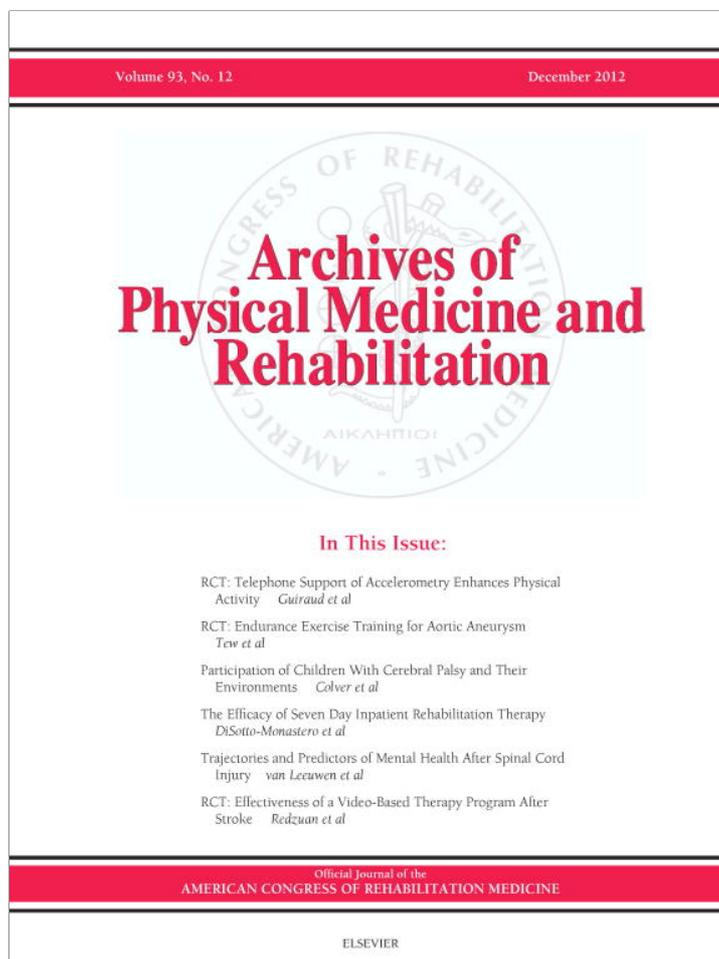


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SPECIAL COMMUNICATION

Mauritius Calling: Medical Care and Neurorehabilitation Needs in an Oceanic Idyll

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The tropical island of Mauritius, located off the coast of Southern Africa, has greatly improved its health care system, especially for frontline services and procedures such as cardiac surgery. But the post-acute neurorehabilitation care is still problematic, much to the detriment of disabled patients, their families, and Mauritian society overall. Comparisons with neurorehabilitation care in the United Kingdom suggest the scale of the problem in terms of uncoordinated medical teams, limited follow-ups, lack of expertise, and cultural stigma. This article assesses the needs of the neurologic rehabilitation segment in Mauritian health care and submits a set of policy recommendations addressing what medical professionals, hospitals, government officials, and other organizations can do to improve the neurologic rehabilitation infrastructure for Mauritian patients.

Key Words: Brain injuries; Disabled; Long-term care; Mauritius; Rehabilitation; Rehabilitation centers; Spinal cord injuries; Stroke.

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THE STUNNING TROPICAL ISLAND of Mauritius surprises through beauty, warmth, and hospitality. Besides the idyllic appeal, Mauritius has a great record of stability, one of the highest per capita incomes in Africa, and a positive record on human rights. As a consultant physician currently practicing in the United Kingdom, but born and raised in Mauritius, I marvel at the speed of improvement in health care services and acute care technology available in many of the island's hospitals. State-of-the-art clinics for procedures such as cardiac surgery have turned Mauritius into a medical hub for the Mascarene Islands and the Southern part of the Indian Ocean.

But while acute care has seen enormous progress, the infrastructure for post-acute care, including long-term rehabilitation and social reintegration, is problematic at many levels. This article will focus on neurorehabilitation and the lack of facilities in this area. Indeed, the increasing number of patients with stroke, acquired brain injury (ABI), and

spinal cord injury (SCI) means that this gap in post-acute care amplifies the effects of impairment and disability on patients and their families, as well as on Mauritian society. This problem may be common for many developing countries, but this should not invite resignation or inaction. The objective of this article, therefore, was to highlight the problem spots in the Mauritian post-acute care system and formulate a plan of action for the future.

BACKGROUND ON THE REPUBLIC OF MAURITIUS

Located off the coast of Southern Africa, east of Madagascar, the island—as of December 2010—has a population of 1.28 million, with a remarkable racial and ethnic diversity.¹ According to official statistics for 2010, the population growth rate has reached 0.4%, with a crude birth rate of 11.7 per 1000 and a crude death rate of about 7 per 1000.¹ Life expectancy is 69 years for men and 76 years for women.² According to the World Health Organization, Mauritius faces the burden of an aging population. The group “aged 75 years and above” represented 2.39% of the population in 2011 and is projected to reach 6.9% by 2037.³ In 2010, the country's gross domestic product (GDP) was estimated at £5.96 billion, with a GDP per capita of £8578.⁴ In 2008, the health spending per capita was £151, public health expenditure was 2.0% of the GDP, and private health expenditure reached 2.1%⁵ of the GDP.

Mauritius has successfully discarded the burden of communicable diseases, but demographic and health statistics suggest instead a rise in noncommunicable and chronic diseases. Brought about by socioeconomic changes, unhealthy lifestyles, and poor nutrition, these include diabetes mellitus, cardiovascular conditions and hypertension, cerebrovascular diseases, cancer (malignant neoplasms), and mental illness.

The Ministry of Health and Quality of Life is tackling the above problems on all fronts. It has intensified preventative measures and promotion of health with regular educational programs on radio, television, and local media; health care technology procurement has increased significantly for both diagnosis and treatment. Public and private hospitals now boast new diagnostic technologies such as the latest magnetic resonance imaging and computed tomography scanners, and sophisticated new surgical techniques such as cardiac and neurosurgery. Patients now come to Mauritius from neighboring countries to undergo cardiac surgery. However, these changes in acute care do not seem to be matched in the equally important area of post-acute rehabilitation for patients suffering from, among others, SCI, ABI, or stroke.

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List of Abbreviations

ABI	acquired brain injury
GDP	gross domestic product
MRC	Mauritius Research Council
SCI	spinal cord injury
TBI	traumatic brain injury

Table 1: Comparing Incidence of Neurologic Diseases in Mauritius and the United Kingdom

Incidence	Stroke	TBI	SCI
Mauritius (figures between 2005 and 2009)*	428.3–910 (per million)	141.6–299.1 (per million)	12.5–23.3 (per million)
United Kingdom	2500 per million [†]	2300 people (ABI) per million [‡]	1000 new cases per year, or 16.6 per million [§]

*Source: Ministry of Health, Mauritius.⁸

[†]From the Stroke Association.¹¹

[‡]From UK Acquired Brain Injury Forum.¹²

[§]From University of Cambridge Neuroscience.¹³

Improvement in acute care leads to an increased survival rate in patients, who then require long-term general care such as return to a disabled-friendly home and follow-up visits by health care professionals and social services. In neurology, patients with stroke or head injury now benefit from thrombolysis for stroke victims or brain decompression for head injury sufferers. Consequently, they may live longer but with significant medical, nursing, and therapy needs. Our research suggests that there is a significant discrepancy between advanced “frontline” services and those available for long-term care, including the facilities required to deal with the medical and social consequences of neurologic disabilities.

Neurologic insults such as ABI, SCI, and stroke often lead to long-term disability, that is, impaired bladder, bowel functions, mobility, or speech. The resulting disabilities are often complex, and a review of the rehabilitation system in Mauritius suggests that disability management is not performed in a coordinated manner involving relevant experts, that is, physiotherapists, occupational therapists, speech and language therapists, and specialist doctors.

The benefits of a good neurologic rehabilitation infrastructure far exceed the financial and social investments needed to achieve it. It will not only improve quality of life for patients and their families but also decrease the burden on caregivers and society by making disabled individuals more socially independent and sometimes employment-ready.

ASSESSING THE NEEDS

Having identified the above reported and observed shortcomings, I wanted to gather objective facts and therefore joined forces with a Mauritian neurologist from the United States to prepare an article on “Needs Assessment for Neurological Rehabilitation”⁶ that we submitted to the Mauritius Research Council (MRC) and the Ministry of Health and Quality of Life in an attempt to establish the magnitude of the problem. Given my academic work in International Health Planning and my previous international rehabilitation responsibilities with the International Red Cross, I felt equipped to help the MRC carry out a survey. From the outset I worked closely with the researcher appointed by the MRC and the Ministry of Health and Quality of Life (he also benefitted from support from researchers and his academic employers at the MRC as well as from professionals at the Ministry of Health and Quality of Life and the Ministry of Social Security). Together we presented our findings in a workshop that was held on April 7, 2011, in the offices of MRC.⁶ The report from the workshop has been published by the MRC, and it is available online.⁷

The report established the following:

- Patients in Mauritius benefit from a range of public and private sector health care suppliers. In the public sector, there are approximately 150 medical institutions providing pri-

mary, district, and regional health care, as well as tertiary care such as the cardiac center. The overall bed capacity at the 7 major hospitals is close to 2500.⁸

- In the private sector, at the end of 2009 there were 19 private clinics with a total of 807 beds. These institutions differ in the scope, specialization, and level of services that they offer.⁸
- In addition to diseases, the other main cause of deaths in Mauritius, chronic and disabling conditions, is road traffic accidents. For the 2000 to 2009 period, the average number of car accidents per year was 19,725, resulting in 3054 casualties and 144 deaths.⁹
- Mauritius registers a high incidence of stroke, SCI, and traumatic brain injury (TBI). According to the World Health Organization Report on Noncommunicable Diseases mortality worldwide, in 2008 approximately 615 per 100,000 deaths occurred in Mauritius.¹⁰ In the United Kingdom, 833 per 100,000 people died from noncommunicable diseases in the same year (table 1).¹⁰

CHALLENGES FACED BY PATIENTS

Given the difficulty of gathering information in Mauritius and the dearth of data from both public and private hospitals, the figures provided in table 1 are far from being accurate. Also, the higher figures in the United Kingdom are for ABI (which includes but is not limited to TBI), whereas in Mauritius the data refer only to TBI in public hospitals. For the purpose of this article, accurate figures are not necessary. It is equally challenging to draw a map of the typical patient journey through the system from the onset of disease to discharge back into the community. Nevertheless, basic qualitative research based on several patient interviews highlights some areas of concern regarding the patient interaction with hospitals and staff.

- Patients and families reported the lack of a reliable and easily accessible transport system to take the injured to emergency care and patients to follow-up visits.
- There are few home visits by doctors, physiotherapists, or speech therapists.
- The major initiative to attempt to offer regular home care to the disabled is the community-based rehabilitation program, but it is understaffed and overwhelmed by the number of patients. The average proportion of the time spent on neurologic cases by community-based rehabilitation program staff every week ranged from 10% to 50% because the program does not focus exclusively on patients who need neurologic rehabilitation.⁷
- Family members must care for the injured and thus attend to the rehabilitative needs of patients without training. This results in the occurrence of severe secondary diseases such as urinary tract infections and pressure ulcers.
- Disabled patients pointed to the small allowances, which prevented them from receiving full-time care at home.

Table 2: Human Resources Available in Mauritius

UK/US Model	Human Resources Available in Mauritius (Public Sector)	Comments
Physical and rehabilitation medical specialists	4	None
Rehabilitation nurses	Unknown	In general, specialist nurses are not acknowledged
Dieticians	16	Not involved directly
Physiotherapists	17	33 assistants
Occupational therapists	29	None
Speech therapists/audiologists	5	10 assistants
Clinical psychologists	4	Patients not referred
Recreational therapists	0	Does not exist

NOTE. Adapted from the MDC 2010 & Ministry of Health and Quality of Life (2010).⁸

- The lack of specialized home equipment was emphasized as it hampered the patients' rehabilitation. This includes hoists, access rails for stairs, profiling beds, adapted chairs, toilet chairs, wall bars, and adapted cutlery as well as equipment for physical therapy.
- Interviewees also lamented the lack of day-care centers because such institutions would be helpful in efforts to reintegrate patients in the community and involve them with leisure activities. Staff motivation to provide a high level of care was also flagged as an issue.

NEUROLOGIC REHABILITATION HUMAN RESOURCES IN MAURITIUS

The problems highlighted by the patient interviews are compounded by the scarcity of neurorehabilitation expertise. As of 2009, there were 1500 doctors in the Republic of Mauritius, working in both the public and private sectors. However, there are only 4 medical specialists in rehabilitation, 17 physiotherapists employed by the government, and 33 assistants.¹⁴ The current physiotherapists are responsible for on average 200 patients per day and thus have to delegate care to assistants (table 2).

PUBLIC INFRASTRUCTURE

Despite ambitious claims on paper, the welfare system has not given enough weight to specific disability needs.¹⁵ Legally, individuals with disabilities are entitled to a range of benefits and aids, from advocacy, counseling, and guidance to provision of assistive devices (eg, wheelchairs and hearing aids), parking coupons, bus passes, concessionary air fares, liaising with nongovernmental organizations, refunding of transport costs to disabled children (accompanying parents) attending schools, and integration assistance.¹⁶ People with disabilities also benefit from exemption of customs duty on specially adapted cars.¹⁶ However, disabled people and their relatives often fail to claim such benefits because they are not aware of them. Therefore, the relevant government departments need to drive the message home about the rights and benefits that people with disabilities are entitled to.

Equally important is the Mauritian government's recent adoption of the "Standard Rules on the Equalization of Opportunities for Persons with Disabilities"¹⁷ and ratification of the Convention on the Rights of Persons with Disabilities and its

Optional Protocol.¹⁸ In accordance with these 2 documents, the government must now, in addition to promoting the rights and dignity of persons with disabilities, aim to accomplish goals such as disabled access to all new public buildings and free and reserved parking.

As much as these developments are remarkable, recent visits to the country demonstrated that Mauritius is overall not wheelchair-friendly yet. Pavements, public and private buildings, and other public spaces such as parks and beaches are mostly inaccessible to disabled people. Moreover, parking spaces for the disabled are being abused or obstructed. In an attempt to tackle these issues, the government is now imposing heavy fines for the illegal use of parking spaces for the disabled. In tackling all these problems and harnessing all its creative forces, Mauritius could open itself to a lucrative market constituted of physically disabled tourists.

POLICY RECOMMENDATIONS

In light of these findings, I submit the following comprehensive policy recommendations to improve hospital care, long-term neurorehabilitation for disabled patients, and better reintegration into their communities. For some of these recommendations, significant budget allocations at the national level are required. However, critical logistical problems such as the lack of multidisciplinary teams can be addressed quickly and effectively with simple administrative realignments.

1. In hospitals:

- Allocate more staff to meet patient needs in neurologic rehabilitation.
- Develop expertise in neurologic rehabilitation for medical doctors and allied health professionals.
- Offer specialist training, refresher courses, and workshops to staff on how to provide quality care to patients and cope with changing needs.
- Set up multidisciplinary teams to include physiotherapists, occupational therapists, speech and language therapists, psychologists, social workers, dieticians, orthopedic workshop staff, and nongovernmental organizations.
- Develop specialist skills that include sensory rehabilitation and swallowing assessment.
- Set up a hospital devoted partly or entirely to neurorehabilitation. All services would be located on the same site. A neurorehabilitation hospital would include treatment facilities (medical and/or surgical, therapy such as gymnasium and hydrotherapy pool, sensory room), diagnostic facilities (electromyography, radiology, swallowing clinic), outpatient and outreach services, and preventative medicine.
- Provide a rehabilitation program in the community for less severe cases or as a follow-up after acute admissions.
- Develop a good and reliable transport infrastructure for people with disabilities, which should also be appropriately adapted to patient condition. Some ambulances should solely be used for rehabilitation services to make access easier and faster.
- Given the geographical isolation of the island, far removed from all the continents and centers of excellence abroad, encourage communication (live or virtual conferences, visits, distance training) and exchange programs with institutions providing neurologic rehabilitation services abroad.

- Enhance the communication infrastructure to include administrative equipment such as computers, telephones, and fax machines.
2. In patients' homes:
 - Increase the frequency of follow-up home visits by doctors, therapists, and community nurses.
 - Customize programs and leisure activities to highlight personal independence and skills.
 - Educate patients and families about their rights and the services and benefits to which they are entitled.
 - Subsidize in-cash or in-kind home adaptations for disabled individuals.
 - Supply equipment such as specialist beds, backrests, splints, neck collars, chairs with special head support, and walking frames. These should be easily available and not subject to waiting lists; the use of local technology should be encouraged.
 3. Within society:
 - Encourage hospitals to work in close collaboration with relevant nongovernmental organizations that provide legal and/or social assistance to people with disabilities, thereby facilitating a smoother transition back into society, and with those that focus on the prevention of accidents and diseases as well as the promotion of health.
 - Raise awareness and educate the general public about the social and economic impact on people suffering from neurologic accidents.
 - Comply with United Nations standards such as provision of disabled access features to all new public buildings and public spaces and free and reserved parking.
 4. Encourage monitoring, evaluation, and research in this particular area:
 - Encourage institutions to share data for more effective monitoring and planning for neurologic conditions in view of setting up a central database for stroke, SCI, and TBI.
 - Provide controlled access to such information to researchers and university students with an interest in neurologic rehabilitation.
 - Evaluate programs systematically to ensure the effectiveness of the measures taken.

CONCLUSIONS

Mauritius has registered significant improvements in its health care system. Acute care is good and has brought about a longer life expectancy on the island. However, for patients who have survived SCI, ABI, or stroke, structured long-term neurorehabilitation is nonexistent. The situation is hardly different for musculoskeletal or amputee rehabilitation. Unfortunately, these types of problems are not confined to Mauritius and are common throughout the developing world, something corroborated by previous research as well as the work that I carried out in Southeast Asia and Eastern Europe.¹⁹

We think that if there is a national will, Mauritius can become a shining example of commitment to the enhancement of the lives of people with disability. The task ahead is difficult, but by tapping into the already existing pool of dedicated men and women health care professionals, there is the possibility to improve the rehabilitation services in the country. I hope the above comprehensive proposals will spark a national conver-

sation and action to improve the living conditions for patients with disabilities.

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