

APPLYING THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH (ICF) AND KAWA MODELS IN FAMILY MEDICINE - A CASE OF AN ADOLESCENT WITH A STROKE.

Dr Tan Hwei Ming, Dr Jeffrey Jiang Song' En

ABSTRACT

The rehabilitation of a 19-year-old male with a congenital ventricular septal defect who suffered a haemorrhagic stroke from a ruptured mycotic aneurysm, secondary to infective endocarditis is described in this case study. This case study illustrates the application of the International Classification of Functioning, Disability and Health (ICF) model, and Kawa model in the structuring of a holistic, interdisciplinary team management. Application of both models provide clear communication within the interdisciplinary team and aids the team to understand the contextual factors in the interaction of the patient's rehabilitation journey.

Keywords: Rehabilitation, stroke, ICF model, kawa model

SFP2020; 46(7): 36-41

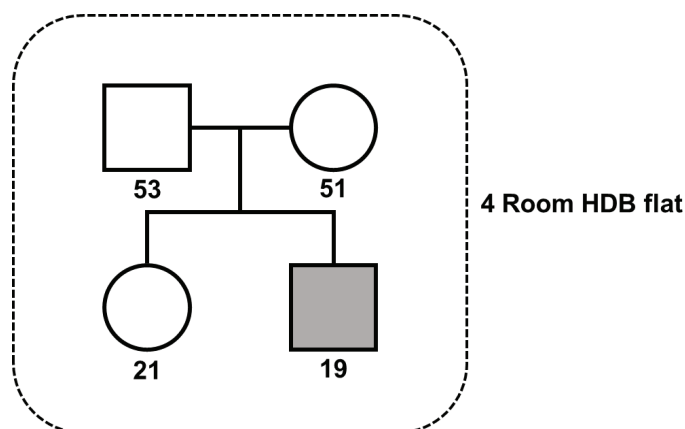
INTRODUCTION

Stroke rehabilitation can be complex, with many barriers to effective rehabilitation such as limited resources and lack of communication.¹ Hence, a structured framework is useful in guiding the team in utilising scarce resources in the rehabilitation process.² This case highlights the combined use of two models to guide Family Physicians (FPs) in their management.

PATIENT'S REVELATION: WHAT HAPPENED?

Mr J is a 19-year-old Chinese male who had a conservatively managed congenital ventricular septal defect. He was otherwise a healthy second-year polytechnic student studying electrical engineering. An introvert, Mr J enjoyed reading manga, watching anime and playing computer games. Figure 1 illustrates his genogram.

Figure 1: Genogram



In April 2017, he presented to the emergency department with an acute severe headache and persistent vomiting. Brain imaging revealed a right intracerebral haemorrhage secondary to right middle cerebral artery rupture for which he underwent immediate decompressive craniotomy, clipping of aneurysm, and placement of a bone flap in the abdomen. He subsequently had a stormy post-surgical stay as he developed multiple intracranial bleeds due to recurrent aneurysms resulting in myoclonus. He then underwent further surgical evacuation of clots and aneurysm clipping. It was discovered on an echocardiogram that he had underlying infective endocarditis, predisposed by his ventricular septal defect. He was treated with an eight-week course of antibiotics with a clearance of the bacteraemia. Sodium valproate and levetiracetam were started for myoclonus. Due to the intracranial insults, Mr J suffered left hemiparesis with hemisensory loss, oropharyngeal dysphagia requiring nasogastric tube feeding and mild cognitive-communication deficits (MMSE 23/30) with disinhibition, impulsive behaviour, and reduced attention span. He was discharged to an acute rehabilitation unit in May 2017. Botulinum injections and baclofen were given for left-sided spasticity, and he was subsequently discharged home after four weeks with the achievement of moderate assistance in activities of daily living (ADL). He was successfully weaned off nasogastric tube feeding and referred for outpatient rehabilitation.

In October 2017, Mr J was admitted for an elective autologous cranioplasty and was discharged to the community hospital for rehabilitation. At the community hospital, FPs were responsible for his overall care. His neurological findings on admission are summarised in Table 1.

Mr J now required minimal assistance in his ADL. His family provided good emotional and physical support, with his parents taking time off their full-time jobs to assist him. He underwent intensive physiotherapy and occupational therapy and home modifications were undertaken. His parents then hired a domestic helper so that they could resume their jobs. Though motivated initially, Mr J subsequently started expressing

TAN HWEI MING
Family Medicine Resident,
Department of Family Medicine,
National University Health System

JEFFREY JIANG SONG' EN
Registrar, St Luke's Hospital, Singapore

frustration as he felt that the progress was slow. He feared that he would never return to his pre-morbid state and worried that he would be a burden to his family and society. He occasionally blamed doctors for "not preventing his brain injury" and became depressed with low mood and decreased appetite and motivation.

INSIGHTS

During Mr J's rehabilitation journey, he asked: "Can I ever be the same again?" This case triggered several questions:

1. As FPs in the primary or intermediate care setting, how can we come up with a holistic, structured management plan for post-stroke rehabilitation?
2. How should we involve the interdisciplinary team and allocate our scarce resources to maximise Mr J's recovery?

MANAGEMENT/DISCUSSION

The World Health Organisation's (WHO's) International Classification of Functioning, Disability and Health (ICF) model and Kawa model were utilised to guide the formulation of an individualised, targeted, interdisciplinary management plan in Mr J's rehabilitation journey.

THE ICF MODEL - APPLICATION

The ICF model³ is a guide for providing healthcare professionals with a common language to describe the patient's physical disability in relation to his environment, and personal factors.^{4,5} Physical disabilities are referred to as impairments. In contrast, the activity affected by physical disability is known as the limitation. Physical disabilities preventing participation in societal roles are known as restrictions. Furthermore, this model also focuses on positive terms rather than negative terms like disabilities.

By providing a structure to organise information, the ICF model was applied in cycles of identifying the patient's problems and needs, relating the problems to relevant factors of the person and the environment, defining therapy goals, planning and implementing interventions, and assessing the effects.⁵⁻⁸ To ensure patient-centred care, the Rehabilitation Problem-Solving Form⁶ (Table 2) was used to visualise the perspectives of the patient as well as the analysis from healthcare professionals.

THE KAWA MODEL

Application And Relevance

The Kawa model was developed by Japanese and Canadian rehabilitation professionals to guide management based on context-dependent life events that eventually shaped and influenced the individual's daily choices.⁹⁻¹¹ Juxtaposing the ICF model and other traditional Western-based models of rehabilitation, the Kawa model represents one of the very few models born out of the Eastern sociocultural context.¹⁰ Western-based models highlight individual goals of independence, autonomy and self-determination. This is in

contrast to family-centric Asian models in the individual's identity.¹² It has been theorised, that culture influences the models for rehabilitation. Hence it is of value to consider the Kawa model in addition to the Western-based ICF model in Singapore's rehabilitation scene. Also, not all patients may conform to the theorised universal models like the ICF model. Utilising the Kawa model in addition to the ICF makes up for the above shortcoming of it, providing a more tailored approach for each patient.¹⁰ Since its conception, the application of the Kawa model in the rehabilitation process has been demonstrated in several Asian and Western countries such as Japan and Hong Kong. For example, in a study in Hong Kong, it was reported that the utilisation of the Kawa model helped the tetraplegic patients visualise their assets and life circumstances, encouraged positive experience and thinking, and aided the therapists to understand the patients' contextual factors more clearly.¹³

Components

The Kawa model begins with a river, representing a person's journey from birth to death. Embedded in the river are five components:

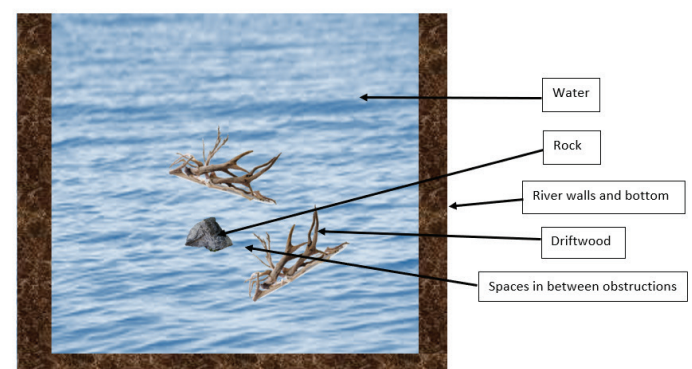
1. Water – represents life flow and energy.
2. Rocks – represents life circumstances.
3. River walls and bottom – represents the patient environment.
4. Driftwood – represents personal resources encompassing assets and liabilities.
5. Spaces between obstructions (an area where life energy flows) – represents areas that the patient holds dear.

This structured diagrammatic guide helps the team to visualise and come up with a plan to identify and overcome the patient's obstacles, and to enhance the factors that restore the patient's life flow.^{9, 10}

MR J'S KAWA MODEL

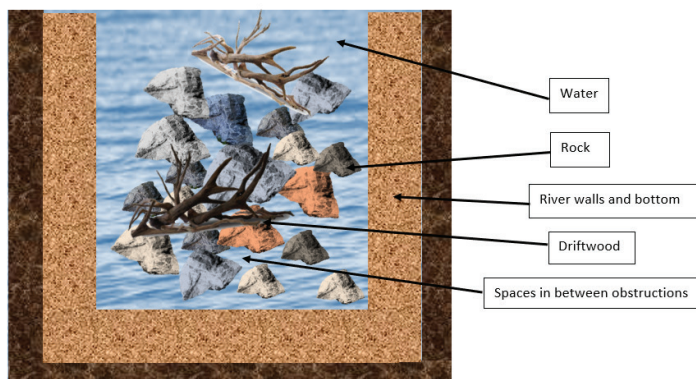
Before the stroke, Mr J's model is depicted in Figure 2.

Figure 2: Mr J's Kawa Model Pre-stroke



Before commencing rehabilitation at the community hospital post-stroke, Mr J's Kawa model had changed as depicted in Figure 3.

Figure 3: Mr J's Kawa model post-stroke (prior to community hospital stay)



Management Plan

The ICF and Kawa models helped the team to elucidate Mr J's impairments, limitations, the interactions with Mr J's societal roles, and his protective and risk factors to tailor a multidisciplinary management plan as detailed in Table 3.

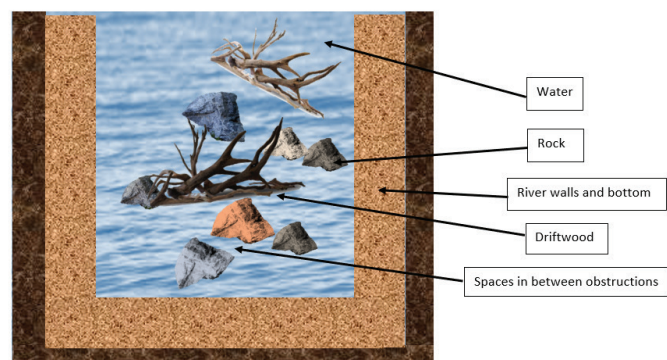
The rise of care planning due to the increased prevalence of complex and chronic diseases has led to the increasing role of FPs in multidisciplinary care.^{14,15} It is essential to ensure that everyone in the team understands each other's scope of practice, strengths and experiences. This requires sharing of power, trust and self-awareness.¹⁶ Often, the FP takes the leadership role and has to devise a care plan for the patient and is ultimately responsible for the overall care of the patient.¹⁷ The multidisciplinary team then helps the FP achieve the target therapeutic goals.

It can also be seen that Mr J's contextual factors greatly impacted his rehabilitation process. The FP needs to be aware of these barriers and mitigating factors.¹⁸ Invariably, the FP would also face the challenge of moderating patients' expectations, assisting the patient in setting realistic goals and journeying with the patient, thus empowering him and his family to take greater ownership to achieve the maximum level of independence possible.

Outcomes

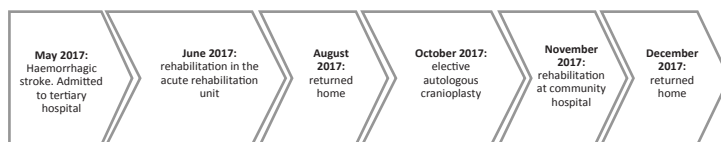
After four weeks of rehabilitation in the community hospital, he was enrolled in an outpatient rehabilitation programme. Mr J's Kawa model evolved as depicted in Figure 4.

Figure 4: Mr J's Kawa Model Post-stroke (After community hospital rehabilitation)



Mr J's function continued to improve after the above rehabilitation. His Modified Barthel Index score improved from 66/100 at the time of admission to the community hospital to 80/100 on discharge, and eventually 82/100 one-year post-discharge. His instrumental ADL (Frenchay Activities Index) continued to show improvement from 5/45 to 13/45 post-discharge. During the one-month outpatient follow-up, his mood, neurological function (Medical Research Council grade two for left C7-T1 myotomes and grade three for left L3-S1 myotomes) and his communication and social skills had improved. He understood that recovery in these domains would take time and looked forward to resuming his studies. Months later, Mr J only required minimal supervision for instrumental ADL and did not require the use of a walking aid. He subsequently became a volunteer patient care assistant in the hospital while his future plans for studies and career are still being explored. His journey through the healthcare system is summarised in Figure 5.

Figure 5: Movement of patient transiting in the healthcare system



IMPLICATIONS TO CLINICAL PRACTICE

How do we apply this to our clinical practice?

While the ICF model serves as a framework to identify the patient's physical limitations and interactions with their environment and societal roles, the Kawa model doubles up as an added layer of context to understand the patient's challenges and protective factors. With this enhanced understanding shared amongst the interdisciplinary team, it is possible to then come up with a holistic and patient-centred plan.

Limitations and future studies

Although the Kawa model is more Asian-centric, it was primarily based on the Japanese cultural context, which may not be entirely relevant in multi-ethnic, multi-cultural Singapore. However, with a dearth of rehabilitation models based on an Asian background, the combination of the ICF and Kawa models is still a useful framework in the choice of rehabilitation guides. Future studies using the above framework could be done to review the generalisability of the framework in Singapore.

CONCLUSION

The FP plays a pivotal part in the coordination of the rehabilitation of a patient with complex medical problems, and a structured management plan is essential. With the help of the ICF or Kawa model, it is possible to come up with an organised plan for effective and efficient rehabilitation. Lastly, in the development of a management plan, FPs should be cognizant of the impact of contextual factors on the patient's rehabilitation journey.

REFERENCES

1. Meadmore KL, Hallowell E, Freeman C, Hughes AM. Factors affecting rehabilitation and use of upper limb after stroke: views from healthcare professionals and stroke survivors. *Topics in stroke rehabilitation*. 2019 Feb 17;26(2):94-100.
2. Langhammer B, Becker F, Sunnerhagen KS, Zhang T, Du X, Bushnik T, Panchenko M, Keren O, Banura S, Ellessi K, Luzon F. Specialized stroke rehabilitation services in seven countries. *International Journal of Stroke*. 2015 Dec;10(8):1236-46.
3. World Health Organisation. International Classification of Functioning, Disability, and Health: ICF [Internet]. Switzerland: World Health Organisation; 2001 [updated 2001; cited 2020 August 20]. Available from: <https://apps.who.int/iris/bitstream/handle/10665/42407/9241545429.pdf>
4. Proding B. Standardized reporting to facilitate seamless transitions from hospital to the community: The utility of the International Classification of Functioning, Disability, and Health (ICF). *Annals of Physical and Rehabilitation Medicine*. 2014(57):e315.
5. Schiariti V. Focus on functioning: let's apply the ICF model. *The clinical teacher*. 2016 Oct;13(5):378-80.
6. Steiner WA, Ryser L, Huber E, Uebelhart D, Aeschlimann A, Stucki G. Use of the ICF model as a clinical problem-solving tool in physical therapy and rehabilitation medicine. *Physical therapy*. 2002 Nov 1;82(11):1098-107.
7. Stucki G, Pollock A, Engkasan JP, Selb M. How to use the International Classification of Functioning, Disability and Health as a reference system for comparative evaluation and standardised reporting of rehabilitation interventions. *European journal of physical and rehabilitation medicine*. 2019 Jun;55(3):384-94.
8. Tempest S, McIntyre A. Using the ICF to clarify team roles and demonstrate clinical reasoning in stroke rehabilitation. *Disability and rehabilitation*. 2006 Jan 1;28(10):663-7.
9. Wada M. Strengthening the Kawa model: Japanese perspectives on person, occupation, and environment. *Canadian Journal of Occupational Therapy*. 2011 Oct;78(4):230-6.
10. Iwama MK, Thomson NA, Macdonald RM, Iwama MK, Thomson NA, Macdonald RM. The Kawa model: The power of culturally responsive occupational therapy. *Disability and rehabilitation*. 2009 Jan 1;31(14):1125-35.
11. Carmody S, Nolan R, Ni Chonchuir N, Curry M, Halligan C, Robinson K. The guiding nature of the kawa (river) model in Ireland: creating both opportunities and challenges for occupational therapists. *Occupational therapy international*. 2007 Dec;14(4):221-36.
12. Tsai DF. How should doctors approach patients? A Confucian reflection on personhood. *Journal of Medical Ethics*. 2001 Feb 1;27(1):44-50.
13. Chan AP, Wong SK. Psych Application of Kawa Model Using Occupation-based Activity. *Hong Kong Journal of Occupational Therapy*. 2009;2(19):A11.
14. Harris MF, Jayasinghe UW, Taggart JR, Christl B, Proudfoot JG, Crookes PA, Beilby JJ, Powell Davies G. Multidisciplinary team care arrangements in the management of patients with chronic disease in Australian general practice. *Medical Journal of Australia*. 2011 Mar;194(5):236-9.
15. Touati N, Rodríguez C, Paquette MA, Maillet L, Denis JL. Professional role identity: at the heart of medical collaboration across organisational boundaries. *International Journal of Integrated Care*. 2019 Apr;19(2).
16. Freeman TR. McWhinney's Textbook of Family Medicine, Fourth Edition [Internet]. United States of America: Oxford University Press; 2016 [updated 2016; cited 2020 August 2020]. Available from: <https://oxfordmedicine.com/view/10.1093/med/9780199370689.001.0001/med-9780199370689>
17. Gibson J. General practitioners and long-term neurological conditions. *Disability and rehabilitation*. 2008 Jan 1;30(25):1956-8.
18. Mairami FF, Warren N, Allotey PA, Reidpath DD. Contextual factors that shape recovery after stroke in Malaysia. *Disability and rehabilitation*. 2019 Apr 3:1-0.

Table 1: Neurological findings on admission to the community hospital

Left homonymous hemianopia. Mild dysphagia. Remaining cranial nerves intact.

Spinal Root Level	Tone		Reflexes		Power		Sensation	
	Right	Left	Right	Left	Right	Left	Right	Left
C5	Normal	↑	Biceps: 2+ Supinator: 2+	Biceps: 3+ Supinator: 3+	5	3	Normal	↓
C6	Normal	↑			5	3	Normal	↓
C7	Normal	↑	Triceps: 2+	Triceps: 3+	5	1	Normal	↓
C8	Normal	↑			5	0	Normal	↓
T1	Normal	↑			5	0	Normal	↓
L1	Normal	↑			5	4	Normal	↓
L2	Normal	↑			5	4	Normal	↓
L3	Normal	↑	Knee: 2+	Knee: 3+	5	2	Normal	↓
L4	Normal	↑			5	2	Normal	↓
L5	Normal	↑			5	2	Normal	↓
S1	Normal	↑	Ankle: 2+	Ankle: 3+	5	1	Normal	↓

Table 2: The Rehabilitation Problem Solving Form based on the ICF Model

Health Condition (Disease or Disorder)					
Haemorrhagic stroke					
Patient or Family's Perception of Problems	Body Structures & Function (Impairments)		Activities (Limitations)		Participation (Restrictions)
	<p><u>Patient:</u> Irritated about short term memory impairment and worried about appearance (scars on head). Keeps bumping into things. Claims he is "young and dumb" and "a burden to everyone".</p> <p><u>Family:</u> Very vocal, inquisitive and defensive (at times may even offend others) compared to being an introvert pre-morbidly.</p>		<p><u>Patient:</u> Cannot walk long distances or climb stairs well. Needs a straw to drink fluids. Unable to write well. Cannot play computer games and surf the internet using the computer but still able to read comic books and listen to music.</p>		<p>Wants to be normal again and resume studies in polytechnic. Cannot play football. Anxious about finding a job in future and getting a girlfriend.</p>
Health Professional's Identification of Relevant Problems to Target	<p>Right middle cerebral artery aneurysmal rupture</p> <ul style="list-style-type: none"> - left hemiparesis and hemisensory loss with spasticity and myoclonus - left homonymous hemianopia - mild oropharyngeal dysphagia - mild cognitive communication deficits (disinhibition, impulsive, reduced attention span) 		<p>Minimal to moderate assistance in ADLs.</p> <p>Limited mobility on left side with reduced muscle strength and walking speed.</p> <p>Poor balance (left foot drop, circumduction gait).</p>		<p>Difficulty taking public transportation to school. Difficulty participating in class activities.</p> <p>Social life: Interacting with friends and participating in leisure activities.</p> <p>Long term: Driving, employment, physical intimacy, starting a family.</p>
Contextual Factors					
Environmental			Personal		
<p>House undergoing renovations</p> <p>Flat has direct lift-landing</p> <p>Employing domestic helper</p>			<p>Low mood</p> <p>Coping strategies</p> <p>Close-knit and supportive family – no overt financial issues</p> <p>Student</p>		

Table 3: Multidisciplinary Management Plan

Doctors	<ul style="list-style-type: none"> • Coordinate care amongst the medical team comprising: neurosurgeon, neurologist, paediatric cardiologist, rehabilitation physician, psychiatrist, ophthalmologist, family physician • Set goals and moderate patient's expectations • Spasticity treatment: started on baclofen and botulinum injections • Mood: started on mirtazapine and monitored mood and co-managed with psychiatrist, psychologist and chaplaincy service • Hemianopia: co-management with ophthalmologist for ocular rehabilitation • Primary care: co-management outpatient for continued management of Mr J's VSD • Preventive: vaccinations, oral hygiene, education and written memo to dentist on pre-procedure antibiotic prophylaxis • Continuing, comprehensive care: ensuring follow up management and utilising community resources and the multidisciplinary team
Psychologist	<ul style="list-style-type: none"> • Cognitive restructuring, encouraging positive thinking • Set boundaries with Mr J, came up with a contract with Mr J • Encouraged Mr J to jot down thoughts in a notebook • Refrained from engaging in verbal discourse with Mr J • Psychological education to Mr J's parents: encouraged them to take a step back to encourage independence
Physiotherapist	<ul style="list-style-type: none"> • Upper and lower limb strengthening to increase ADL independence • Use of upper limb robotic technology to improve function (Hand of Hope) • Aid with foot drop (ankle foot orthosis) • Ensure safety while maximising functional independence through caregiver training and outpatient rehabilitation
Occupational Therapist	<ul style="list-style-type: none"> • Integration back into the community while ensuring safety through home visits and modifications, home and community integration and safety training and falls prevention • Music therapy
Speech Therapist	<ul style="list-style-type: none"> • Dysphagia: swallowing therapy and monitoring tolerance to diet of choice • Dysarthria: communication therapy and social skills intervention. Aimed to improve communication awareness and improve Mr J's ability to self-correct his inappropriate behaviour. Cognitive training was included to improve Mr J's short term and working memory for daily tasks and communication
Social worker	<ul style="list-style-type: none"> • Explored Singapore National Stroke Association support group • Explored befriender services • Explored self-management programmes