

Nongovernmental Organizations in Musculoskeletal Care

Orthopaedics Overseas

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Abstract Injuries are a major worldwide contributor to morbidity and mortality. The negative impact caused by such injuries is disproportionately heavy in developing countries. Such disparities are caused by a complex array of problems, including a lack of physical resources, poor infrastructure, and a shortage of trained health professionals. Overcoming such deficits in care will require the involvement of organizations that can offer broad-based solutions. These organizations must bridge the gap between private and public institutions to establish a systems-based approach to program development and institution-building. They must provide not just an adequate level of care, but a transfer of knowledge that leads to sustainable and cost-effective intervention. Orthopaedics Overseas is an example of such an organization. We examine the development of

Orthopaedics Overseas and describe their interventions in Uganda as a case-study to show the unique position they have to affect change.

Introduction

Injuries are a major cause of mortality worldwide, and for every death a substantial number of individuals will survive with a permanent disability, mainly due to extremity injuries. Addressing this burden requires a well-coordinated response from key stakeholders including governments, ministries of health, international societies, NGOs, academic institutions, and individuals [1].

Major barriers to the provision of health care for the injured include not only a lack of infrastructure and scarcity of resources, but sufficient numbers of adequately trained health care workers. There is a global shortage of approximately 4 million health care workers, over one million in Africa alone [18]. Africa has 11% of the world's population and 24% of the world's burden of disease, yet only 3% of the world's health workers, and less than 1% of the world's health spending [12]. To effectively lessen the burden of musculoskeletal trauma and injury requires strengthening health systems in low- and middle-income countries, and the teaching/training of health care providers is an essential component. The training must be "appropriate," and must focus on local diseases and conditions, utilizing locally available infrastructure and resources. This is particularly challenging when practitioners from economically developed countries are charged with transferring knowledge to colleagues in economically underdeveloped regions. Transferring this knowledge effectively is the backbone of Orthopaedics Overseas.

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Orthopaedics Overseas is the founding division of Health Volunteers Overseas, a private nonprofit organization dedicated to improving the availability and quality of health care in developing countries through the education of local health care providers. With its emphasis on teaching and training programs, Orthopaedics Overseas has addressed the enormous need for capacity-building in the developing world by training a variety of skilled musculoskeletal healthcare workers – from general surgeons to clinical officers to orthopaedic assistants [6] (Table 1).

The history of Orthopaedics Overseas has been well summarized by Derkash [5]. Orthopaedics Overseas originated from the Orthopaedics Letters Club initiated by Dr. Allan McElvie and other members of the Association of Bone and Joint Surgeons (ABJS) in 1958. The impetus was to allow the transfer of information and ideas without the formality of journals. The Overseas Program of the Orthopaedic Letters Club was initiated in 1961, after assessing the postwar health care needs in Jerusalem and Jordan. The program was taken over by CARE and in 1963 the name was changed to Orthopaedics Overseas. In 1973 Orthopaedics Overseas became the American chapter of World Orthopaedic Concern (United Kingdom). This further strengthened the philosophy and importance of teaching and training physicians and healthcare workers locally with use of appropriate technology. As it continued to recognize the enormous need across the healthcare professions, OO became the founding division of Health Volunteers Overseas (HVO at www.hvovusa.org) in 1986 [5].

We will discuss the unique role and contributions that a nongovernmental organization (NGO) can have in strengthening the health care delivery system in developing

countries by focusing on the education of local providers and educators. NGOs, by virtue of their mission-focused approach to the delivery of programs in the field, are characterized by a willingness to collaborate with both public and private sector agents and are noted for their ability to leverage support and donations to support their activities.

Orthopaedic Overseas Philosophy

At its core for over 40 years, Orthopaedics Overseas has been a collaborator and catalyst in its quest to improve the availability and quality of healthcare in developing countries. The primary focus of OO's programs is the transfer of clinical and surgical knowledge and decision-making skills to students, clinicians and faculty. The goal is to strengthen local capacity to provide better care in a timely manner. OO orthopaedic surgeons act through a multiplier effect by "training the trainers" for musculoskeletal trauma care. These principle agents are orthopaedic surgeons, nurses, assistants, general surgeons and trainees, residents and physicians, orthopaedic clinical officers and medical students.

OO's annual operating budget is approximately \$260,000. Raised primarily from gifts from individuals and from corporate support, these funds cover the costs associated with developing and managing programs as well as recruiting and preparing volunteers. These resources are substantially leveraged by the value of in-kind donations from manufacturers and the value of time and out-of-pocket travel-related expenses contributed by the volunteers. The average out-of-pocket expenses contributed by

Table 1. Demographics of Orthopaedics Overseas trainees

Country	Institution	Length of assignment	Start date of program	Who OO is teaching
Bhutan	National Referral Hospital	1 Month	1990	Orthopaedic surgeons, nurses, assistants
Cambodia	Sihanouk Hospital Center of HOPE and Kossomak Hospital	2–4 Weeks	2000	General surgeons and trainees
Cameroon	Mbingo Baptist Hospital	1 Month	2007	Residents
China (Wenzhou)	Wenzhou Medical School	3–4 Weeks	2006	Residents and physicians
China (Yanji)	Yanbian University of Fuzhi Hospital	2–4 Weeks	2005	Physicians
Malawi	Queen Elizabeth Central Hospital	1 Month	2006	Orthopaedic clinical officers (graduates and those in training) and residents
Moldova	State University of Medicine	2 Weeks	2005	Physicians, residents and medical students
Nicaragua	Three state hospitals in Managua (2 adult, 1 pediatric)	2 Weeks	2004	Residents
Peru	Various hospitals in EsSalud Hospital System	2 Weeks	1985	Physicians, residents, nurses
South Africa	Bedford Orthopaedic Centre	1 Month	1986	Orthopaedic medical officers
St. Lucia	St. Jude Hospital	2–4 Weeks	1985	Direct service site
Uganda	Mulago Hospital	1 Month	1999	Residents, medical students, assistants, physicians

OO = Orthopaedics Overseas.

each volunteer is \$2,300, not including time away from their practices. OO placed 144 volunteers in 2007 (out of 474 volunteers total placed by HVO that year). The time away for these volunteers ranged from 2 to 4 weeks.

In addition to the core operating budget, OO receives grants and other restricted gifts for specific projects or activities. OREF has funded a fellowship for US orthopaedic residents interested in volunteering at an OO site since 1999. OO placed more than 55 residents with this funding, providing young orthopaedists with exposure to the complexity and challenges of delivering orthopaedic care in a resources scarce environment.

As a strategic partner, OO is well-placed to draw upon the wealth of intellectual, educational, clinical, administrative, and systems knowledge to further the goals of prevention and improved trauma care with global collaborators. Volunteers bring not only their expertise and skills in orthopaedic surgery: most are leaders in professional societies, educators, and researchers in academia, and bring those additional skills. A more systems-based approach to program development and institution-building will lead to a more integrated, sustainable and, hopefully, cost-effective effort to reduce the burden of musculoskeletal diseases.

Effects of Orthopaedics Overseas

Since its inception, HVO has sent more 3700 volunteers overseas, and they have completed more than 5300 assignments [6]. HVO sends not only physicians, but also dentists, nurse educators, physical therapists, nurse anesthetists, and other skilled professionals interested in collaboration and sharing. Today, HVO has broadened its scope with programs in child health, primary care, trauma and rehabilitation, essential surgical care, oral health, infectious disease, nursing education and burn management. Aside from assisting in program development, HVO volunteers bring new insights and problem-solving strategies. They have introduced new teaching methods, updated or created teaching curricula, and inspired new ways of thinking. Clearly, this breadth of expertise will be required to develop and implement strategies to reduce the global burden of musculoskeletal injuries.

Case Study from Uganda

One example of HVO's dedication to achieving sustainable relationships in the developing world can be illustrated by the Orthopaedics Overseas program in Uganda. During the 1960s Sir Ronald Huckstep, a British-trained orthopaedic surgeon, was instrumental in developing an Orthopaedic

Officer's program at Makerere University. Much of the Ugandan health infrastructure collapsed during the periods of civic unrest that followed (when Idi Amin and Milton Obote ruled), including the departure of a large portion of the health workforce [14]. Once political stability was reestablished after the overthrow of Obote in 1985, HVO was successful in obtaining a grant from the Patrick J. Leahy War Victims fund in 1989. The focus was on the disabled and victims of civil wars, and the project was entitled the "Uganda Orthopaedics and Physical Therapy for the Disabled Project." HVO entered a three-year grant agreement with USAID for the Ugandan project to "improve the provision of orthopaedic, prosthetic, orthotic and physical therapy services for Uganda's thousands of children and adults who have lost upper and lower limbs, been crippled through the paralytic residual of poliomyelitis or otherwise become immobilized, especially those persons whose disabilities resulted from civil strife" [16].

The original objectives included the following: (1) teach and train 40 Ugandan medical students, physicians and surgeons in orthopaedic surgery to care for amputees and crippled patients; (2) enhance the efforts of other agencies in Uganda concerned with the training and continuing education of 20 prosthetists, orthotists, and physical therapists; (3) provide one adequately equipped operating room close to the central orthopaedic workshop to permit prompt, reasonable and adequate surgical treatment of patients with crippling injuries and diseases [16].

Amendments and extensions to the grant provided for greater objectives which ultimately concluded in 1998. These objectives included: (1) continue to develop a corps of Ugandan orthopaedic surgeons qualified to continue this teaching program by training 150 more medical students, 5 surgeons in-training and 25 physicians in orthopaedic surgery; (2) assist the Ministry of Health in the extension and coordination of orthopaedic services to areas outside of Kampala through an active outreach program; (3) work with the Department of Orthopaedics and various sponsoring agencies to enable qualified personnel from nearby countries to enroll in the Department of Orthopaedics for study, and; (4) provide technical training and assistance to the Department of Orthopaedics and to Mulago Hospital to enhance sustainability and maintenance of donated equipment [16].

HVO hired Rodney Belcher, an American orthopaedic surgeon, as Medical Director who soon became Professor and Head of the newly formed Department of Orthopaedics. Under his dedicated and superb stewardship, numerous achievements were realized. HVO continued to supply a steady stream of short-term and long-term volunteers along with considerable management and administrative support. A building was renovated for department offices, clinics, library and seminar/classrooms along with an HVO office.

Two operating rooms for “clean surgeries” were built near the orthopaedic ward. A prosthetic workshop was constructed in Mbale Regional Hospital along with a guest house at Mulago Hospital for visitors and volunteers. With regard to teaching and education, the quintessential achievement was the establishment of a Masters in Medicine (Orthopaedics) postgraduate degree at Makerere University and Mulago Hospital. The goal was to sustainably train and supply a corps of qualified surgeons who could continue this program at the finality of the grant. The four-year program began in 1995 with the enrollment of three young Ugandan physicians as the first residents.

In addition, substantial energy was directed towards the training of Operating Room personnel, orthopaedic nursing staff, and the advancement of sterile technique and OR productivity. Further energy was spent in the training of technicians to maintain and service the medical equipment and hospital engineers to attend to the needs of other departments such as radiology, cardiology, anesthesia and respiratory therapy. Many of the staff surgeons were funded for training outside of Uganda to develop other collaborative relationships with successful programs at other academic centers.

Extension of Services (Orthopaedic Outreach Programme) HVO and Dr. Belcher spent considerable effort on the expansion of the delivery of services outside of Kampala at the numerous regional hospitals along with the establishment of an effective referral system from the upcountry regions. HVO volunteers supplemented this Orthopaedic Outreach Programme, and staffed periodic “surgical camps” that increased visibility of available services, identified those in need, and provided education and training for medical officers and surgeons at the peripheral hospitals, thereby strengthening the national referral system [2]. These successes were documented in a process evaluation in 2004 (see “Does the Orthopaedic Outreach Programme Work for Uganda?”) [3].

Further accomplishments include the procurement of educational materials such as books (more than 5000), journals, slide sets, videos, CD-ROMS, computers, and photocopiers. The program also promoted collaboration between orthopaedics and other departments including pathology, radiology, oncology, neurosurgery, and pediatrics. Strengthening capacities within these other departments was another product of the development of a strong orthopaedic program [16].

Dr. Belcher was in the process of transition of administrative and management responsibilities to senior Ugandan members of the Department when he was tragically killed in a carjacking on the hospital grounds in 1996. Dr. Ed Naddumba was elected head of the Department and was capably able to sustain an outstanding academic program which continues its vibrancy up to the present [16].

Success of the program can also be seen in the number of graduates and contribution to the skilled orthopaedic workforce of Uganda. In the early 1990s there were just six orthopaedic surgeons for the country of approximately 25 million. The residency program has graduated 31, with about half coming from neighboring countries. All but one of the Ugandan graduates are practicing in Uganda. Currently, there are 20 orthopaedic surgeons in Uganda, and 13 graduates of the program remain on staff at Makerere University (T. Beyeza, MD, Chairman, Dept. of Orthopaedics, Makerere University, Kampala, Uganda, personal communication, February 1, 2008).

Through HVO academic volunteers and partnering NGOs, the capacity of the orthopaedic department to further its mission of providing improved musculoskeletal and trauma care to the people of Uganda has increasingly improved. Collaborations with such Northern academic centers as University of British Columbia, as evidenced by the Uganda Clubfoot Project [17] and University of California, San Francisco with the Institute of Global Orthopedics and Traumatology [8] have strengthened both programmatic and research capacities and attract global health partners. SIGN [15], an NGO founded by Lew Zirkle, Orthopaedics Overseas volunteer and former program director, has improved fracture care by introducing (and donating equipment for) intramedullary fixation that may be performed without fluoroscopy, as well as funding for improvement of trauma systems development within the department and hospital [15]. These efforts have emphasized capacity-building and empowerment of Ugandan physicians to work within their systems, thereby strengthening the infrastructure and long-term sustainability.

Discussion

The global burden of musculoskeletal trauma, despite being often overlooked, is a substantial portion of the global burden of disease. Worldwide, nearly one in 10 mortalities are caused by injury [13]. Rates of mortality due to injury vary drastically by socioeconomic status; greater than 90% of injury-related mortality occurs in low- and middle-income nations [13]. As many highly-populated countries undergo or approach rapid economic development, this growth outpaces the development of systems and infrastructure to prevent and treat injury, most notably traffic injuries. Road traffic accidents, currently the eighth leading cause of DALYs worldwide, are projected to be the fourth leading cause in 2030 [9]. In developing countries, where adequate treatment is often unavailable and complications are high, there is a tremendous and growing backlog of untreated surgical disease [11].

Addressing the global burden of injury requires a multisectorial and multidisciplinary approach centered on strengthening health care systems, including the provision of adequate infrastructure and physical resources, and the acquisition and maintenance of appropriately trained health care workers. Such an approach requires interventions which build or enhance local capacities, and are sustainable [2]. Public health specialists are increasingly recognizing the role of surgical treatment at district level health facilities [4] and recent studies demonstrate basic surgical and hospital care can be cost-effective with a cost-per-DALY that is comparable with well-accepted preventive procedures [10].

Such a broad approach to the problem of musculoskeletal trauma care requires the forming of partnerships of stakeholders – public, private, and academic. There are national, regional, and local differences with respect to disease burden, access to care, and the number and training level of health care providers; interventions must be adapted to the local needs, and a coordinated response requires communication and increased resources from multiple stakeholders, both public and private [7].

Health Volunteers Overseas, with a focus on training and education, a large cadre of trainers, and associations with leadership in industry, government, civil society, and academia, is well situated to act as a catalyst for such a multidisciplinary effort. HVO coordinates the volunteer efforts of not only physicians, but also dentists, nurse educators, physical therapists, nurse anesthetists, and other skilled professionals interested in collaboration and sharing. Today, HVO has broadened its scope with programs in child health, primary care, trauma and rehabilitation, essential surgical care, oral health, infectious disease, nursing education and burn management. Aside from assisting in program development, HVO volunteers bring new insights and problem-solving strategies. They have introduced new teaching methodologies, updated or created teaching curricula, and inspired new ways of thinking. Clearly, this breadth of expertise and disciplines will be required to effectively approach and develop strategies for lessening of overall burden of musculoskeletal trauma, injuries and their sequelae. Through a model which emphasizes teaching and training, HVO has a proven track record of sustainability. We have demonstrated the HVO intervention in Uganda has provided an effective collaborative partner whose multiplier effect has better prepared the country for this trauma epidemic.

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