

CLINICAL REVIEW

Essential Surgical Services: An Emerging Primary Health Care Priority

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ABSTRACT

Essential surgical services have been a neglected part of global primary health care priorities. This neglect has not been intentional; rather it is a consequence of the logistical, practical and social challenges unique to surgery. Recent literature demonstrates the vast unmet global surgical need and deconstructs the issues underlying the provision of this essential health service. Surgical conditions such as injury, obstetrical complications, and congenital anomalies contribute to 15% of death and disability worldwide, largely in the most resource-poor countries. Yet new evidence confirms that surgical care is more cost-effective than antiretroviral treatment for HIV in preventing death and disability. There has simply been a lack of attention and resources directed at improving the necessary components of surgical care: training of health workers to deliver emergency and essential surgical services, and provision of the necessary ancillary staff, equipment and supplies to provide basic surgical care. Reviewing the current best evidence, this paper reflects on the historical roots of primary health care, and argues that surgical services are an essential component of primary health care that should be universally accessible and affordable.

INTRODUCTION

Essential surgical services (ESS) are services that are provided to reduce morbidity and mortality related to surgical conditions. As an emerging concept, ESS are currently building momentum in the surgical community and finding favour on the international primary health care (PHC) stage. Driven by the landmark study by Debas in 2006, in which surgical conditions were shown to account for up to 15% of the total disability adjusted life years (DALYs) lost worldwide, ESS have been recognized as a neglected piece of primary health care.¹

New terminology often increases confusion as authors try to push their agenda to multiple audiences using various frames of reference, and establishing ESS as a PHC priority is no different. The term “surgical conditions” is often used in parallel with surgical disease, though neither is consistently defined in the literature. Surgical conditions, as defined by Debas and colleagues in 2006, include conditions that require suture, incision, excision, manipulation, or other invasive procedures that usually, but not always, require local, regional, or general anesthesia.¹ This definition allows

for the inclusion of conditions such as airway resuscitation or traction of a fracture that would not require an incision, as well as more traditional surgical conditions like obstetric fistula, burns, and acute abdominal emergencies. Surgical disease is defined by the Burden of Surgical Disease Working Group as any “premature death and disability amenable to surgical care through appropriate, sustainable and cost-effective surgical solutions.”² According to these definitions, surgical disease provides the conceptual framework in which the term “surgical conditions” is embedded. These terms are used throughout the literature, and in the context of the individual health outcomes impacted by ESS. For example, the international surgical community maintains that ESS reduce the burden of surgical disease through the treatment of surgical conditions. Thus distinguishing between surgical disease and surgical conditions is a necessary aspect of re-conceptualizing ESS as a PHC priority.

The purpose of this article is to review the foundation of PHC, deconstruct the challenges that have resulted in the neglect of ESS in the PHC agenda, and highlight the current efforts to establish ESS as an integral part of PHC.

BACKGROUND

Primary health care, which began in the late 1960s, has a history rooted in politics (Table 1). The concept of PHC emerged during the Cold War. At this time, the vertical health approach used in malaria eradication by the World Health Organization (WHO) and the U.S. agencies since the late 1950s was under heavy criticism. John Bryant's book *Health and the Developing World* was filled with new proposals for health and development.³ Carl Taylor, founder and chairman of the Johns Hopkins Department of International Health, became the founding chair of the National Council for International Health, now known as the Global Health Council. Kenneth W. Newell from the WHO, and the 1974 Canadian Lalonde Report were collectively challenging the assumption that health resulted from the transference of more doctors, services, or new technologies. With the addition of the Christian Medical Commission, and the new WHO appointment of Halfdan T. Mahler as the Director General, the world was on the cusp of a new health care paradigm:

primary health care.^{4,5} The landmark event for primary health care was the International Conference on Primary Health Care that took place at Alma-Ata, Kazakhstan, from September 6 to 12, 1978. The conference's main document, the Declaration of Alma-Ata, supports the universal implementation of PHC.⁶ PHC is therein defined as "essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination."⁷ The slogan "Health for All by the Year 2000" was decreed and supported unanimously.

Since 1979, the definition, utilization, and understanding of PHC has evolved significantly. As of 2009, the WHO defines primary health care as "essential health care made universally accessible to individuals and families in the community by means acceptable to them, through their full

Table 1. Timeline of primary health care

| Timeline | Contribution | Impact |
|------------------------|---|--|
| Late 1960s-early 1970s | Cold War | Early criticisms of the 1950's United States and WHO's vertical malaria eradication program. |
| Late 1960s | Increase in WHO projects related to development of basic health services from 85 in 1965 to 156 in 1971 | These projects became the institutional predecessors for PHC. |
| Late 1960s | Christian Medical Commission (CMC) | Missionaries worked in LMICs and emphasized training of village workers at the grassroots levels. Carol Taylor and John Bryant were members. |
| 1967 | Kenneth W. Newell | A WHO Staff member who was a researcher on medical auxiliaries in developing countries published <i>Health By the People</i> . |
| 1969 | John Bryant published <i>Health and the Developing World</i> | Questioned the transplantation of hospital-based health care system to developing countries and the lack of current focus on prevention. |
| 1970 | CMC created the journal <i>Contact</i> | Is the first published reference to "primary health care" |
| 1972 | Carl Taylor | Became the founding chair of the National Council for International Health, now known as the Global Health Council. |
| 1972 | WHO Division of Strengthening of Health Services created. Kenneth Newell appointed as Director | First WHO Division dedicated to equitable community based health care. |
| 1973-1988 | Halfden Mahler elected WHO's Director General | Maher led the WHO to become the leader in establishing PHC at an organization level and contributed a strong social justice mentality to the WHO. |
| 1973 | WHO Report entitled, <i>Organizational Study on Methods of Promoting the Development of Basic Health Services</i> published | Formed the basis for a redefinition of the collaboration between WHO and UNICEF. |
| 1974 | Canadian Lalonde Report published | De-emphasized the importance attributed to quantity of medical institutions and proposed four determinants of health: 1) Biology, 2) Health Services, 3) Environment, and 4) Lifestyles. |
| 1974 | UN General Assembly adopted a resolution on the International Economic Order | Purpose was to aid in "uplifting" less-developed countries. |
| 1975 | 28th World Health Assembly | Concluded that the construction of national programs in PHC were an urgent priority. |
| 1976 | 29th World Health Assembly | Halfden Mahler introduced the slogan, "Health For All by the Year 2000." |
| 1978 | International Conference on Primary Health Care | Alma-Ata Declaration supported unanimously by the international community. |

participation and at a cost that the community and country can afford. It forms an integral part both of the country's health system of which it is the nucleus and of the overall social and economic development of the community."⁶ The three key ideas promoted in the 1978 Alma-Ata declaration (acceptability, accessibility and affordability) are still evident in the 2009 definition. However, critical appraisal of the current services included under the PHC umbrella, as outlined in the 2008 WHO World Health Report, *Primary Health Care—Now More Than Ever*, leads one to ask, "What's missing?"

ESTABLISHING AN UNMET NEED

ESS has historically been left off the PHC agenda. None of the "grand challenges in global health" identified by the Gates Foundation in 2004 relates to surgical conditions,⁸ and basic surgical services (except obstetrical care) are not included in the Millennium Development Goals.⁹ Until recently, PHC projects were focused on communicable disease like AIDS and smallpox, but reflection on the need for both international surgical care and control of communicable disease emphasizes the relative inattention given to ESS.

The lack of global focus on ESS was previously based on the misconception of need and the resultant low prioritization of ESS as a PHC issue. A recent modeling study by Thomas Weiser and colleagues in the *Lancet* estimated that there are 234.2 (95% confidence interval [CI]: 187.2-281.2) million major surgical procedures worldwide each year, which is seven times the 33.2 million people infected with HIV.^{10,11} The study further concludes that 30% of the world's population receives 73.6% of the world's surgical procedures and the poorest third receives only 3.5% of all surgical procedures.¹⁰ Even if we assume that there is a higher rate of elective surgery in high-income countries, these findings suggest an enormous unmet need for surgical care in low- and middle-income countries (LMIC). An estimated one-third to one-half of our world's population (two to three billion people) lack basic surgical care.¹² Mathers and Loncar's article reveals that surgical conditions are among the top 15 causes of disability.¹³

Additionally, in 2006 Debas and colleagues concluded that surgical conditions account for up to 15% of the total DALYs lost worldwide.^{1,14,15} Surveys from rural areas in Bangladesh, India and urban South America indicate that 10% of all deaths and almost 20% of deaths of young adults are the result of conditions such as injury that would be amenable to surgery.⁹ Prospective studies in Africa have estimated that 85% of children will require surgical care by age 15; yet ESS for children remain poorly developed, with little to no access in most countries.^{9,15-17} Clearly, there is an unmet need for ESS, especially in LMICs.

Initial estimates from the Global Burden of Disease (GBD) updated study suggest 11% of the global burden of disease can be treated with surgery.¹⁴ This total is composed

of injuries (38%), malignancies (19%), congenital anomalies (9%), complications of pregnancy (6%), cataracts (5%), and perinatal conditions (4%).¹⁴ These totals, even without the obstetric complications that are addressed through PHC, rank surgical care as one of the most important global services needed to prevent morbidity and mortality. In 2008, Ozgediz concluded that the common misconception that surgical care is merely a luxury must be recognized, and its essential role in global PHC must be acknowledged. Ozgediz argued that 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."⁹ These inequalities in both access to ESS and the misconceived need for ESS lead one to observe that this health service is a significant omission from the current primary health projects agenda.

CHALLENGES FACED IN ESTABLISHING ESS AS A PHC PRIORITY

Economic Considerations

Surgery has previously been viewed as a high-cost treatment that lies outside the capacities of traditional PHC models. However, Dr. Paul Farmer recently decreed ESS as a "Public Good for Public Health."¹⁸ Emerging evidence suggests that ESS compares favorably with selected primary-health interventions in terms of cost-effectiveness (Table 2).^{1,19-21} Recent cost-effectiveness studies report USD \$11-\$33/DALY averted for surgical care as compared to traditional public health intervention such as vaccinations (USD \$5/DALY averted), while surgical services are demonstrably more cost-effective than antiretroviral therapy (USD \$300-\$500/DALY averted),^{1,20,22} even when assuming low-cost production, high HIV prevalence, and high compliance.²¹ Other barriers to including ESS in PHC have historically included poor infrastructure, inadequate physical resources, and insufficient health human resources.²³

Table 2. Estimated cost-effectiveness of health interventions

| Intervention | Cost-Effectiveness |
|---|--|
| Rapid impact package for neglected tropical disease | USD \$2-USD \$9/DALY averted ³⁸ |
| Measles vaccination | USD \$5/DALY averted ²² |
| Essential surgical services | USD \$11-USD \$33/DALY averted ^{19, 20} |
| Antiretroviral therapy for HIV | USD \$300-USD \$500/DALY averted ²² |

Competing International Health Priorities

Another reason ESS have been left off the PHC agenda is the decades-long domination of the international health movement by those concerned with communicable disease. Previously, both the WHO and the Gates Foundation have planned to address malaria and other neglected diseases of

poverty with no mention of supporting treatment for surgical conditions. There is no global fund for surgery, and rarely are foundations willing to support ESS or invest in surgical infrastructure as an important part of the global PHC agenda.

From a clinical perspective, there seems to be a widening gap between generously funded infectious disease programs and essential health services. For example, of the 111 donor-supported health projects in Uganda totalling nearly USD \$300 million over the last two years, only two have partially supported regional hospital services.²⁴ Research funding is also directed primarily at infectious diseases: USD \$85/DALY is spent on HIV research compared to only USD \$0.50/DALY for injury research.²⁵

Most pathologies requiring surgical interventions are not transmissible from one person to another and thus do not rank as a traditional global health concern necessitating public health support. In the absence of public funding or health insurance, and with widespread international attention surrounding communicable diseases like AIDS, TB, polio, and smallpox, the treatment of surgical conditions usually hinges on fee-for-service-based programs.²⁶ Keeping ESS as fee-based health services cuts off the majority of people who need the services, which in turn undermines the objectives of PHC and the Alma-Ata Declaration.

Improving surgical services can strengthen health systems overall. Like neglected tropical disease initiatives, surgical services intersect with many programs such as maternal health, child health, non-communicable diseases, and HIV. For example, despite the fact that many HIV patients present with a surgical problem such as enlarged lymph nodes, tumors, or soft tissue infections, there has been very little effort made to link HIV programs with surgical services. Strengthening the linkages between ESS and other existing PHC priorities, benefits the PHC system as a whole.

Establishing Providers of Surgical Care

It took decades of advocacy to develop funding mechanisms for AIDS prevention and care. A report published in December 2009 by the Bellagio Essential Surgery Group proposes mechanisms for increasing accessibility to ESS, and has listed expanding the supply and quality of health workers with surgical skills as one of their four recommendations.³⁰ This recommendation is based on evidence from Sub-Saharan Africa, where an audit of eight district hospitals in Zambia revealed that at least 86% of all surgical procedures performed could have been carried out by a trained non-surgical health worker.³¹ Furthermore, given the current need for ESS, the reality is that not every operation is being performed by a surgeon. A 2008 survey by Ozgediz revealed that in four district hospitals in Uganda, 3,621 surgical procedures were performed in one year, with 53% obstetric in nature, and only one obstetric surgeon at one hospital and no surgeons at any of the other three facilities.⁸

The response to the shortage of surgically-trained personnel has led to the initiation of targeted, surgical skill training and education programs. In Niger, the government has begun to deploy teams of two general practitioners who have “capacity in district surgery” into rural Nigerian communities, and to provide them with financial and other incentives to stay in their districts. These physicians, some of whom are already working at the district level, are trained for three months at the University of Niger's Faculty of Health Sciences and selected hospitals in Niamey, and for nine months in regional hospitals throughout the country.³² As of 2003, Malawi had only 15 trained surgeons of any specialty, including expatriates, to serve a population of 12 million, and none of these were stationed at any of the district hospitals.³³ To address this acute surgical workforce shortage, in 2005 Malawi started piloting on-the-job training in surgery for non-physician clinical officers. Moreover, a bachelor's program is now being developed to address these issues surrounding the training of health workers in ESS. The highest achieving clinical officers, who complete two years of on-the-job training at the district level, are then given the opportunity to continue on to a two-year advanced course on surgery, gynecology, and orthopedics/trauma under supervision at the Central Hospital. With this experience, they learn how to deal with the most acute conditions and complicated cases.³⁴

Defining the Need

In addition to the perceived costs and lack of popular global health support, the relative inattention to surgery as an essential component of PHC has also been due to the narrow definition of a surgeon. The surgical community needs to speak fluently about building infrastructure, training personnel, and delivering high-quality care in a universal, equitable, and accessible way. This may mean broadening the definition of a surgeon to include non-specialists such as general doctors, non-physician clinical officers, and anaesthetic officers with variable nursing assistance, who perform most surgical procedures in the global context.²⁷⁻²⁹ Acknowledgement of the range of health care providers who can provide surgical services is needed to fully empower and encourage them to advocate for ESS as a global health priority.

The suggestion to broaden the definition of a surgeon is not made lightly here, for indeed there are potentially negative consequences. While some countries, like Niger and Malawi, are adopting this approach and expanding their surgical workforce, it is essential that non-specialist health workers are properly supervised and that their training programs are carefully evaluated. However, as the Bellagio report suggests, there is sufficient experience with training non-surgeons to establish mechanisms for accreditation and coordination of the training programs within and across countries, and to conduct objective evaluations of their outcomes.³⁰

Lastly, surgery is a highly complex intervention. With few exceptions, such as innovative cataract removal, surgery usually requires not only a surgeon but anesthesia, an operating room, autoclaves, sutures, drapes, and other supplies, not to mention post-operative care and blood banking. There is no surgical equivalent to a vaccination campaign or a mosquito net. To do surgery properly requires significant investment in infrastructure and training as well as a steady supply of consumables.²⁸ In order to achieve this, ESS need to become embedded in the language and priorities of both PHC and public health care funders and administrators.

ESS: NOW AND IN THE FUTURE

Despite the challenges intrinsic to delivering ESS, many promising events have driven the formulation of a new global health agenda. For the first time, primary surgical skills were included as one of the chapters in the second edition of the Disease control priorities in developing countries text,¹ and the WHO established a Global Initiative on Emergency and Essential Surgical Care (GIESSC)³⁵ and the Integrated Management of Emergency and Essential Surgical Care toolkit for district hospitals.^{36,37} The Bellagio Group, who first met in June 2007, are dedicated to increasing access to surgical services in resource-constrained settings, highlighting the need to measure the scale of unmet surgical services, and to describe surgical workforce necessities.³⁸ The Copenhagen Consensus in May 2008 considered essential surgery as a potential priority investment for the world's poor, and in April 2008 the Burden of Surgical Disease and Access Working Group convened for the first time.² Given these recent advancements and the current surge of literature advocating the need for further research in understanding access to primary surgical care, as well as the need for high-quality information on which to base models of surgical service delivery, it is clear that ESS are finally being incorporated as fundamental components of primary health care.

CONCLUSION

The world has seen a very drastic change in primary health care over the past thirty years. While the foundational concepts have remained constant, the breadth, scope, and need for primary health care services, as well as service delivery, has significantly evolved. The world is starting to acknowledge the importance of embedding essential surgical services as part of the primary health care definition in order to address the current inattention to surgical need, increase the resources allocated for ESS, and establish ESS as part of the primary health care system as an integral part of reducing mortality and morbidity. This global acknowledgment, coupled with the pressing need to tackle the challenges that prevent universal and equitable access to these services, surely represents a new era of primary health care. With continued support from organizations such as the

WHO, the Bellagio Group, the Burden of Surgical Disease Working Group, dedicated funding priorities, and an increase in both surgeon and community advocacy, essential surgical services can be established as an emergent (and urgent) primary care priority. †

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