgery. This total is composed of injuries (38%), malignancies (19%), congenital anomalies (9%), complications of pregnancy (6%), cataracts (5%) and perinatal conditions (4%).¹ By region, the most surgical DALYs are in South-East Asia (48 million); however, Africa has the highest ratio of surgical DALYs per 1000 people. While this is useful as an initial estimate, a more formal evaluation is necessary. Future projections suggest a rapid rise in non-communicable diseases; already, 80% of deaths from these conditions – at least partially treatable with surgery – occur in LMICs.³

“Surgical conditions” have not been consistently defined, but include any pathology for which an invasive procedure may provide treatment, palliation or cure. However, some surgical conditions may not require an incision, such as an injured patient who requires airway management and resuscitation, or traction for a fracture, and this must also be considered. These procedures may not be performed in operating rooms, may not require anaesthesia, or be performed by “surgeons”. Some of these and other common surgical conditions, such as acute abdominal emergencies and surgical infections, were not included in the initial GBD study. Untreated obstetric fistula and inadequately treated burns and fractures

also leave a large residue of serious disability in LMICs, some of which could be prevented by appropriate early care. A more comprehensive review is necessary to address these issues.

Surgical conditions are diverse and occur in every phase of the life-cycle; the overall burden must consider each condition separately and as a whole. The extent that non-surgical interventions (e.g. prevention of road traffic injuries) can reduce the surgical burden must also be clarified. Furthermore, the proliferation of “vertical” programmes in public health (i.e. child health, maternal health, cancer, and trauma) has also made it difficult to approach the problem in a coordinated fashion. Most of these programmes have a surgical component, and this suggests that effective surgical services may improve health systems overall.

Access to care in LMICs

While the burden of surgical conditions represents a “denominator”, there currently is no aggregated estimate of the “numerator”, “met need” or “effective coverage” for surgical services in LMICs. Based on prior work, “effective coverage” of surgery is the fraction of health gained that could be delivered by surgical intervention that is actually delivered.⁴ Measuring access to surgical care is central to this concept.

“Access” to care is variably defined. At the point of care, it is influenced by workforce, infrastructure and patient-related factors, and at the structural level by the organization of health systems. Owing to the complex interplay of these factors, the true “rate-limiting steps” to improve surgical services in LMICs have been poorly characterized.

Rates of major surgery in LMICs lag far behind estimates of these rates

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in rich countries.⁵ While some countries do routinely collect data from (especially rural) hospitals, this is often limited to an operative logbook that records procedures and immediate perioperative mortality. There has been no systematic review of even this basic retrospective data to quantify the amount of surgery being done, and even less is known about the basic short-term outcomes of operations and the quality of perioperative care.

Health-facility-based data have limited generalizability, since most patients with surgical conditions never reach a health facility. As a result, community surveys are more appropriate to assess unmet surgical need. For example, community surveys suggest that only a minority of injured patients reach a health facility in rural areas of low-income countries.⁶ Community surveys should be designed to evaluate access for a broader range of surgical conditions.

Many humanitarian nongovernmental organizations provide surgical services in LMICs, but the impact of these services on the GBD has not been evaluated. Few organizations track patient data and outcomes, and those that do rarely share this information. Measurement of the contribution collectively made by the humanitarian community would further identify the “met” and “unmet need” for surgical services. These organizations also can share lessons for cost-effective, sustainable service delivery in austere medical environments.

Services and indicators

The organization of surgical services within the health systems of LMICs is poorly characterized. Several recent studies in low-income countries have documented the cost-effectiveness of surgical care in small hospitals.¹ These studies must be

more carefully evaluated, and perhaps also piloted in other countries. This will also help define the role of surgery in the “minimum package” of health services; the entire “package” was initially costed at US\$ 34 per capita by the Commission on Macroeconomics and Health, and the only surgical input included was emergency obstetric care.⁷

Malawi, Mozambique and other countries have trained non-physicians in surgery, but only part of the need can be met in this fashion.⁸ In addition, service delivery can sometimes be radically improved through a simple reorganization of services at no cost, as shown, for example, by the essential trauma-care guidelines and their use as needs assessment tools in a range of countries.⁶ These guidelines also may provide an entry point to develop overall surgical services as LMICs cope with a growing burden of road traffic accidents.

More generally, as with other public-health initiatives, could “surgical indicators” be developed to further characterize burden, access and unmet need? These could be integrated into national health information systems, demographic health surveys, or the newer in-depth demographic surveillance sites. For example, a recent demographic health survey from Malawi has provided estimates of the prevalence of obstetric fistulae.

The way forward

A broad group, including health personnel, public-health experts, academic institutions and international organizations, must address the expansive questions concerning global surgery. Though health disparities in surgical care are significant, none of the “grand challenges in global health” identified by the Gates Foundation in 2004 relates to surgical conditions. As priority

setting often follows donor agendas, surgery has generally been left out.

Nonetheless, support of several recent surgical initiatives is encouraging. The inclusion of chapters on surgery, emergency medical systems, and injury in the second edition of the *Disease control priorities in developing countries*¹ indicates that these services are gaining recognition as essential components of health systems. Emergency obstetric care and essential trauma guidelines are both being used to evaluate surgical needs in LMICs. WHO established a Global Initiative on Emergency and Essential Surgical Care (GIESSC), and the WHO Integrated Management of Emergency and Essential Surgical Care toolkit includes training and research for surgical services at the district hospital. In addition, the Bellagio Essential Surgery Group, established to improve access to surgical services in Africa, will be meeting again in 2008.

For these reasons – large burden, attractive cost-effectiveness and past neglect – the Copenhagen Consensus in May 2008 considered essential surgery as a potential priority investment for the world’s poor. Finally, to build on the work of prior initiatives, a Burden of Surgical Disease and Access Working Group, representing the constituencies listed above, was convened for the first time in April 2008.

The common perception that surgical care is merely a luxury in poor countries must be reconsidered and its essential role in global public health must be acknowledged. Anything less will ensure that the morbidity and mortality endured by millions of people in poor countries unable to access surgical care will continue to remain invisible to the rest of the world. ■

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