CASE STUDY

Outcome of Multidisciplinary Management of Knee Osteoarthritis using the International Classification of Functioning, Disability and Health

Shankar Ganesh[1]*, Patitapaban Mohanty[2], Sakti Das[3], Rishee Patel[4], Ram Naresh Pandey[5], Ananya Satapathy[6]

1. Demonstrator in Physiotherapy, Swami Vivekanand National Institute of Rehabilitation Training and Research (SVNIRTAR), Odisha, India.
2. Associate Professor in physiotherapy, SVNIRTAR, Odisha, India
3. Assistant Professor in Orthopedics, SVNIRTAR, Odisha, India
4. MPT student, SVNIRTAR, Odisha, India.
5. MOT student, SVNIRTAR, Odisha, India.
6. MPT student, SVNIRTAR, Odisha, India.

ABSTRACT

Purpose: *To identify the role of environmental, cultural and accessibility factors in community reintegration and to assess how a healthcare team can provide complete rehabilitation to a client with knee osteoarthritis (OA).*

Method: *A 57-year-old woman with bilateral knee OA was assessed using the ICF core set for OA. The components identified were linked to ICF categorical profile and assessment sheet. ICF allowed the team to identify the global, service programme and cycle goals. The client's clinical status was followed over a 4 month period.*

Results: *At 16 weeks, the client was able to walk faster and reported an increased ability to sit continuously, climb stairs and carry out her routine activities for a full day without increase in pain. Though she is satisfied with the outcome of the treatment, her engagement with public sphere continues to pose a problem in her attempts to reintegrate in to community. She is also concerned that her pace of doing activities has decreased within the household and outside world.*

Conclusion: *The social construct of disability needs to be emphasized more seriously for complete rehabilitation, failing which there may not be any success at the level of functioning.*

* **Corresponding Author:** Shankar Ganesh, Demonstrator in Physiotherapy, Swami Vivekanand National Institute of Rehabilitation Training and Research (SVNIRTAR), Odisha, India. Email: shankarpt@rediffmail.com

Implications: *This method of depicting the problems from both the client's and health professionals' perspective ensured that the process of goal setting is shared between the client and rehabilitation team. Some of the non-modifiable goals identified by the team revolved around environmental factors and social policy development. These factors have to be considered by policy makers to improve functioning of persons with OA at the community and society level.*

Keywords: *Osteoarthritis, ICF, Client-Centered Care, Interdisciplinary Health Team.*

INTRODUCTION

Health is best understood in terms of a combination of biological, psychological, and social factors rather than purely in biological terms. As disability is relative to a person's physical, social, and cultural environment, it may be argued that the manifestation of disability is dependent upon the demands and lack of support in the environments of the people affected.

The social part of the biopsychosocial model investigates how different social factors such as socioeconomic status, culture, poverty, technology, and religion can influence health (Santrock, 1997). Other social factors that may influence disability include tolerance of high-risk working conditions, overwork, stress, low public safety standards, poor architectural design of public buildings, public transportation, degradation of the environment, education, poverty, and social assistance benefits (Wendell, 1996). These social factors may influence the biological component of disability in some groups of a society more than others. Further, disability is perceived differently in different cultures.

The biopsychosocial model forms the basis of the World Health Organization's International Classification of Functioning, Disability and Health [ICF]. The ICF attempts to provide a coherent view of health from a biological, individual, and societal perspective. Functional assessments are generally done through both objective and subjective methods. These tools provide a limited picture of a person's overall function, because they only assess functional abilities within the testing environment and over a short period of time. Likewise, subjective measures are limited because they rely onaffected persons' ability to accurately recall activities they have been able/unable to do over a specific period of time. Objectively measuring the components of the ICF may provide a better measure of a person's true level of function and offer additional insight into the impact of

disability as it relates to the ICF. Further it is important to recognize a distinction between accessibility in the private sphere (which can often be modified or changed by individuals or rehabilitative approaches for improved access) and in the public sphere, where alterations to improve access to public services or spaces present greater challenges. Within the public sphere, government policies and laws as well as city planning and building codes have a significant impact upon how accessible public areas are to those with disabilities. This realm is largely out of the control of individual clients and rehabilitation teams. A person's degree of accessibility impacts in turn his or her participation and overall ability to reintegrate into communities.

The objective of this study is to identify the role of environmental, cultural and accessibility factors in community reintegration and to evaluate if a healthcare team can provide complete rehabilitation to a person with knee osteoarthritis [OA] living in India, using ICF-based tools. We use the definition of function conceptualized by the ICF as the dynamic interaction of a person's physical activity within his or her environment.

The Biological component

Osteoarthritis [OA] is the most common form of chronic arthritis affecting approximately 10% of men and 18% of women (Woolf & Pfleger,2003). OA is associated with pain, functional disability and impaired quality of life (Arden & Nevitt, 2006). It is the leading cause of musculoskeletal disability in both developed and developing countries (Brooks, 2002; Rabenda et al, 2006; NICE,2008;NCC-CC,2014), and the extent of the burden of OA in both developing and developed countries in terms of health care costs and lost wages are considerable (Gabriel et al,1997). Currently, there is no cure for OA and once a person develops OA particularly in the knee the condition often gets worse over time and can lead to severe pain and disability. Given that OA is a long-term condition, it impacts on physical, mental and social functioning, and there are multiple options for treatment where successful management requires a holistic (optimal) client-centred approach (NICE, 2008). The rehabilitation programme should facilitate clients' functioning, activities and level of participation, with encouragement to deal with limitations of physical activities and restrictions in daily activities and participation in an adequate way. If successful management is not achieved, it may lead to an inability in achieving an optimal level of functioning and increase the costs for affected persons, their households, health care systems and the nation as a whole (Reginster, 2002; Elders, 2000; Lapsley et al, 2001).

Client history

The client, Mrs. P.S was a 57 year old woman living in a joint family (11 people) from a rural background. She was referred to our hospital by her primary care physician. Apart from her symptomatic complaints, her main difficulties were sitting for longer than 15 minutes, pain early in the morning after waking and during weight bearing activities including walking for more than 10 minutes, stair climbing (especially ascending), crouching, squatting, maintaining sustained postures and doing her household chores. She was unable to go to the temple or market, and to interact with her friends/family due to her health condition. She was frustrated that her interactions with her grandchildren were limited.

Assessment

An ICF assessment requires framing an ICF categorical profile and assessment sheet (13) with analysis of limitations of functions from both the client and health professional's perspective. The assessment was made using the ICF core set for OA (Dreinhöfer et al, 2004) (Table 1).

Functioning profile

BODY FUNCTIONS			**Impairment**				
			0	**1**	**2**	**3**	**4**
b130	Energy and drive functions (G)		■	■	■	■	
b134	Sleep functions		■				
b152	Emotional functions (G)		■	■	■		
b280	Sensation of pain (G)		■	■	■	■	
b710	Mobility of joint functions		■	■	■	■	
b715	Stability of joint functions		■				
b720	Mobility of bone functions		■				
b730	Muscle power functions		■	■	■		
b735	Muscle tone functions		■	■	■		
b740	Muscle endurance functions		■	■	■	■	
b760	Control of voluntary movement functions		■				
b770	Gait pattern functions		■	■	■		
b780	Sensations related to muscles and movement functions		■	■	■		

BODY STRUCTURES		Impairment					
			0	1	2	3	4
s720	Structure of shoulder region						
s730	Structure of upper extremity						
s740	Structure of pelvic region						
s750	Structure of lower extremity						
s770	Additional musculoskeletal structures related to movement		9				
s799	Structures related to movement, unspecified		9				
d540	Dressing	Difficulty					
			0	1	2	3	4
d230	Carrying out daily routine (G)	P					
		C					
d410	Changing basic body position	P					
		C					
d415	Maintaining a body position	P					
		C					
d430	Lifting and carrying objects	P					
		C					
d440	Fine hand use	P					
		C					
d445	Hand and arm use	P					
		C					
d450	Walking (G)	P					
		C					
d455	Moving around (G)	P	9				
		C	9				
d470	Using transportation	P					
		C					
d475	Driving	P	9				
		C	9				
d510	Washing oneself	P					
		C					
d530	Toileting	P					
		C					

Prefers to performance; Crefers to capacity

The client's view of her problem and health functions was extracted via interview. The health professional's perspective of the client's health required that the specific domains of ICF-OA comprehensive core set be assessed by relevant multi-disciplinary team members. The capacity and performance was individually evaluated for the affected activity and participation components. Information regarding environmental factors (facilitators and barriers) was collected from the client and from all members of the rehabilitation team.

Intervention

The goal set; global, service programme and cycle were identified within the components of functioning. Global goals set for the client were reintegration into the community, participating in social gatherings, interacting with friends and playing with her grand children. The rehabilitation practitioners set a service programme goal of making the client independent in her basic and instrumental activities of daily living. The cycle goals set to achieve the service goals were to reduce the client's pain, improve the range of motion and muscle strength of both knees, improve her ability to walk, carry, and move objects and promote a healthy life style. For the goals and intervention targets identified, the interventions were shared between physiotherapist, occupational therapist, orthotist, clinical psychologist and social worker along with the primary care of orthopedic specialist.

Table 2: Intervention targets

	Intervention Targets–ICFCategories		Intervention		Orth	PT	PO	OT	SW	CP	Evaluation Value	Goal Value
			Type	Intensity								
Body Functions	b280	Sensation of pain	NSAIDs Ultrasound	400 mg twice per day for 3 weeks 1 MHz frequency at 0.8 W/ cm2	✓	✓	✓				3	0
	b710	Mobility of joint functions	Manual Therapy	5d/week for 6 weeks; 10 mins		✓					3	0
	b730	Muscle power functions	Open and closed chain hip and quadriceps strengthening exercises.	5d/week for 6 weeks; 30 mins		✓					2	0

	b735	Muscle tone functions	Stretching exercises to hamstrings, calf muscles, ilio-tibial band, rectus femoris and posterior capsule of both side knees.	5d/week for 6 weeks; 10 mins		✓					2	0
	b740	Muscle endurance functions	Strengthening exercises.	5d/week for 6 weeks; 30 mins		✓					2	0
	b770	Gait pattern functions	Hip abductor strengthening exercises. Orthotics	5d/week for 6 weeks; 30 mins		✓	✓				2	1
Activity and Participation	d410	Changing basic body position	Pain reduction Strengthening and endurance exercises Active strategy training Orthotics Assistive devices	5d/week for 6 weeks; 30 mins Daily Daily Daily	✓	✓	✓ ✓	✓			3	0
	d415	Maintaining a body position	Endurance and strength training. Balance training.	5d/week for 6 weeks; 30 mins 5d/week for 6 weeks; 15 mins		✓ ✓					3	0
	d430	Lifting and carrying objects	Active strategy training	Daily				✓			3	0
	d450	Walking	Active strategy training. Endurance training	Daily 5d/week for 6 weeks; 30 mins		✓		✓			3	0
	d510	Washing oneself	Environmental modifications and training to adapt to modification.	Daily				✓			1	0
	d530	Toileting	Environmental modifications and training to adapt to modification.	Daily				✓			3	0
	d620	Acquisition of goods and services	Environmental modifications and training to adapt to modification.	Daily				✓			3	0
	d640	Doing housework	Environmental modifications and training to adapt to modification.	Daily				✓			3	0

Environ-mental factors	e120	Assistive products and technology for personal indoor and out door mobility and transportation	Prescription of walking cane and training.	Daily			✓				9	+2

RESULTS

At the end of the treatment intervention of 6 weeks, the client reported a significant reduction in pain during rest (2/10) and activities (4/10). She was able to sit for over an hour and climb stairs without increase in pain, and reported improvement in her activities and social participation. At 16 weeks, she reported that she was able to sit continuously, climb stairs without pain and go through her routine activities for a full day without increase in pain. She also reported improvement in her gait as she felt more 'agile' and able to 'walk faster' compared to the baseline; and noted improvement in her ability to play with her grandchildren, take care of her family, interact with friends and attend social gatherings. She was instructed to continue her home exercises programme, eat healthy food and stick to ergonomic advice. Though she was satisfied with the outcome of the treatment, her interaction with the public sphere continued to pose problems in her attempts to reintegrate in to community. She was also concerned that her pace of doing activities had decreased within the household and outside world (Table 3).

Contextual factors affecting functioning

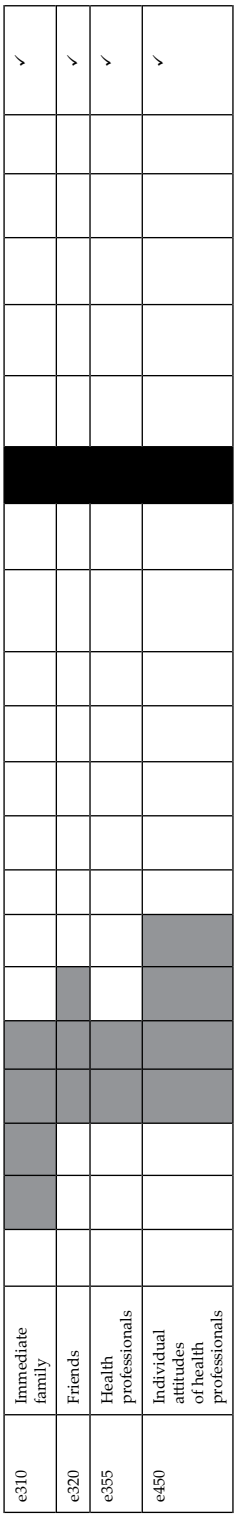
The client's family (e310- immediate family) was rated as a strong facilitator along with 'e115- products and technology for personal use in daily living'. 'e110-products and technology for personal consumption', and 'e355- health professionals' were rated as mild facilitators. Factors like 'e320 – friends' and 'e450- individual attitudes of health professionals' were rated as both facilitators and barriers. Environmental factor 'e150 - design, construction and building products and technology of buildings for public use' was rated as a complete barrier and factors 'e155- design, construction and building products and technology of buildings for private use', 'e460- societal attitudes', 'e540- transportation services, systems and policies' and 'e580- health services, systems and policies' were marked as severe barriers to the client's functioning.

Table 3:

Evaluation																Final Value							
Patient Goal (PG)																							
1. participating in social gatherings															0							✓
2. interacting with friends															0							✓
3. playing with her grand children															0							✓
Long Term Goal (LTG)																							
1. making the patient independent in her basic and instrumental activities of daily living															0							✓
2. promote a healthy life style															1							✓
Short Term Goal 1 (STG1)																							
reducing the patient's pain															0							✓
Short Term Goal 2 (STG2)																							
improve the range of motion															0							✓
Short Term Goal 3 (STG3)																							
improve muscle strength of both knees															0							✓
Short Term Goal 4 (STG4)																							
improve walk pattern and the ability to walk long distances															0							✓
ICF Categories									ICF Qualifier					Goal Relation	Goal Value		ICF Qualifier					Goal Achivement
									0	1	2	3	4				0	1	2	3	4	
b130	Energy and drive functions													LTG2	1							✓
b152	Emotional functions													LTG2	1							✓
b280	Sensation of pain													STG1 STG4	0							✓
b710	Mobility of joint functions													STG2	0							✓
b730	Muscle power functions													STG3	0							✓
b735	Muscle tone functions													STG2	0							✓

b740	Muscle endurance functions													STG4	0							✓
b770	Gait pattern functions													STG4	1							✓
b780	Sensations related to muscles and movement functions													STG2 STG4	0							✓
d410	Changing basic body position													LTG1	0							✓
d415	Maintaining a body position													LTG1	0							✓
d430	Lifting and carrying objects													LTG1	1							✓
d450	Walking													LTG1 STG4	0							✓
d470	Using transportation													LTG1	0							✓
d510	Washing oneself													LTG1	0							✓
d530	Toileting													LTG1	0							✓
d620	Acquisition of goods and services													LTG1	1							✓
d640	Doing housework													LTG1	0							✓
d660	Assisting others													LTG1	0							✓
d910	Community Life													PG	0							✓
d920	Recreation and leisure													PG	0							✓
Influence of environmental factors		Facilitator				Barrier							Facilitator				Barrier					
		+4	+3	+2	+1	0	1	2	3	4			+4	+3	+2	+1	0	1	2	3	4	
e110	Products or substances for personal consumption																					✓
e115	Products and technology for personal use in daily living																					✓

Vol. 26, No.4, 2015; doi 10.5463/DCID.v26i4.397



DISCUSSION

ICF based tools allows implementation of a client-oriented multi-disciplinary management. Instead of focusing on mainly body structures and functions for treatment and rehabilitation, ICF promotes a focus on interventions that relate to activities and participation from a cultural point of view and to assess the impact of the environment on functioning.

In Mrs. P.S's case, her treatment focused primarily on pain control and improving her functional abilities. She received rehabilitation and was fitted with assistive devices that were backed up by evidence and clinical reasoning, helping to increase her mobility; and the adaptation of the family home improved her accessibility.

When OA affects hip or knee, it leads to difficulty with bathing, dressing (especially undressing the lower part of the body), going up and down stairs, rising from a chair or bed, and walking (Creamer,2000). However Mrs. P.S. had no issues with dressing. In India, women's clothing varies widely and is closely associated with the local culture, religion and climate. Traditional Indian clothing for women is a sari, a long sheet of cloth, draped over a blouse. This is an example where culture can greatly influence disability.

ICF helped significantly in client education. The client who initially attributed all her functioning problems to knee pain was surprised to identify so many factors that contributed to her difficulties.

Though Mrs. P.S. was able to attend social gatherings, improving access to the outside world continues to present her with a significant challenge in learning to live with OA. The measures and interventions undertaken by the rehabilitation team were not sufficient to provide her with enhanced accessibility outside her home. Poor road and sidewalk conditions, physical barriers, limited usable public transportation are some of the common external environmental factors that are barriers for her. Beyond

limiting physical accessibility, these barriers negatively impact her efforts at reintegrating into the community at large.

There were a number of contextual factors relevant to her functioning state. Environmental factors included facilitators – her husband's and daughter-in-law's support, an adapted house, medication, therapy and assistive devices; while barriers were mainly difficulties with mobility outside the home. Importantly, there are a number of environmental factors that would require changes in public policy to make a difference at an individual client level. These include issues such as the design and construction of buildings for public use, and adequate health systems and policies.

India enacted the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act of 1995 in fulfillment of its obligation as a signatory to the Proclamation on the Full Participation and Equality of People with Disabilities in the Asia Pacific Region. The UNCRPD recognizes that disability results from the interaction between persons with impairments and attitudinal and environmental barriers that hinder their full and effective participation in society on an equal basis with others. The Indian Law on the other hand has provided for impairment based definitions of disability. Consequently, people with impairments not expressly mentioned in the Act have often been denied the rights and entitlements recognized in the Act. The Government of India has proposed to enact the Rights of Persons with Disabilities Bill, 2011, where is a plan to establish the National Centre for Universal Design and Barrier Free Environment to assist the country to become universally accessible and inclusive in terms of accessibility. While these policies and legal amendments offer an important starting point, effective strategies and the necessary resources for translating these frameworks into real increased accessibility for those with arthritis and other disabilities is still a great need.

Despite her increased interaction with her grandchildren and improved self-care and independence, her inability to assist her larger family ('d-660- assisting others') continues to worry Mrs. P.S. This is probably due to cultural beliefs and traditions. The joint family in India is highly valued; it consists of several generations residing, working, eating, and worshipping together. Psychologically, family members typically experience intense emotional interdependence and derive moral and practical support from one another. Mrs. P.S' position in her family requires her to accept responsibility for meeting the increasing needs of other family members. Her shortcomings in providing care to her elders are

criticized and she fears the possibility of being left alone, without social support. When she tries to keep-up an increased pace of work, this reduces the energy available for other life activities, upsetting her rhythm of functioning.

Mrs. P.S is now deeply concerned about how others perceive her since her social networking is reduced. Factors such as social network/support seem to have effects on quality of life. Bowling and Browne (1991) (found that having a social network increased the well-being of older people, a result supported by Kendig et al (2000); Lambert et al (1989), and Blixen and Kippes (1999) indicated social support as an important predictor for well-being in women with arthritis.

Factors 'e320 – friends' and 'e450- individual attitudes of health professionals were rated as both facilitators and barriers to the client's functioning. Though her friends were supportive, they complained that she was not interacting with them as before. Mrs. P.S was also concerned about the increasing budget of health care. Category 'e575- general social support services, systems and policies' was graded not specified (8) as the she was not aware of such facilities in her community. The rehabilitation team is of the consensus that the existing health services, systems and policies need to be updated for persons living with OA in India, in order to improve their functioning in their society and community.

There were certain areas where we felt more descriptions are needed from ICF. For example, the description of what constitutes capacity and performance for 'd470- using transportation' was an issue since transportation is generally outside of a standard environment. Another area of concern was 'd530-toileting'. As ICF is considered to be culturally neutral, what constitutes the standard toileting environment in India is unclear. For both these categories, we ranked performance to be more affected than capacity. For category 'd510- washing oneself', the rehabilitation team identified capacity to be more affected [ICF qualifier 3] than performance [ICF qualifier 1] as the client was used to sit and bathe due to her inability to sustain long standing postures.

CONCLUSION

People with mobility limitations report more barriers in their environment than people without limitations. Mobility is important for maintaining community independence. Apart from specific interventions and rehabilitation, supportive environments assume greater importance. The social construct of disability

needs to be emphasized more seriously for the complete rehabilitation of persons affected by OA, failing which the efforts of rehabilitation may not bear any success at the level of functioning.

This case report highlights the need for rehabilitation practitioners to understand cultural issues. The rehabilitation team, who sees a wide range of impairments, functional limitations, and disabilities, is expected to meet the needs of a client within the context of that client, her family and community, and the broader cultural setting. Understanding cultural issues will help in better client-therapist interaction and the rehabilitation services they provide to create the best plan of care possible. However, reintegration into the larger community needs extensive reform in public health and accessibility policies and systems of the government..

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