Rehabilitation Medicine in the Developing World

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Objectives

- To Discuss:
  - 1. The role of rehabilitation in the management of patients with functional impairments including the contributing roles of various members of the rehabilitation team.
  - 2. Common diagnoses managed by rehabilitation medicine and common functional impairments.
  - 3. Implications of these functional impairments for patients in the developing world
  - 4. Risk factors for acquiring functionally limiting conditions in the developing world and opportunities for modification of these risks
  - 5. Availability of rehabilitation services in the developing world and pros and cons of various models of rehabilitation that have been used.
Branch of Medicine dedicated to restoring or supporting the development of an individual to their optimum level of functioning, reducing impairments and handicaps and improving the quality of life

Providing assessment and development of interventions based upon needs and deficits of an individual patient within the context of their unique circumstance
Supporting health and function in people with disabilities

In pediatrics, supporting the process of continued development of physical, emotional, behavioral and cognitive function

Interventions designed within the context of the patient’s family, community and culture
Rehabilitation Medicine

- Doesn’t own any one organ system
- Attends to any system which impairs function
- Monitoring for problems commonly associated with disabling conditions
- Interventions designed within the context of the patient’s family, community and culture
WHO Disability Definitions

- Impairment: Any loss or abnormality of physiologic, psychological or anatomic structure or function
Activity limitation—A restriction, due to an impairment in the ability to perform an activity within the range of what is considered able-bodied.
WHO Disability Definitions

- Participation limitation—A disadvantage resulting from an impairment or disability that limits or prevents the fulfillment of a role that is “normal” for the individual. Defined by environment and reflects societal bias.
Patient Populations of PM&R

- Patients with congenital, acquired disability from injury or acute or chronic illness
- Growing population with medical advances which reduce mortality
- WHO 1 in 10 persons has a significant disability
- 80% of 600 million people with disabilities live in the developing world. 1–2% of these people receive rehabilitative care
Rehabilitation Team

- Physiatry
- Rehabilitation Nursing
- Physical Therapy
- Occupational Therapy
- Speech Therapy
- Rehabilitation Neuropsychology
- Orthotics
- Prosthetics
Rehabilitation Team

- Adaptive Equipment providers
- Nutritionists
- Teachers
- Medical Social Work
- Family
- Community members
Challenges Specific to Developing World

- Limited resources
- Rehabilitation Medicine is relatively young field with few providers or training programs in the developing world
- Resources often concentrated in urban areas—>70% of population doesn’t have access to care
- Much of the health care is provided by private sector
Religious and Cultural Influence

- Religious community can be very supportive locally and globally
- Islamic teaching Qur’an and Hadith (Words of Prophet Mohammed)
- Verses indicating people with disabilities are to be treated with the same rights as nondisabled
- Neither blessing nor curse
- Able to come to prayers
- Cultural belief that disability is a curse or punishment and requires atonement
Disabling Cultural Influence

- Expectation to care for elderly disabled family members and not promote independence
- Begging is common, little spent on education of disabled children as is considered a poor investment
- Disabled family members kept at home

*Morgan, et al, Child, 2010*
Common Diagnoses which require Rehabilitation Support

- Cerebral Palsy
- Spina Bifida
- Acquired Brain Injury
- Spinal Cord Injury
- Neuromuscular disease
- Acquired and congenital amputation and limb deficiency
- Rheumatologic disease
- Brachial plexus injury
- Burns
Cerebral Palsy

- Group of disorders of development of movement and posture causing activity limitations attributed to nonprogressive disturbances that occurred in the developing fetal or infant brain
- Most common motor disability of childhood
- Common associated issues include:
  - Contracture
  - Dysphagia
  - Cognitive limitation
  - Sensory impairment
  - Seizure disorder
Risk factors for Developing Cerebral Palsy

- Difficult to ascertain true population in developing countries
- Saudi Arabia—higher incidence of consanguinity
- Nigeria—kernicterus
- Uganda—meningitis, encephalitis
- South Africa—meningitis, encephalitis, trauma, stroke

Simkiss, J Trop Ped, 2002
Morbidity and Mortality Risks

- 114 Children w/CP in Brazil 50% severely malnourished overall, 72% in quad CP higher compared with children w/CP in developed countries
- More severe with quadriplegia, dysphagia and low SES, low use of gastrostomy tubes
- Bangladesh 9% mortality in children under 3y w/CP

Simkiss, J Trop Ped, 2002
Opportunities for Intervention

- Single event multilevel surgery in 85 Pakistani children with spastic diplegia who were nonambulatory and had never been treated. Mean age 8.5y, 89% could not sit fully erect. All had sitting ability.
- If not ambulatory by 8yo in developed countries, prognosis for ambulation is poor.
- In this series, all became ambulatory. 21% exercise, 45.9% household, 33% community.

*Khan, J Bone and Joint Surg 2007*
Family Centered Care in Cambodia

- Cambodia highest per capita rates of disability in the world
- CP most frequent disability in children
- Trial of collaborative goal setting with providers and families
- Team of PT, orthotist and social worker met with child and family to develop Individual Rehabilitation Plan
- Travel to urban center once a month

Morgan, Child, 2010
Family Centered Care in Cambodia

- Biomedical explanation and PM&R are not part of traditional culture
- Genocide, loss of the entire educated class, chronic extreme poverty
- Hierarchical culture, do not question authority
- Needs of the family are more important than the needs of the individual
- Fatalistic acceptance of karma
Family Centered Care

- Frustrated by lack of cure and not understanding process
- Valued support and respect for their role as parents
Spina Bifida

- 2nd most common disability in children
- Neural tube defect with physical, psychological and social impact
  - Paralysis and loss of sensation below level of lesion
  - Chairi Malformation and hydrocephalus are common
  - Nonverbal learning disorder
  - Neurogenic bowel and bladder
- Folic acid supplementation decreases risk of the disorder 50–70%
Saudi Arabia and Neurogenic bladder study

- Saudi Arabia, series of 15 patients with neurogenic bladder presenting in CRF, ESRF mean age 6.2 yo
- Spina bifida–89% of parents with consanguinity vs 67% controls
- Many had health care including VPS,
- CRF rarely seen at an early age, lack of awareness for pediatricians
- Psychosocial implications of CIC

Kari, Ped Nephrology 2006
1.5 million die worldwide, WHO estimates 90% occur in LAMIC
150–200 per million annually disabled leading cause of disability under 40
Major cause of death and disability, leading cause of death in children > 1 yo
Effects gross and fine motor skills as well as neurobehavioral skills and can effect sensory perception
Risk factors and level of disability/handicap varies according to culture and location

Murray, Global Health Statistics 1996
Traumatic Brain Injury Risk Factors

- Unintentional injury to children <5yo: 740 deaths/million in developing world, 249 deaths per million in developed world
- Child labor, rapid lifestyle changes
- Falls reported to be a significant cause of TBI of children in India and Nepal. TBI falling off roofs in New Delhi—children are 30–40% total falls
Traumatic Brain Injury Risk Factors

- Epidemiology of neurotrauma in Kathmandu
- 96% TBI, 4% SCI
- Falls most common etiology
  - Unsafe architecture
  - Unsupervised play
- Rural children with delayed care
- Most injured children in rural settings cared for by faith healers. Time to reach neurosurgical care 30.1 hrs rural, 7 hrs urban

Mukhida, Child Nerv System 2006
MVC

- Developing countries: 72% of population, 75% MVC deaths
- Road traffic: 9th leading cause of global loss of health life
- Ghana, Nigeria, Uganda: traffic is leading cause of injury death
- 1# cause TBI in Indian children

*Kumar, Childs Nerv Syst 2009*
MVC

- MVC incidence is related to
  - # of cars
  - population density
  - condition of roads
  - social education of safe driving

- Unique risks of MVC in Developing world
  - Pedestrians and animals sharing road
  - Poorly maintained vehicles
  - Overloaded buses
  - Disregard of traffic rules and low driving standards
  - Defective roads
MVC

- Developed countries 1970–1995
  - Mortality due to MVC decreased 47%
  - 40% decrease in hospital admissions
  - 40% increase in population
  - 120% increase in registered vehicles

Kumar, Childs Nerv Syst 2009
Penetrating Missile Injuries

- Developed world: LA gang related homicides in 19 y or younger account for 31% total homicides
- Developing world: India 2-18 yo roadside grenade attacks, crossfire, playing in fields, firing on processions—children have a tendency to run for shelter rather than lying down
- Similar survival rate to other mechanisms, worse with GSW compare to grenade fragments
- Mean interval injury to treatment is 65 minutes
- ATLS guideline treatment

Wani, J Neurosurg Ped 2011
TBI Outcomes, Disability, Handicap

- CRASH 8927 pt 46 countries
- 6 m outcomes in low, middle and high income countries
- >16y, GCS<14
- All cause mortality <14 days
- GOS questionnaire 6m, excluded disability not related to TBI
- Functional disability– mobility and ADL performance
- Social disability–work, social and leisure activities and sustain relationships

DeSilva, Int J Epidemiology, 2009
TBI Outcomes, Disability, Handicap

- 1/3 mod to severe disability
- ¼ death
- ½ good recovery
- LAMIC 2x the odds of dying following severe TBI, no different in mild and moderate injury
- ½ the odds of disability after mild and moderate TBI
Spinal Cord Injury

- Paralysis and sensory impairment
- Neurogenic bowel and Bladder
- Autonomic instability
- Complete and Incomplete injuries
- In developing countries 80% of people with SCI die from pressure sore related issues in the first 2 years

Shapcott et al Proc Expl New Hor 1996
2005 Pakistani Earthquake and SCI

- 2005 73000 deaths, 126,000 injured, estimate 650–750 SCI
- Safe evacuation, spinal fixation
  - Helicopter with spinal stabilization
- Bowel, bladder and skin care
- 3 makeshift SCI units with rehab MD—no deaths few complications

Farooq, Arch Phys Med Rehabil 2008
2005 Pakistani Earthquake and SCI

- Natural disasters and SCI–
  - Anticipate SCI
  - Appropriate evacuation prevents unnecessary SCI
  - Early psychosocial culturally appropriate support
  - Coordinated international support
  - Religious community support
  - Ongoing support return to community
Cushion

- Tuball cushion made from bicycle inner tubes and plastic balls materials cost $6,
- Similar in some measures of pressure distribution and durability to ROHO, better than foam

Guimaraes, Int J Rehab Res 2003
Availability of Physiatry

- 10,280 PMR MDs in Europe
- 7000 in US
- 10,000 in China
- Sub-Saharan Africa 2009: 788 000 000 permanent residents, 78 million people with disabilities
- No PM&R training programs, no professional organizations, no specialty board requirements and no known professionals practicing in the field.

Availability of Physiatry

- Pakistan: 176 million people
- 64% rural
- 6% high school graduates
- Life expectancy 65 y
- 4–6% population is disabled–vast underreporting
- 2% GDP spent on health care, no government sponsored health insurance
- 38 practicing rehabilitation consultants, 1000 PTs, 150 OTs
- Traditional faith healers–pirs, hakims

Farooq, Arch Phys Med Rehabil 2011
Community Based Rehabilitation: measures taken at the community level to use and build on the resources of the community including the impaired, disabled and handicapped persons themselves, their families and the community as a whole (WHO 1981)

People with disabilities and their families are taught to care for themselves


- Break down rehab into steps that could be followed by community members with no training

_Fokenflugel, Int J Rehab Res 2005_
Community Based Rehabilitation

- Developed countries: Community Based Rehabilitation is an extension of formal services.
- Developing countries: it stands alone.
- Rarely includes physician support.
- Does not address intensive often critical care needs.
Community Based Rehabilitation

- Visiting physicians cannot address long term care needs
- Aid provided often doesn’t include a needs assessment—don’t ask for what you don’t know is missing
- No clear systematic evaluation of efficacy

Rehabilitation Strategies and Developing World

- Assess the patient and the system of care within the context of their culture
- Assess unique strengths and abilities as well as challenges and limitations
- Prioritize interventions
- Utilize local resources
- Strive for sustainability
- Go and form ongoing relationships
Suggested Interventions

- Cooperation of public and private sector
- Increase training programs
- Address public health risk factors
- Pre-hospital care, EMS, ICU, ventilators
- Early and continued rehab
- More centers not only in urban areas
- Increase vocational rehabilitation and public education opportunities for the disabled
- Improve public accessibility