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Musculoskeletal Trauma Services in Mozambique and Sri Lanka

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Abstract There is currently an escalating epidemic of trauma-related injuries due to road traffic accidents and armed conflicts. This trauma occurs predominantly in rural areas where most of the population lives. Major ways to combat this epidemic include prevention programs, improved healthcare facilities, and training of competent providers. Mozambique and Sri Lanka have many common features including size, economic system, and healthcare structure but have significant differences in their medical education systems. With six medical schools, Sri Lanka graduates 1000 new physicians per year while Mozambique graduates less than 50 from their singular school. To supplement the low number of physicians, a training course for surgical technicians has been implemented. Examination of district hospital staffing and the medical education in these two countries might provide for improving trauma care competence in other developing countries. Musculoskeletal education is underrepresented in most medical school curricula around the world. District hospitals in developing countries are commonly staffed by recently graduated general medical officers, whose last formal education was in medical school. There is an opportunity to improve the quality of trauma care at the district hospital level by addressing the musculoskeletal curriculum content in medical schools.

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Introduction

There is currently an escalating epidemic of trauma-related injuries worldwide due to road traffic accidents and armed conflicts. Expertise in treating traumatic injuries involves knowledge of the abdominal, thoracic, neurological, and musculoskeletal systems. About half of trauma patients who reach a hospital have an injury involving their extremities or spine [10, 15]. Most of the trained physicians and healthcare facilities are clustered in urban central teaching hospitals and yet most of the trauma occurs in rural areas with access only to rural health stations or district hospitals.

Providing adequately trained staff for these hospitals is a problem in many countries and several strategies have been employed. Most countries, including Mozambique and Sri Lanka, require 1 year of postgraduate training (internship) after medical school graduation then a period of service in a district-level hospital as a general medical officer. When physician numbers have been inadequate some countries have initiated programs to train alternative providers such as medical and surgical assistants or technicians. Medical school and internship are the last formal education programs that a general medical officer receives before being posted to a district hospital. There is concern that instruction in musculoskeletal medicine is deficient in the medical school curriculum in most areas of the world. This includes competence in trauma care. Therefore one strategy for increasing trauma care competence at the district-hospital level would be to improve the musculoskeletal curriculum in the medical schools.

The relationship between medical school graduates and district hospital staffing will be discussed. Using Mozambique and Sri Lanka as examples, possible solutions for providing better care to trauma patients will be suggested.

Mozambique and Sri Lanka Profiles

These two countries each have a population of about 20 million, have been previously colonized by European countries, are or have been engaged in prolonged, debilitating internal armed conflicts, and have government-supported free education and healthcare systems. Mozambique has one medical school graduating 50 students per year while Sri Lanka has six graduating about 1000 students per year.

While both countries have coastlines on the Indian Ocean, Mozambique lies on the east coast of Africa and Sri Lanka is an island nation at the tip of India. Mozambique is 801,590 k^2 in size, has a literacy rate of 54%, and a gross domestic product (GDP) per capita of US$ 320. Eighty-one percent of the population is engaged in agriculture although that segment of the economy generates only 21% of the GDP. Both countries are multiple-party democracies. Sri Lanka is 1/12 the land size of Mozambique, has a literacy rate of 91%, and GDP per capita of US$ 1,600. This is generated in the sectors of agriculture (16%), services (56%), and industry (27%). About 20% of the population of both countries lives in urban areas. This continues to change with urban migration [2, 3].

Mozambique

After achieving independence, Mozambique became involved in an internal armed conflict, which lasted for more than 15 years. During this time, travel about the country was unsafe and referral between hospitals was extremely difficult and often impossible. The conflict resulted in substantial destruction of the infrastructure of the country, including the healthcare system. A Ministry of Health report suggested 30% of the 1900 health care facilities in the country and a similar amount of personnel were rendered nonfunctional [9]. The capital city and some larger cities within the provinces were relatively safe and few of the hospitals in those areas were affected. Today, there are approximately 1200 rural health posts, 27 district and rural hospitals, and nine provincial and three central hospitals.

The majority of the trauma involves civilians and derives from knives, guns, and land mines. Prior to the end of the fighting, road traffic accidents were few in number. Most of the trauma occurred in the rural areas where about 80% of the population resides, a pattern common in many developing countries [4]. Emergency transport systems were and are rare and local care is often unavailable in these areas.

The single medical school in Mozambique graduates less than 50 students per year. After a year of postgraduate training most are posted as general medical officers to the 27 rural area district hospitals throughout the country. They are typically the best-trained providers at these hospitals. Further specialty training would not begin until after this period of general service, so even if operating room facilities are available, trained personnel are not.

The medical school curriculum at Eduardo Monlane University in Mozambique's capital city of Maputo contains the usual major subjects including general surgery. Orthopaedic or musculoskeletal topics are limited to a series of lectures given by the orthopaedic department over an 8-week period. During the first postgraduate year residents spend a 1-month rotation in the orthopaedic outpatient clinic at Maputo Central Hospital. Many of the patients present with trauma-related problems but there is little direct surgical experience during this time.

To address the need for additional surgical care throughout the country, a program was established in the late 1980s to train surgical assistants (technios de cirurgia). This group has received a preliminary education through the medical assistant level. The 36-month training course concentrates on surgical techniques for major surgical emergencies, including cesarean sections and appendectomies. Some training is given for wound débridement including open fractures and major fracture care. Followup training is provided subsequently by the general surgeons and orthopaedists at the district hospitals at which the surgical assistants were working. The musculoskeletal component focuses on emergency procedures such as débridement of open fractures, placement of external fixators, compartment syndrome, and amputation principles. This program continues with more than 80 functioning assistants currently providing surgical care to areas of the country not otherwise served. One study of the effectiveness and safety of the surgical assistant program, including complication rates and length of stay following C-section, reported no differences when the procedure was performed by physician obstetrical surgeons or surgical assistants [12]. Other countries, such as Malawi [11] and Tanzania [7], have similar alternative provider programs to staff underserved areas. The critical factor is whether either group can competently provide the level of care necessary to handle the increasing number of traumatic injuries.

Sri Lanka

Currently the armed conflict in Sri Lanka is largely confined to a limited section of the country and the civilian

population elsewhere is affected more by road traffic accidents than penetrating trauma. However the economic drain on all sectors, including healthcare, is felt throughout the country. In the majority of the country there is a well-developed healthcare system with functioning referral and transportation components. The trauma load is substantial in most general hospitals, ranging up to 75% of surgical admissions. The number of vehicles has increased by 64% during the past 6 years and the roadways remain multiple-use right of ways for everything from foot traffic to trucks and buses.

Similar to Mozambique the approximately 125 district hospitals are staffed by young newly graduated general medical officers and there may or may not be surgical facilities available. However, because of the large number of graduates, the needs of the district hospitals are met and alternative care providers are not necessary. The general medical officers usually remain in this post for just a few years, leaving to pursue postgraduate training or for a post in one of the approximately 18 teaching hospitals in one of the major cities. So there is lack of experienced physicians at the district level and therefore concern for trauma care competency.

Programs in Sri Lankan medical schools are 6 years in length following secondary education with a subsequently required postgraduate year (internship). The musculoskeletal content of the undergraduate curriculum contains a series of lectures during the third year with an additional one month clinical orthopaedic rotation during the fourth year. There is also exposure to orthopaedics and trauma during an 8-week fifth-year surgical rotation. The first postgraduate year is spent on just two major clinical services and it would be unlikely an orthopaedic rotation would be included. Despite this, the importance of musculoskeletal competency seems to be understood in general. Currently there just 20 fully trained orthopaedists in the country; about 1 per 1 million population. Finding qualified instructors will be a concern if the musculoskeletal curriculum expands substantially.

The Medical Curriculum

Worldwide, 45% to 65% of trauma-related injuries and up to ⅓ of primary care physician contacts involve the musculoskeletal system [10, 15]. Medical school curricula do not reflect these proportions and there is a general feeling that musculoskeletal education is lacking in medical schools worldwide [1, 5, 6]. Akesson et al. [1] in a review article published in the WHO Bulletin in 2003 summarized a series of studies indicating that, on average, less than 3% of undergraduate teaching hours are devoted to the musculoskeletal system and that in the first postgraduate year (intern year) a musculoskeletal rotation is required in just 3.5% of programs surveyed. The lack of fundamental musculoskeletal knowledge by graduating medical students in North America is documented by several articles in 1998 and 2000 [8, 13, 14]. Similar deficiencies occur throughout the global education system. The American Academy of Orthopaedic Surgeons through its Project 100 has promoted curriculum change in medical schools in the United States and Canada, and it is just beginning to take effect. Enlisting the cooperation of the American Association of Medical Colleges (AAMC) and the National Board of Medical Examiners has helped. There is now an AAMC competency document for medical schools to follow and a shelf examination is being developed. But progress has been slow at the individual medical school level.

The WHO Global Initiative for Emergency and Essential Surgical Care is aimed at improving emergency surgical and obstetrical care at the district-hospital level. This program has been developed to train providers of various education levels who function in this setting. It is currently being presented to an ever-increasing audience globally and is being incorporated into the education system of the Ministries of Health. Whether this can be fully incorporated into the medical school curriculum is not yet known, but it is being used to some extent in medical schools in Ethiopia, Gambia, and Mongolia.

Sri Lankan medical schools are in the midst of major curriculum change similar to the model purposed by the AAMC and others. Several schools have been able to increase the musculoskeletal content for both didactic material and clinical skills. But curriculum change anywhere is difficult, especially if new material and techniques are introduced and older ones reduced or abandoned. Trauma care training to the competence level needed at first referral hospitals in developing countries would displace a substantial amount of the traditional medical curriculum. This will be met with resistance from medical school faculties who face competing political interests, increased curriculum demands from each department, and limited available time.

The need for surgical expertise accessible to all of the population is just now being recognized. The global trauma epidemic is making this more apparent along with the critical situation of maternal fetal health and obstetrical emergencies. But it will take a determined effort to continue to increase the priority for trauma care competence among the medical community. The efforts of the WHO, the Bone and Joint Decade, and conferences such as this Brighton Workshop are helping. Most important now is for those with musculoskeletal interests to work within each medical school faculty. We must be part of the process of curriculum change or the musculoskeletal system and trauma care competence will not be afforded adequate importance.

Discussion

The majority of trauma injuries in Mozambique and Sri Lanka occur in rural areas where 80% of the population resides. This pattern is typical of many developing countries. These areas have access to rural and district hospitals most often staffed by recently graduated general medical officers. The medical education system in both countries is similar in duration and basic content. However, Sri Lanka produces graduating physicians at 20 times the per capita rate as Mozambique. There is no physician shortage in Sri Lanka and it has not been necessary to supplement their physician workforce with alternative providers in order to staff the rural and district hospitals.

Both countries have limited musculoskeletal content in the medical curriculum, a condition which exists globally. Graduating physicians generally are not sufficiently trained to handle the level of trauma injuries presenting to the rural healthcare sector. To address the continuing increase in trauma-related injuries, we need better prevention programs, improved facilities, and a plan to train more competent providers.

Considering the district hospital staffing pattern, it is apparent that addressing musculoskeletal trauma competency within the medical school curriculum could be an important strategy. Several Sri Lankan medical schools have revised their curriculum and added musculoskeletal content. They are also considering doubling the length of the internship to 2 years assuring at least 6 months of surgical training to all graduates. The effects of these measures have not yet been tested.

We are in the midst of a global interest in medical curriculum revision. Those with expertise in the musculoskeletal system need to be involved with this process. We need to support efforts to increase public awareness of the trauma epidemic and the consequences it has on the population. This information should be conveyed to Ministries of Health and other public officials to help direct funding and policy issues. Partnering with the WHO when possible may amplify such efforts. Locally, we can help gather data through support of trauma registries. We need to be involved with the medical school curriculum process at our institutions. While it is not always of great interest to take time from busy surgery schedules, we need to be at the meetings. Curriculum revision is difficult and other departments will not offer us curriculum time. We must be there encouraging the inclusion of these competencies in the curriculum. Although it is just one part of a complex puzzle, it might help.

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