

# Chapter 2

## Practice of Chronic-phase Rehabilitation and Homecare

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## Chapter 2

### Practice of Chronic-phase Rehabilitation and Homecare

#### 2.1. Effect of chronic-phase rehabilitation

The extent and timing of post-stroke functional recovery differ between individual patients. However, marked recovery in function is observed within a few weeks of onset due to the improvement in cerebral oedema, the recovery of blood circulation in the penumbra, and brain plasticity. Rehabilitation plays an important role in this function recovery, and early intervention has been demonstrated to enable the maximisation of plastic reorganisation in the motor area (Barbay et al., 2006).

The recovery in function is said to reach a plateau at 4–6 months after onset, but the increase in efficiency of synaptic transmission induced by training (training-induced synaptic strengthening) is thought to sustain the strengthening of functions beyond 6 months (Swayne et al., 2008).

Patients with chronic-phase hemiplegia show improvement in muscle strength in the leg on the affected side (Ada, Dorsch, and Canning, 2006) and gait-related indices through leg muscle strengthening training and gait training (Dean, Richards, and Malouin, 2000; Marigold et al., 2005; Salbach et al., 2005). In addition, there are reports that suggest home-visiting rehabilitation to be more effective than outpatient rehabilitation (Young and Forster, 1992). However, the superiority and inferiority of these types of rehabilitation vary between reports (Lincoln et al., 2004).

In recent years, there have been reports that have investigated the improvement in function for patients with chronic stroke through neural stem cell implantation (Kalladka et al., 2016), and meta-analysis on the effect of robotics in rehabilitation which revealed that the addition of training using robots in occupational therapy led to significant improvements in activities of daily living (ADL) and the motor function of the arm (Mehrholtz et al., 2018) and that the addition of training using robots in physical therapy did not lead to significant improvements in the gait speed or 6-minute walking distance, but did significantly increase walking independence (Lang et al., 2016). There is a lot of research being reported regarding this methodology.

With respect to quantitative response, the effect of task-specific training in the arm paralysis of patients with chronic stroke and hemiplegia could not be confirmed. However, intervention by rehabilitation based on community life is expected to slow the exacerbation of the disorder and encourage improvement in ADL and improvement in the instrumental activities of daily living (Pang et al., 2005; Outpatient Service Trialists, 2004; 2003). These findings suggest that tasks for rehabilitation should be set based on the activities of living and social roles, and the quality of the rehabilitation should be ensured rather than increasing the amount of training without considering the patient's background and movement in daily life.

## 2.2. Survey of the needs of chronic-phase rehabilitation and care of patients and family

### (1) Subjects

Amongst patients who were admitted and treated in Cambodia (Sunrise Japan Hospital Phnom Penh), the Lao PDR (Mittaphab Hospital), and Viet Nam (Viet Duc University Hospital) between August 2018 and August 2019, 30 patients from each country diagnosed with apoplexy or head injuries and were dependent on care (modified Rankin Scale  $\geq 4$  at discharge) were targeted.

### (2) Method

Basic information on those dependent on care was collected, and questionnaire on care for the primary caregiver was conducted.

Data on the following items were collected: age, gender, name of disease, and hospitalised duration for basic information; Barthel Index (BI) at admission, BI at discharge, and modified Rankin Scale (mRS) at discharge for the evaluation during hospitalisation; and the severity (mRS) 2–3 months after discharge. In the questionnaire survey conducted for the primary caregivers, questions regarding the current situation of care, the burden on the primary caregiver, and any needs related to caregiving were asked about (Table 2.1).

Regarding the methodology, information during hospitalisation was collected from hospital medical charts. For the questionnaire survey for primary caregivers, explanation was provided to them about the survey, and the response to the questionnaire was collected during the outpatient rehabilitation or home-visit rehabilitation. For the cases that did not receive outpatient rehabilitation or home-visit rehabilitation, information was collected by video telephone or telephone.

**Table 2.1. Survey on rehabilitation and caregiving: questionnaire content**

<b>(i) Basic information</b>		
	<i>Question content</i>	<i>Choices</i>
i-1	Relationship of the primary caregiver	Husband; wife; grandparent; sibling; child; grandchild; relative; non-relative
i-2	Age of primary caregiver	Age
i-3	Number of caregivers	1; 2; 3; 4 or more
i-4	Use of assistive device	Bed; wheelchair; cane; shower chair; handrail; none (multiple answers accepted)

i-5	Motive of primary caregiver regarding caregiving	I want to provide care because the person is family; whichever is fine; I want someone from outside to do it.
<b>(ii) Content of caregiving and the amount of care</b>		
	<i>Question content</i>	<i>Choices</i>
ii-1	What care is currently performed by the primary caregiver?	Meal assistance; excretion assistance; changing clothes; bathing/sponge bath; transfer; walking; medication/suction; communication (multiple answers accepted)
ii-2	What is the total time spent for providing care per day?	1–2 hours; within half a day; half a day; more than half a day; almost a whole day constantly.
ii-3	Is care provided at night?	Yes or No
<b>(iii) Feelings of burden in caregiving</b>		
	<i>Question content</i>	<i>Choices</i>
iii-1	Do you feel a burden in caregiving?	Yes or No
iii-2	Assistance is needed, and there is a physical burden.	Yes or No
iii-3	I feel physical fatigue due to caregiving.	Yes or No
iii-4	I can't provide assistance due to the severe condition of the patient.	Yes or No
iii-5	There is a mental burden due to difficulties in communication.	Yes or No
iii-6	The primary caregiver cannot be refreshed due to caregiving.	Yes or No
iii-7	I can't afford time for myself.	Yes or No
iii-8	Financial difficulties due to the caregiver not being able to work.	Yes or No

iii-9	Financial difficulties because I can't work due to caregiving	Yes or No
iii-10	Economic burden due to treatment costs.	Yes or No
<b>(iv) Services wanted</b>		
	<i>Question content</i>	<i>Choices</i>
iv-1	Where would you like care services to be carried out?	Home-visit care service, visit a social welfare facility service, hospitalisation service
iv-2	Service wanted	Nursing services (bedsore care, medication management), care service (care such as sponge bath), rehabilitation, entertainment such as travel, food service (prepared in consideration of food style and nutrition, etc.)

Source: Authors.

### (3) Results

#### 1) Basic information of the care dependent

In Cambodia and the Lao PDR, only stroke patients were taken as the respondents of this survey, whilst in Viet Nam, head injury patients were dominant. The average number of hospitalisation days was almost the same for the study countries at approximately 1 week. At the time of survey, more than half of the patients had a disability to a moderate degree (Table 2.2).

**Table 2.2. Basic information of the patients**

	<b>Cambodia</b>	<b>Lao PDR</b>	<b>Viet Nam</b>
Age	62.8±10.2	60.1±12.1	45.0±15.8
Sex (male/female)	16/14	14/16	23/7
Diagnosis	Infarction 23 Haemorrhage 7	Infarction 16 Haemorrhage 14	Haemorrhage 5 Traumatic brain injury 22 Tumour 3

Length of stay in hospital (days)		8.1±3.9	6.7±4.5	8.4±6.0
Barthel Index (at admission)		22.1±17.1	14.3±12.7	2.0±5.5
Barthel Index (at discharge)		30.0±20.2	23.5±15.3	19.0±19.3
Severity (at discharge)	mRS 3	3	0	0
	mRS 4	15	16	5
	mRS 5	12	14	25
Severity (at the time of the survey)	mRS 0	0	0	0
	mRS 1	0	6	0
	mRS 2	4	8	0
	mRS 3	6	8	2
	mRS 4	13	1	11
	mRS 5	7	7	17

Note: The number after the mark '±' indicates standard deviations.

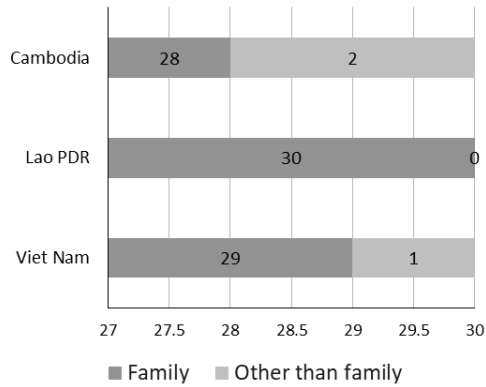
Source: Authors.

## 2) Care questionnaire results

### *Questionnaire (i). Basic information of the primary caregiver*

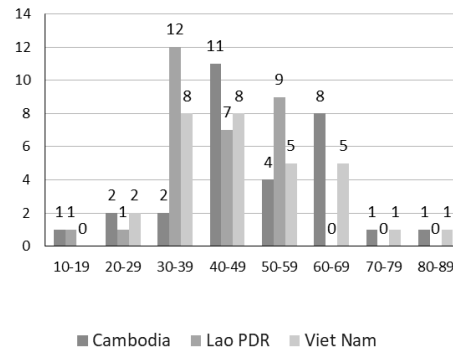
The concept that families should provide care even in cases with sequelae of serious disease is mainstream in all three countries. Regarding the relationship between the care dependent and primary caregiver, the family occupied a dominant position amongst the respondents (Figure 2.1). Regarding the number of caregivers, more than half of the respondents in Cambodia and the Lao PDR answered two or more. However, in Viet Nam, the results were 1–2 persons (Figure 2.3). Regarding the use of assistive devices, there was a higher use ratio of equipment related to transfer, such as canes, in Cambodia. In the Lao PDR and Viet Nam, there was a higher use ratio of equipment for less-active patients, such as beds and wheelchairs (Figure 2.4).

**Figure 2.1. Relationship between the care recipient and the primary caregiver [N=30]**



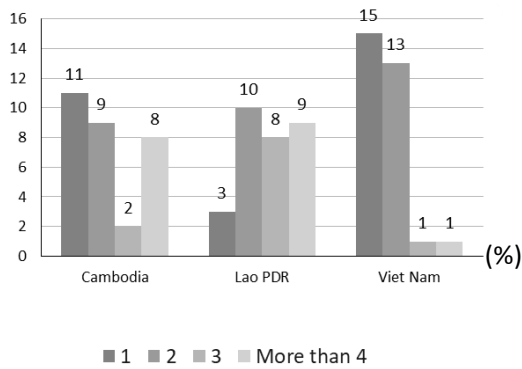
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**Figure 2.2. Age of the primary caregiver [N=30]**



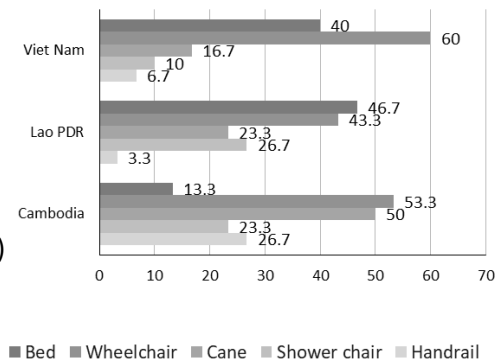
Source: Authors.

**Figure 2.3. Number of caregivers [N=30]**



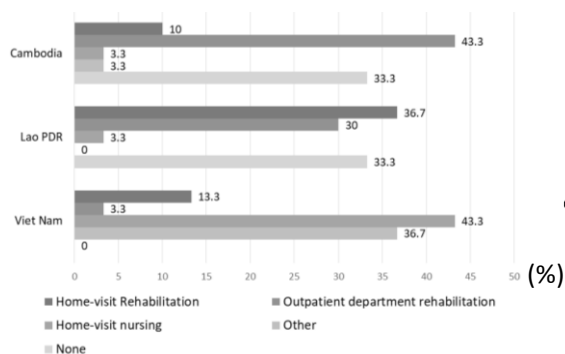
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**Figure 2.4. Assistive device in use [N=30, multiple answers were allowed]**



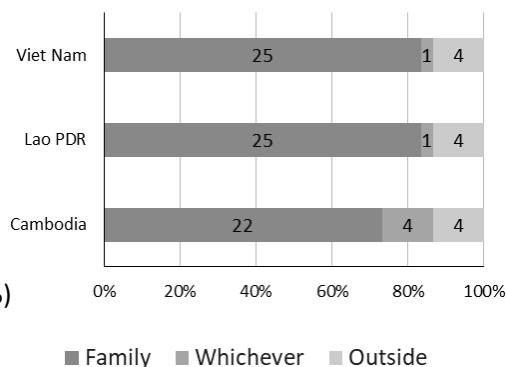
Source: Authors.

**Figure 2.5. Ongoing care and rehabilitation services**  
[N=30, multiple answers were allowed]



Source: Authors.

**Figure 2.6. Motive of main caregiver regarding caregiving**  
[N=30]



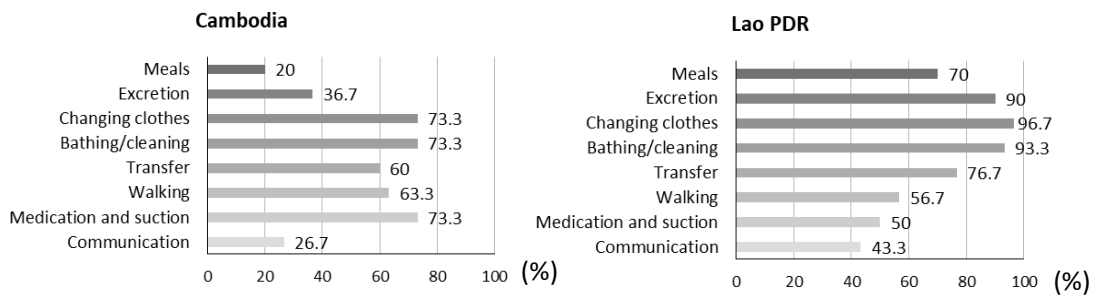
Source: Authors.

*Questionnaire (ii). Types and time of care provided*

Many types of care for the activities of daily living were provided, such as changing clothes, bathing, and toilet activities, which were common in all three countries. In the Lao PDR, the majority of caregivers spent their time on caregiving from almost the whole day, including at night. In Cambodia, the implementation frequency of care for eating, an activity that is easily acquired even in severely ill patients, was lower (Figures 2.6, 2.7, and 2.8). Arranging the activities of daily living (ADLs) from the easiest to the hardest, the order would be dining, dressing, defecation/urination control, changing clothes, transferring, toileting, walking, bathing, and climbing the stairs. The low frequency of assistance in dining suggests that the patients and their families are able to live without over-assistance.

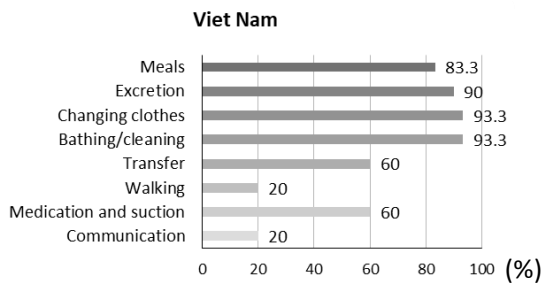


**Figure 2.7. What care is currently performed by the main caregiver?  
[N=30, multiple answers were allowed]**



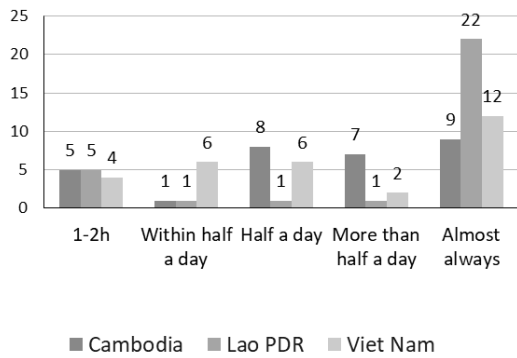
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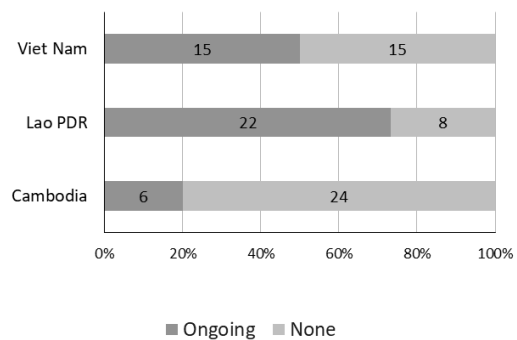
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**Figure 2.8. Time spent providing caregiving  
[N=30]**



Source: Authors.

**Figure 2.9. Is care provided at night?  
[N=30]**

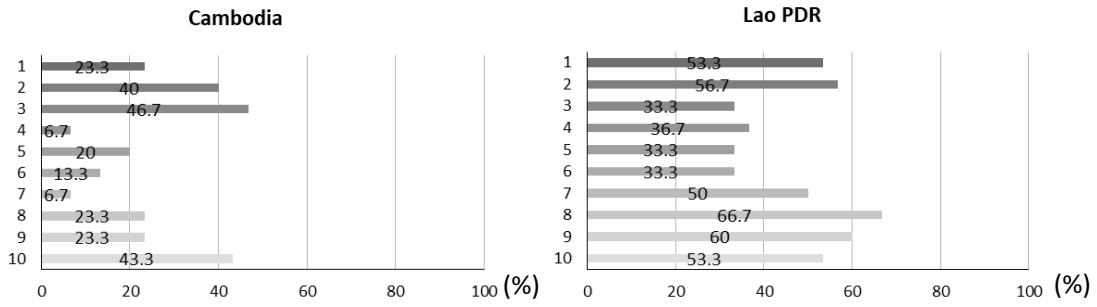


Source: Authors.

Questionnaire (iii). Feelings of burden in caregiving

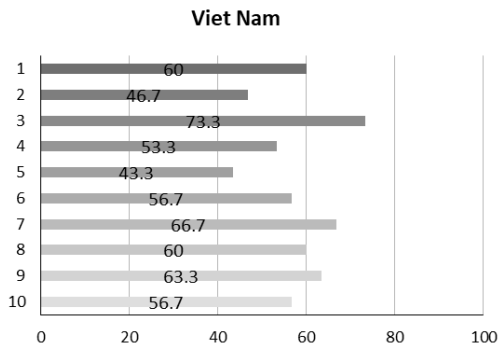
Regarding the burden of caregiving, many primary caregivers tended to complain of the physical and economic burden more than the mental burden.

**Figure 2.10. Feelings of burden in caregiving**  
[N=30, multiple answers were allowed]



Source: Authors.

Source: Authors.



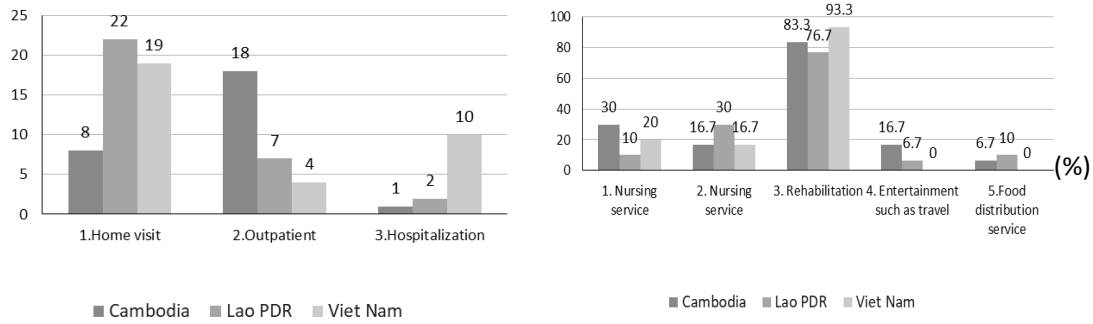
Source: Authors.

(%)

Questionnaire (iv). Services wanted

The need for home rehabilitation was high, and so was the need for rehabilitation.

**Figure 2.11. Service wanted**  
[N=30, Multiple answers were allowed]



Source: Authors.

Source: Authors.

**(4) Summary**

In accordance with the characteristics of the targeted facilities in the three countries, and because only severe cases with mRS4-5 at discharge were targeted, more than half of the patients needed care even 1 month after leaving acute-phase hospitals. Respondents in all three countries reported that care should be provided by the family. On the one hand, mental distress tended to be low even in cases where constant care was provided, but on the other hand, cases with heavy economic burden due to time-consuming care and limited opportunities to work were also observed.

Regarding patients discharged from Sunrise Japan Hospital Phnom Penh, Cambodia, and their families, a tendency for a higher rate of assistive device use and a lower burden in caregiving, including less caregiving at night, were observed. Regarding patients discharged from Mittaphab Hospital, Lao PDR, and their families, care was provided by more persons than the other two countries, and the time spent on caregiving, including night care, was longer. Regarding patients discharged from Viet Duc University Hospital, Viet Nam, most of them had only one or two caregivers, and outside services, such as home-visiting nurses, were used to reduce the burden. In the Lao PDR and Viet Nam, more support was provided for dressing, bathing including sponge baths, and feeding than in Cambodia.

### **2.3. Field survey on current practices of chronic-phase rehabilitation**

To understand the actual situation of chronic-phase rehabilitation in Cambodia, the Lao PDR, and Viet Nam, we visited several hospitals that provide services for chronic-phase rehabilitation. Before our visits to hospitals, we obtained the permission with the cooperation of the ministries of health and related hospitals. We also visited pharmacies in the cities where the hospitals are located, to ask the availability of some equipment required for chronic-phase rehabilitation.

#### **2.3.1. Cambodia**

##### **1) Rehabilitation professionals in Cambodia**

Training for physical therapists began in 1987 at the Technical School for Medical Care (hereinafter referred to as TSMC). Currently, 15 students are enrolled each year. The school provides two courses: a three-year course for an associate degree and an additional two-year course for a bachelor's degree. Both curricula have lectures and clinical training. Cambodia does not have a national exam system for the qualification of physical therapists, but the graduates of the TSMC are automatically granted with the national qualification. There are no training facilities for occupational therapists or speech language pathologists (SLPs) in Cambodia. Physical therapists are expected to play various roles in Cambodia, such as in hospitals, physical therapist training schools, rehabilitation centres, facilities for persons with disabilities, private clinics, and soccer teams. In hospitals, physical therapists can be found in most national and provincial hospitals, but only few physical therapists can be found in regional hospitals and health centres. Since the establishment of the TSMC in 1994 until 2017, approximately 460 students have graduated, which makes 3 physical therapists per 100,000 population in Cambodia. Amongst them, only about 230 certified physical therapists practice physical therapy. As much as 60% of physical therapists working at referral hospitals do not practice physical therapy but engage in jobs other than rehabilitation for the following reasons: (1) lack of awareness of the necessity and importance of rehabilitation amongst medical staff, especially doctors, in referral hospitals; (2) lack of financial resources of referral hospitals to employ even a few rehabilitation staff; and (3) prioritisation of the employment of staff engaged in medical care, such as doctors or nurses, rather than physical therapists.<sup>1</sup>

##### **2) Field survey**

###### **a. Basic information of the visited province**

Kratie Province is located approximately 260 km northeast of Phnom Penh. The area of the province is 11,094 km<sup>2</sup> and the population is 339,756 (Council for the Development of Cambodia, 2013). Kratie Province has one provincial referral hospital with 150 beds, 2 referral hospitals, 30 health centres, and 14 health posts. As for medical professionals, 37

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<sup>1</sup> Information provided by Many San, General Secretary of Cambodia Physical Therapist Association.

physicians, 145 primary nurses, 186 secondary nurses, 134 primary midwives, and 114 secondary midwives work in the province.

**b. Kratie Referral Hospital**

The hospital was established in the 1950s, supported by France. Its bed capacity is 150, and the average bed occupancy rate is 96%. The hospital has the following departments: emergency, pharmacy, examination, rehabilitation, internal medicine, surgery, obstetrics and gynaecology, paediatrics, ophthalmology, otorhinolaryngology, and dentistry. It is equipped with an operating room, X-ray, and ultrasound scan. The total number of staff is 118, including 15 physicians (12 specialised physicians, 13 general physicians), 1 dentist, 5 medical assistants, 2 pharmacists, 42 nurses, 23 midwives, 1 accountant, 3 physical therapists, 3 prosthetists, and others. Table 2.3 shows the diagnoses and illnesses of outpatients and inpatients of Kratie Referral Hospital.

**Table 2.3. Diagnoses of patients at Kratie Referral Hospital in 2018**

Outpatients (20,006 cases in total)		Inpatients (11,567 cases in total)	
General diseases	1,563	Traffic accidents	1,253
Respiratory diseases	244	Respiratory diseases	942
Ophthalmology	363	General diseases	783
Diabetes	698	Obstetrics and gynaecology	322
Infectious diseases	231	Infectious diseases	367
Otorhinolaryngology diseases	156	High blood pressure	289
Dermatology	80	Otorhinolaryngology	188
High blood pressure	25	Ophthalmology	163
Traffic accidents	9	Diabetes	79
Obstetrics and gynaecology	2	Stroke	70

Source: Interviews of hospital staff by the authors.

## Resources and services of chronic-phase rehabilitation in Kratie Referral Hospital

### i. Personnel assignment

Three physical therapists and three prosthetists work in this hospital. Physical therapists are expected not only to provide rehabilitation services but also to support nurses. At the beginning of 2018, rehabilitation services were provided to approximately 35 outpatients each month. However, the priority of their responsibility has shifted from rehabilitation services to nursing support due to the shortage of nurses. In 2019, physical therapists only take on the role of nursing assistants and do not carry out any rehabilitation, but they still provide rehabilitation services outside the hospital as private business.

### ii. Rehabilitation rooms and equipment

In 2000, a US non-governmental organisation (NGO) established a prosthetics room and had provided rehabilitation services. However, their support was suspended due to budget limitations at the time of our visit.

This hospital also has a rehabilitation room, which was established in the outpatient ward through support from the Red Cross in 2018, and three physical therapists have been assigned. This rehabilitation room is equipped with blood pressure meters, TENS, wheelchairs, weights, floor lamps for thermotherapy, two beds (one made by a physical therapist), crutches, and balance balls, etc.

### iii. Patients receiving rehabilitation services

Physical therapists provide services mainly to patients with stroke, cerebral paralysis, or orthopaedic diseases, whilst prosthetists deal with patients with amputations, arthritis, clubfoot, broken bones, infantile paralysis, and stroke.

### iv. Practices

Physical therapists do not provide rehabilitation services at the hospital as their duty; however, they carry out home-visit rehabilitation, mainly range of motion exercises, for two clients a day on average as their private business. They provide services 5–7 times a week per client.

These services are carried out upon request from the patients, except paediatric cases, for which doctors prescribe physical therapy and the cost is covered by aid agencies. The price of private home-visit rehabilitation was not confirmed at the site visit, but the normal price of private rehabilitation in Cambodia is equivalent to US\$10–US\$20 per service.

The clients are mainly patients who have just completed acute care at a national hospital, provincial referral hospital, or referral hospital and have returned home, but the services are usually completed within a month. The people who are in a chronic phase, however, are mainly taken care of by family members, even if they have sequelae of stroke.

### v. Capacity building of physical therapists

Physical therapists working at the hospital participate in training sessions held by the

Cambodia Physical Therapy Association regularly in Phnom Penh. Costs like travel expenses are often sponsored by aid agencies.

**c. Other services related to chronic-phase rehabilitation in Kratie Province**

In Kratie Province, assistive devices for people who need chronic-phase rehabilitation, such as wheelchairs, side canes, or pick-up walkers, are not available at local pharmacies. In cases where a physical therapist suggests that they need such devices, they are required to order them from retailers in Phnom Penh.

**2.3.2. Lao PDR**

**1) Rehabilitation professionals in the Lao PDR**

Physical therapists working in the Lao PDR can be found only in ‘central hospitals’ and ‘provincial hospitals’. The University of Health Sciences in Vientiane is the only educational institution to create physical therapists in the country. Up to 2018, approximately 1,100 persons had graduated but only 200 persons were working as active physical therapists. At district hospitals, which are placed under central hospitals in the healthcare system of the Lao PDR, physical therapists work as nursing assistants due to a shortage of nurses.

**2) Field survey**

**a. Basic information of the visited province**

Champasak Province is the southernmost province in the Lao PDR with an area of 15,415 km<sup>2</sup> and a population of 694,000 (Japan International Cooperation Agency and KOEI Research and Consulting Inc, 2017). The province has one provincial hospital with 250 beds, 9 district hospitals, 75 healthcare centres, and 53 private clinics. There are 1,621 medical personnel in total in the whole province, comprised of 615 persons at provincial hospitals, 617 persons at district hospitals, and 389 persons at healthcare centres.

Table 2.4 shows the annual numbers of outpatients and inpatients depending on the diagnosed illnesses in all the public health facilities of Champasak Province in 2018.

**Table 2.4. Diagnoses of patients in Champasak Province in 2018**

Outpatients		Inpatients	
Thyroid diseases	63,567	Upper gastrointestinal diseases	10,339
Upper gastrointestinal diseases	45,268	Gynaecology and obstetrics	6,235
Fever	39,486	Thyroid diseases	5,639
Neurological diseases	15,333	Diarrhoea	3,638

Pneumonia	12,008	Pneumonia	2,308
Diarrhoea	11,103	Traffic accidents	2,197
Gynaecology related diseases	9,993	Lower gastrointestinal diseases	1,861
Eye diseases	7,317	High blood pressure	1,537
Otorhinolaryngology related diseases	5,897	External injuries	1,448
Lower gastrointestinal diseases	5,752	Dengue fever	1,234

Source: Interviews of hospital staff by the authors.

#### **b. Champasak Provincial Hospital**

The hospital is functioning as a referral hospital covering Champasak Province and three other surrounding provinces. The hospital has the facilities to perform operations, but most patients with severe symptoms are transferred to hospitals in Ubonratchathani and Bangkok, Thailand. 3,449 cases were transferred from district hospitals to Champasak Provincial Hospital in 2018, but patient information is not shared between hospitals. The means of transportation for patients to be transferred should be arranged by family members.

The hospital receives training students from the Champasak College of Health Science. The average length of stay in this hospital was 4 days, and the bed occupancy rate was 102% in 2018. The hospital has the following departments: emergency, outpatient, internal medicine, obstetrics and gynaecology, paediatrics, ophthalmology, otorhinolaryngology, infectious disease, dermatology, dentistry, clinical laboratory, rehabilitation, and radiology. It is equipped with an operating room, X-ray room, and ultrasound scanner. The total number of staff is 541, including 141 physicians, 181 nurses, 19 pharmacists, 15 medical laboratory technologists, 44 physicians affiliated with the administrative department, 141 contract workers and volunteers, 10 physical therapists, and 6 prosthetists. The annual number of patients was 65,558 and that of inpatients was 54,546 in 2018. According to their classification, 936 'major' operations, such as spinal surgery, surgery for fractures, etc. were carried out in 2018, whilst the number of 'intermediate' operations like appendectomies and caesarean sections was 791, and 2,496 'minor' operations, such as wound suturing, were performed in 2018.



## Resources and services for chronic-phase rehabilitation in Champasak Provincial Hospital

### – Rehabilitation room and equipment

The hospital has a rehabilitation ward that accepts patients to stay, as well as a prosthetic room and three rehabilitation rooms. Regarding devices for physical therapy, the hospital is equipped with electric therapy devices, hot packs, therapeutic ultrasound devices, a massage machine, treadmill, and ergometer.

### – Patients receiving rehabilitation services

Rehabilitation services are provided for approximately 10 cases per day. In 2018, 2,670 sessions were provided as outpatient rehabilitation services, and 770 inpatients received the rehabilitation services, including patients in other wards than the rehabilitation ward. Amongst them, 24 outpatient cases and 11 hospitalised cases were patients of stroke. Back pain is the most common cause for rehabilitation. The rehabilitation ward accepts about 4–5 patients each month. Most of them stay in the ward for 2–3 days only and are then discharged home after the family receives advice on home care.

### – Practices

Rehabilitation services are provided 30 minutes per session every day on weekdays. In severe cases, implementation is done even on Saturdays and Sundays. The hospital also provides home-visit rehabilitation services. Physical therapists implement physical therapy and provide guidance to the family members. The care to prevent bedsores, and contracture is performed by a nurse. The fee for the rehabilitation is KN15,000 per session for outpatients and KN30,000 per session for inpatients.

### – Capacity building

Meetings and training sessions are carried out every 3 months by rehabilitation personnel, and healthcare personnel throughout the four provinces of the southern part of the Lao PDR are invited to these sessions.

## **c. Champasak District Hospital (Type A district hospital)**

Type A district hospitals are placed under provincial hospitals in the healthcare system of the Lao PDR. Type A district hospitals have more capacity to provide medical services than Type B district hospitals, like the capacity to provide surgery requiring anaesthesia (World Health Organization, 2014). District hospitals of the Lao PDR are supposed to mainly provide services for childbirth, minor diseases, and chronic-phase diseases. Patients with intermediate or severe conditions, such as stroke patients, are transferred to provincial hospitals or Thailand.

Champasak District Hospital is located approximately 60 km south of the Pakse urban area. The patients of serious diseases are referred to Champasak Provincial Hospital or hospitals in Thailand. The hospital has 20 beds, and the average occupancy rate in 2018 was 67%. The hospital has consultation services for internal medicine, obstetrics and gynaecology, paediatrics, and dentistry. The hospital is equipped with an operating room, X-ray room and ultrasound scanner but does not have equipment for physical therapy. The staff of

the hospital comprises 3 consultant physicians (1 obstetrics and gynaecology, 2 home doctors), 8 general doctors, 25 nurses, 3 pharmacists, 2 medical laboratory technologists, 1 X-ray technologist, 1 dentist, and 1 physical therapist (working as a nurse assistant).

Major operations cannot be performed in this hospital, but the hospital did perform 27 intermediate operations and 423 minor operations in 2018. Three delivery cases were also handled in 2018.

This hospital does not provide rehabilitation services, although it has a rehabilitation room.

Table 2.5 shows the number of patients by the diagnosed illnesses at Champasak District Hospital in 2018.

**Table 2.5. Diagnoses of patients at Champasak District Hospital in 2018**

Outpatients		Inpatients	
Upper gastrointestinal diseases	5,835	Infectious diseases	1,401
Neurological diseases	2,182	Upper gastrointestinal diseases	955
Odontopathy	744	Lower gastrointestinal diseases	832
Fever	679	Gynaecology and obstetrics	561
Musculoskeletal disorders	607	Pneumonia	186

Source: Interviews of hospital staff by the authors.

**d. Sanasomboun District Hospital (Type B district hospital)**

This hospital has 15 beds and is located approximately 24 km northwest of Pakse. The construction of the currently used hospital was completed in 2010 with support from the Japanese government. Patients with serious conditions are referred to Champasak Provincial Hospital or hospitals in Thailand.

The average bed occupancy rate was 71% in 2018, and consultations for internal medicine, obstetrics and gynaecology, and dentistry are accepted. The hospital has seven physicians, five nurses, one pharmacist, and two medical laboratory technologists but no physical therapists are assigned. The hospital provides no rehabilitation services and has no rehabilitation equipment.

Table 2.6 shows the numbers of patients by their diagnosed illnesses at Sanasomboun District Hospital in 2018.

**Table 2.6. Diagnoses of patients at Sanasomboun District Hospital in 2018**

Outpatients		Inpatients	
Thyroid diseases	2,075 cases	Lower gastrointestinal diseases	413 cases
Upper gastrointestinal diseases	1,476 cases	Gynaecology	373 cases
Fever	1,170 cases	Thyroid diseases	261 cases
Neurological diseases	1,101 cases	Diarrhoea	117 cases
External injuries	296 cases	Pneumonia	95 cases

Source: Interviews of hospital staff by authors.

### **3) Limitations of rehabilitation and caregiving services in the Lao PDR**

In the Lao PDR, rehabilitation is usually completed within a month after discharge from an acute care hospital. For orthopaedic patients, massages, etc. can be performed at physical therapy clinics in urban areas, but for patients with sequelae of stroke, caregiving and rehabilitation are mainly provided by the family. There are no home-visit nursing or home-visit caregiving services provided in the Lao PDR, but home-visit rehabilitation services are available.

At Champasak District Hospital, rehabilitation services for stroke patients in acute phase are not carried out, nor guidance on how to take care of stroke patients for the family, whilst both are provided in the provincial hospital. Home-visit rehabilitation after discharge is provided but is often completed within a short period.

#### **2.3.3. Viet Nam**

##### **1) Rehabilitation professionals in Viet Nam**

Viet Nam does not have national certification system for physical therapists that is regulated by the government. Practically, persons who have successfully completed 9 months of clinical training after graduating from training institutions of physical therapy are called physical therapists, but the law does not guarantee the exclusive use of the title 'physical therapist' to them. Even nurses can call themselves physical therapists and provide rehabilitation services if they have completed short-term training courses. The quality of rehabilitation services in Viet Nam varies greatly.

## 2) Field survey

### a. Hai Duong Medical Technical University Hospital

Hai Duong Province is located in the Red River Delta, with a population of 1.9 million, 75% of whom live in rural areas (General Statistics Office of Viet Nam, 2020a). As of 2017, Hai Duong Province had 20 hospitals, with 4,175 patient beds in total, 1 regional polyclinic with 165 beds, 5 sanatoriums or rehabilitation hospitals with 75 beds, as well as 265 medical service units with 1,060 beds, excluding private establishments. Regarding the number of medical personnel, 1,061 physicians, 2,318 nurses, and 602 midwives were counted throughout the health establishments, excluding private ones in the province (General Statistics Office of Viet Nam, 2020a).

The hospital was established in 2007 and functions as an education hospital for the students of Hai Duong Medical Technical University to train to become health professionals, such as nurses, medical laboratory technicians, radiologic technologists, and physical therapists. At the time of our visit, the hospital had 230 patient beds, and the bed occupancy rate was 113%. Amongst the 35 doctors registered at the hospital, 30 doctors were traditional medicine practitioners. The number of nurses was 70–80, and most of them had been trained for rehabilitation practices. The hospital had departments of paediatrics, rehabilitation, and emergency, etc. and was equipped with a CT scan and ultrasound.

As a common practice in this hospital at the time of visit in June 2019, patients were encouraged to discharge 3–4 weeks after admission because the public medical insurance system does not cover long hospitalisation, but some patients had come back to the ward due to a lack of support for family care and the adjustment in living environment for patients after discharge.

#### Resources and services for chronic-phase rehabilitation in Hai Duong Medical Technical University Hospital

##### i. Rehabilitation personnel and equipment

In this hospital, 35 personal therapists (PTs), 4 or 5 occupational therapists (OTs), and 2 speech-language therapists (STs) provide rehabilitation services, including part-time staff. Most of the staff graduated from Hai Duong Medical Technical University. Some staff teach students at Hai Duong Medical Technical University.

The hospital was equipped with parallel bars (including a traction device) for physical therapy and an exercise device for upper limb exercises.

##### ii. Rehabilitation practices

Rehabilitation is provided for approximately 230–300 patients per month. About 20% of inpatients are stroke patients and about 40% of the clients of rehabilitation services are stroke patients. Most patients have already been treated at Viet Duc University Hospital in Ha Noi, Bach Mai Hospital in Ha Noi, or other general hospitals at their acute phases, including patients after brain surgery.

The services provided by PTs are physical therapy and guidance to the family on home rehabilitation and body position adjustment, etc. Services to prevent bedsores and muscle contracture are provided by nurses.

The fee for the services provided by the PTs, OTs, and STs is D400,000–D500,000 per session. This cost is not covered by the public medical insurance system, whereas the cost for hospital beds is covered.

### **c. Bac Giang Rehabilitation Hospital**

Bac Giang Province is in the northeast region, with a population of 1.8 million, 89% of whom live in rural areas (General Statistics Office of Viet Nam, 2020b). As of 2017, Bac Giang Province had 15 hospitals, with 3,340 patient beds in total, 1 regional polyclinic with 150 beds, 3 sanatoriums or rehabilitation hospitals with 15 beds, as well as 230 medical service units with 1,150 beds, excluding private establishments. Regarding the number of medical personnel, 1,075 physicians, 1,487 nurses, and 323 midwives were counted throughout the health establishments, excluding private ones in the province (General Statistics Office of Viet Nam, 2020a).

The hospital was established in 1965 as a nursing station for the officials of the province. In 1976, the facility was upgraded into a nursing institute with 250 beds, and then in 1996, it was renamed into a centre for rehabilitation and nursing. In response to the modification of the organisational structure of rehabilitation facilities in the country and the province, the hospital was renamed to its current name in 2014. The hospital has 150 patient beds now, with 106 staff, including 31 doctors. Most of the staff have been trained for rehabilitation practices. The hospital is equipped with 4D ultrasound and a microwave thermotherapy machine, etc. and some of these apparatuses have been supplied by international NGOs. The hospital has five clinical departments, which are departments of examination, paediatrics, internal and traditional medicine, surgery and emergency, and rehabilitation (Bắc Giang Provincial Department of Health, n.d.).

#### Resources and services for chronic-phase rehabilitation in Bac Giang Rehabilitation Hospital

##### **i. Rehabilitation personnel and equipment**

The hospital has 20 PTs and 2 OTs. It is equipped with beds for rehabilitation, devices for thermotherapy, devices for electrical stimulation, ultrasound, parallel bars, devices for upper limb exercise, outdoor space for self-practice, and rehabilitation chairs which enable practice in a sitting position.

##### **ii. Rehabilitation practices**

The hospital provides rehabilitation services for outpatients as well as inpatients. The average daily number of patients who were provided with rehabilitation services was 220 for inpatients and 150 for outpatients in 2018. The length of one session is about 30 minutes, and the fee is D318,000–D545,000 per session. The provided services are range of motion practice, thermotherapy, electrotherapy, ultrasonic therapy, walking practice, guidance to families, body position adjustment, etc. The services to prevent bedsores and

muscle contracture are provided by nurses.

**d. Common practices and limitations of rehabilitation and caregiving services in Viet Nam**

The Ministry of Health of Viet Nam has established at least one rehabilitation hospital in each province throughout the country. Patients are usually transferred to local rehabilitation hospitals after completing treatment during the acute phase in major hospitals. Home-visit rehabilitation can be carried out by PTs, but it is not covered by social insurance system regulated by the Ministry of Health, and families are required to pay for such services from their own pockets. As for the home-visit services for chronic-phase patients, acupuncture and moxibustion are also provided by traditional practitioners.

Regarding the quality of rehabilitation, in urban areas, rehabilitation is actively carried out not only for orthopaedic patients but also patients of strokes, spinal injuries, and head injuries, and the services focus on the improvement of activities of daily living (ADL). In rural areas, however, services are limited to exercises on the bed, acupuncture, moxibustion, and massages, and the improvement of ADL is not well considered.

Lack of continuity from acute care to chronic care is another problem in Viet Nam. Acute care hospitals do not track patients after discharge. We found some patients who were discharged from Viet Duc University Hospital in Ha Noi but gradually lost the ability to walk after the discharge because of the lack of opportunities to receive appropriate rehabilitation services. Ordinary households in Viet Nam cannot afford to employ rehabilitation practitioners at home, nor do they have enough knowledge and skills as family caregivers. Viet Nam still has many issues related to improving chronic-phase rehabilitation.

**2.4. Case studies of chronic-phase rehabilitation in the Kitahara style**

Through this project, the Kitahara Group provided services for chronic-phase rehabilitation in Cambodia, the Lao PDR, and Viet Nam, but the practices were modified in accordance with the realities of each country. The clients of our services were patients who had been treated at Sunrise Japan Hospital Phnom Penh in Cambodia, Mittaphab Hospital in the Lao PDR, and Viet Duc University Hospital in Viet Nam. Amongst the clients who received the Kitahara-style services for chronic-phase rehabilitation, five cases of stroke or traumatic brain injury from each country will be shown in this section. Cases of both home-visit and outpatient rehabilitation are included.

### 2.4.1. Cases in Cambodia

#### Case C1. A bedridden case provided with swallowing rehabilitation at an outpatient clinic

[Present illness]

A female patient in her 80s. She suffered from a massive cerebral infarction about 6 months before her first consultation at Sunrise Japan Hospital. The patient was treated at a hospital in Cambodia for 10 days then transferred to a hospital in Viet Nam. She stayed there for 4 days for testing and treatment. She returned home from Viet Nam. Her conditions had been stable after her return, but due to her worsening level of consciousness, she was admitted to a national hospital in Cambodia and then transferred to Sunrise Japan Hospital. Severe pneumonia was observed when she first came to Sunrise Japan Hospital, and she was treated using a mechanical ventilator. She stayed at Sunrise Japan Hospital for about 60 days and left for home after her respiratory condition was confirmed as recovered.

[First examination at the Kitahara facility]

(See Appendix 1 for the indicators of examination)

GCS: E4 V1 M5, MMT (Left side): Upper Limb 0 - Lower Limb 3, mRS: 5, BI: 0/100.

No obvious paralysis of the tongue or soft palate could be seen, but facial weakness could be observed. Severe cognitive impairment was also detected.

[Problems before the Kitahara-style intervention]

The patient spent most of her time on her bed on the first floor of her home. The main caregivers were her daughter living together with her and a neighbour who is not a relative. The house was equipped with a reclining wheelchair, a medical aspirator, and a nursing bed. Because of her swallowing disorder, she was served special drinks containing a food thickener to increase the viscosity and special food which was mashed using a blender.

She was confined to her bed due to severe paralysis and a consciousness disorder. She had severe communication impairment both for expression and comprehension and had no social interaction except with her family. She was totally dependent on caregivers for her daily life, and such her status imposed a great physical, economic, and social burden on her caregivers.

[Kitahara-style intervention for chronic-phase rehabilitation]

Outpatient rehabilitation was provided once a week for 60 minutes each. Due to the massive lesion, her age, and the severe cognitive dysfunction, improvement of motor function could not be expected. We set two main goals when we started the intervention:

(1) improvement of the patient's consciousness level and (2) improvement of swallowing function so that the patient could enjoy oral food intake.

To achieve goal (1), we provided continuous standing training using an antigravity device. For goal (2), we provided indirect swallowing training, such as oral ice massage, facial and neck massage, as well as direct swallowing training using juices thickened with food thickeners and fruits. In addition, guidance and advice for the primary caregivers on practical methods for feeding at home were provided. A mobile phone video camera was used to record the eating situation at home, and the video was checked, and feedback was given to them at each rehabilitation session.

As we expected, the paralysis did not improve at all, nor did the consciousness level, but an improvement in responsiveness to family members was observed. As for her nutritional intake, she was totally dependent on nasogastric tube feeding before the Kitahara-style intervention (after the onset of stroke), but she regained oral intake three times a day at home, although she still needed tube feeding. She did not develop any complications like aspiration pneumonia after the start of the Kitahara-style training. Our intervention was conducted for about 6 months.

[Discussion]

The improvement in consciousness disturbance due to extensive cerebral infarction and cerebral haemorrhage may continue several months after onset. Even in cases where the recovery of physical and cognitive functions, i.e. where improvement in severe paralysis and higher brain dysfunction cannot be expected, it is possible to reduce the burden on caregivers by continuing the intervention for several months. In addition, we believe that our guidance and advice to the family caregivers contributed to risk reduction in the training of the swallowing function.

#### Case C2. A case of cerebellar and pontine infarction with severe ataxia

[Present illness]

A male patient in his 70s. ADLs were independent before the onset. He developed dizziness and vomiting at the first onset, which took place approximately 3 months before his first consultation to Sunrise Japan Hospital. After consultation at a local clinic, he was transferred to a national hospital for further examination. A magnetic resonance imaging (MRI) scan at the national hospital revealed a diagnosis of bilateral pontine and cerebellar infarction. He was then transferred to Sunrise Japan Hospital for specialised treatment. He stayed at the hospital for about 10 days and was discharged home with moderate paralysis and severe ataxia.



[First examination by Kitahara's chronic-phase rehabilitation team]

GCS: E4 V5 M6, MMT (Right side): Upper Limb 3 - Lower Limb 3 - Trunk Muscle 3, mRS: 4, BI: 50/100, MMSE: 23/30.

Neurological examination detected signs of cerebellar ataxia.

He could feed himself independently, and other ADLs were partially dependent.

[Problems before the Kitahara-style intervention]

He lived with his wife and son, but his wife was unable to provide intensive physical assistance to the patient. The main caregiver was his son. The house was equipped with a nursing bed, and he used a wheelchair and a walking frame.

The patient's son was still young and working, so he could not be at home the whole day to provide care to the patient. The patient was distressed that he was annoying and disturbing his son's work.

[Kitahara-style intervention of chronic-phase rehabilitation]

Outpatient rehabilitation was provided three times a week for 60 minutes each. We set two goals for the intervention in this case: (1) to improve mobility and (2) to develop self-care abilities, particularly to improve the required movement for toileting and bathing because these activities required the extensive support of caregivers. To achieve goal (2), we provided balance training in the standing position and practice of changing direction and dressing.

MMT scores were not improved throughout our intervention, but intention tremor, a symptom of ataxia, was reduced. We introduced and trained using a four-wheel rollator at home, and this enabled him to move within his house, particularly for toileting, only with minimal physical support, though his movement still required observation to ensure safety, and assistance to pull and tear off toilet paper was also needed. As a result of our intervention, he became confident to stay at home without the assistance of his son. This change reduced the family's anxiety and burden. Outside the house, however, he still needed a wheelchair.

[Discussion]

We believe that rehabilitation programmes are supposed to be focused on the needs of the patients and their families, and the goals of rehabilitation should be to increase the level of independence in self-care and to relieve the anxiety of the patients and their families. In this case, we discussed the goals of the programme with the patients and family members. Such a procedure is indispensable for any rehabilitation programme to achieve a positive outcome.

To expand the range of activities of the patients who have limited of physical functions, rehabilitation is not enough, but living environments should be modified into disabled-friendly communities or cities. In this case, the patient spent most of the time at home and just went out of the home when he visited the hospital for outpatient rehabilitation. Poor infrastructure for disabled people made it difficult for him to maintain social interaction within the community. On the streets in Cambodia, sidewalks are not well constructed nor maintained, and many physical barriers and steps that hinder the movement of disabled people can be found.

### Case C3. A case of cerebral haemorrhage with sever aphasia

[Present illness]

A male patient in his 50s. ADLs were independent before the onset. He suffered from a left putaminal haemorrhage 1 month before his first consultation to Sunrise Japan Hospital and was transferred to a national hospital for craniotomy for hematoma removal. After staying at the National Hospital for about 20 days, he visited our outpatient rehabilitation. On the first outpatient visit, severe paralysis and severe aphasia were observed.

[First examination at the Kitahara facility]

GCS: E4 VA M6, MMT (Right side): Upper Limb 1 - Lower Limb Hip 1 - Knee 2 - Ankle 1 - Trunk Muscle 4, mRS: 4, BI: 50/100.

Global aphasia (severe impairment of both expressive and receptive language function) was observed. He could feed himself independently. He needed a wheelchair for moving, and transferring to and from the wheelchair required partial support.

[Problems before the Kitahara-style intervention]

The patient lived at home with eight family members, excluding himself. His wife was the main caregiver. He used assistive devices, such as a nursing bed and wheelchair.

Severe aphasia and severe paralysis seriously limited the patient's social inclusion. His salary used to be the main source of income for the family, so economic instability was one of the greatest concerns for them.

[Kitahara-style intervention of chronic-phase rehabilitation]

Outpatient rehabilitation was provided three times a week for 60 minutes each. The goals of this intervention were (1) improving mobility and (2) improving communication skills. An ankle foot orthosis was prescribed to achieve stability in walking. For goal (2), we collaborated with a Cambodian physical therapist to provide voice training, speech

training, language comprehension training, and reading and writing training. A Japanese SLP with expertise in rehabilitation for aphasia also joined the discussion on the practical interventions for this case through a web conference.

MMT improved from 1 to 2 in hip muscle strength and from 2 to 3 in knee muscle strength. The state of severe aphasia and little spontaneous speech had not changed, but language comprehension was seemingly improved a little bit, and we could see occasions when he attempted to respond to staff questions with gestures.

BI improved from 50 to 65, although mRS did not change from 4. Initially, the patient needed almost full assistance to walk, but he became able to walk with an ankle foot orthosis and cane if he was observed by somebody to ensure safety. Initially, he could walk continuously for only about 5 m, but after 1 month of rehabilitation, he became capable of walking about 200 m without complaining of fatigue. He could even go up and down stairs if somebody observed him after our intervention.

#### [Discussion]

The communication disorder caused by aphasia is one of the most stressful symptoms of stroke for patients and families. No training school for SLPs has been established in Cambodia, so the rehabilitation of aphasic patients caused by stroke and traumatic brain injury is a big challenge. Interventions by native speakers are essential for language-targeted rehabilitation, so the training of Cambodian experts on rehabilitation for aphasia is an urgent issue.

In this case, speech therapy was administered by a physical therapist who was a native Khmer language speaker with the supervision of a Japanese SLP through a web conference. Communication between the Japanese SLP and the Cambodian physical therapist was conducted in English, and the Cambodian physical therapist translated the training content proposed by the Japanese side into Khmer for the intervention. The difference in the pronunciation, writing, and grammatical systems of English, Japanese, and Khmer created difficulties in sharing the knowledge and skills of speech therapy between them, so the rehabilitation was conducted with a trial-and-error approach. Due to the severity of the patient's aphasia, the patient did not improve, unfortunately, but this case was a great opportunity to start developing a systematically established method of speech therapy in the Khmer language. Sunrise Japan Hospital offers remote lectures on rehabilitation for aphasic patients by Japanese SLPs for Cambodian physical therapists once a month.

#### Case C4. A mild stroke case with a strong emotional impact on the patient

##### [Present illness]

A 45-year-old male. Before the onset, he was an office worker in charge of administrative work using a computer. He could drive a car by himself for commuting. He had a stroke in

December 2016, resulting in left hemiparesis. He returned to work in February 2017 but could not work as before the onset, so he was assigned lighter jobs with shorter duty hours. The company arranged a driver for him to commute because he could no longer drive.

On 25 August 2017, the patient noticed numbness in his left hand and leg, and consulted Sunrise Japan Hospital.

[First examination at Sunrise Japan Hospital]

GCS: E4 V5 M6, MMT (Left side): Upper Limb 4 - Lower Limb 4, mRS: 2, BI: 100/100.

Left hemiparesis. Numbness in left arm and finger.

Grip strength: Right 38.5 kg, Left 28.2 kg.

[Problems before the Kitahara-style intervention]

He lived together with his wife and three children.

Even after suffering the stroke, he could have an independent life, but the mild left hemiparesis and walking instability remained, and they created anxiety. He returned to work 2 months after the onset, but he was assigned less responsible jobs. Although he was independent in his daily life, he lost confidence and motivation for social interaction because of his impaired physical functions, such as limited walking ability and incapability of driving.

[Kitahara-style intervention of chronic-phase rehabilitation]

When outpatient rehabilitation was started, we tried to strengthen his motivation to undergo the training, telling him that there was a good possibility of improvement, in consideration of his younger age and physical function at the initial examination and that continued rehabilitation is crucial to achieve the goals. We also encouraged him to imagine how his range of activities in life would be expanded if his function could be improved. When new complaints from him arose, like backache, we carefully explained the probable causes, treatment, and preventive measures.

The patient underwent outpatient rehabilitation twice a week for 1 hour per visit. As a result, his left grip strength increased from 28.2 kg to 31.0 kg and mRS improved from 2 to 1. Numbness decreased and only remained in the fingertips. Improvement was also achieved even mentally. After the Kitahara-style intervention, we could see his pleasant facial expression more often, and he had more opportunities to go out.

One year after the outpatient rehabilitation was started, the patient succeeded in going back to work. His next goal was driving, so we arranged special training items for him: finger motor coordination, endurance training, seating endurance training, and the

operation of lower limbs in the sitting position. To achieve such goals, it is indispensable to increase the abilities of keeping attention and the judgment of surrounding situations during driving. As a result, the patient became capable of driving again and eventually accomplished his goal of commuting by driving his own car.

When the goals of our intervention were accomplished, we suggested to him that rehabilitation was no longer necessary for him, but he requested to continue. He expected that rehabilitation would be a good tool to solve the problems he encountered in his daily life.

[Discussion]

A lack of awareness of the effect of full-length rehabilitation (rather than short-term intervention) can lead to lower motivation amongst patients for rehabilitation. Like other cases in Cambodia, this patient had low motivation for rehabilitation, although he had good potential for a remarkable recovery after the stroke. For that purpose, a restriction on activities should not have been placed on him as his office did. Close communication between rehabilitation personnel and patients is crucial to encourage patients to continue rehabilitation until it can have its full effect. If patients can understand the future goals and prognosis from the beginning of the intervention and can imagine life realistically after the expected improvement, they will be more encouraged to stay motivated, increase their sense of self-efficacy, and raise their level of social interaction.

Considering the huge impact of middle-aged stroke patients on families and communities economically and socially, it is urgently required to develop a framework to support the social involvement and social reintegration of such patients. The goals of rehabilitation are not only the improvement of physical function, but also the social reintegration of the patients. Mental and emotional support for patients should be also part of rehabilitation.

#### Case C5. A case of cerebral infarction with prolonged hospital stay because of family matters

[Present illness]

A female patient in her 70s. ADLs were independent before the onset. In January 2019, she felt weakness in her left leg and consulted Sunrise Japan Hospital. She was admitted and started treatment with a diagnosis of multiple cerebral infarctions involving the right frontal and parietal lobes and left corona radiata. The acute treatment was completed in about 2 weeks, but the family did not agree to let the patient leave for home. The patient was discharged home after approximately 6 months of hospitalisation.

[First examination at Sunrise Japan Hospital]

GCS: E4 V5 M6, MMT (Left side): Upper Limb 4 - Lower Limb 3, MMSE: 23/30 (mild dementia), mRS: 4, BI: 60/100.

She could feed herself independently. She needed a walking frame for walking. Other ADLs were partially dependent.

[Problems before the Kitahara-style intervention]

She lived at home with her son and his wife and two grandchildren, but during the daytime, family members other than the patient were away at work or school. As a result, a live-in domestic worker, who was not trained in professional long-term care skills, provided personal care, but the patient had taken falls many times at home.

Although the patient had the ability to live at home with minor assistance, the family members did not agree to have the patient at home. The hospital staff were concerned about a decline in cognitive function and mental activity caused by prolonged hospitalisation considering the patient's age and explained to the family members that her condition based on the professional assessment could allow the patient to leave the hospital and continue the rehabilitation as outpatient. The family members, however, still did not agree on the discharge from the hospital due to anxiety in caring for the patient at home, and she continued the unnecessary hospitalisation.

[Kitahara-style intervention of chronic-phase rehabilitation]

In this case, the most important goal was the alleviation of the family's anxiety. To achieve this goal, it was required to show the family that the patient was able to live safely at home without falling. The intervention in this case aimed at the improvement of the stability of the patient's gait and standing balance skills as well as the establishment of her own self-care movements, which could ensure safety at home. We introduced a walking frame to achieve walking stability. We also provided care guidance to the live-in domestic worker, focusing on care for walking, toileting, and bathing.

After about 2 weeks of rehabilitation, the MMT of the left leg increased from 3 to 4, but she still needed assistance to support herself whilst walking because she still felt unstable and fell easily when changing directions. The scores of mRS and BI did not change. We saw that the domestic worker provided excessive care for the patient, which could undermine the patient's own ability to live independently, so we instructed the domestic worker to reduce the care and assistance so that the patient could maximise her ability to perform her own activities. The patient also said that she could do more things on her own after the rehabilitation than before, though MMSE declined from 23 to 20.

In spite of our intensive training, we failed to persuade the family to agree to the discharge of the patient, and she finally left the hospital for economic reasons.

[Discussion]

Although the patient was ready to return home after the acute phase treatment and rehabilitation, the family did not accept the patient at home, and the period of hospitalisation was prolonged. One of the factors of the refusal of the patient's family was the lack of care skills of the domestic worker despite repeated instructions. The family could not be satisfied with the care provided by their domestic worker.

In the future, the older population is expected to increase, even in Cambodia. For older people to live safely at home, it is required to establish a system to provide training to families and community caregivers. Considering the demographic transition and social change resulting in a decrease in care-providing resources within families and communities, intermediary facilities between hospitals and homes will also be needed to avoid prolonged hospitalisation.

#### **2.4.2. Cases in the Lao PDR**

##### Case L1. A cerebral infarction case with continued rehabilitation using telecommunication

[Present illness]

A 58-year-old woman. The patient noticed paralysis of her upper left limb and speech impairment on 30 August 2018. She consulted a provincial hospital in northern Lao PDR and was diagnosed through a CT scan as cerebral infarction caused by the infarct of the right middle cerebral artery. She was referred to Mittaphab Hospital in Vientiane the next day. Rehabilitation by Kitahara staff started on 3 September. At the beginning of the intervention, the patient needed assistance even in standing up, but after 14 days of rehabilitation and staying at the hospital, the patient resumed the capability to get up independently. She could walk about 5 metres indoors with a cane but still needed moderate assistance. Toileting also required moderate assistance, but it was assessed that she could leave the hospital and continue rehabilitation at home.

[First examination by the Kitahara rehabilitation team]

GCS: E4 V5 M6, MMT (Left side): Upper Limb 2 - Lower Limb 2, mRS: 4, BI: 40/100.

Assistance required for walking and toileting but feeding possible independently.

Sensory disturbance at left-side upper and lower limb was observed.

[Challenges of this case]

The patient lived in a single dwelling unit with a roommate. The main living space was on the first floor, and the patient slept on the floor with a mattress so she did not have to climb up and down the stairs. She had many close neighbours, and her house always had visitors. She was self-employed, working from 9am to 4pm. She could drive a car by herself,

and she mainly used a car for transport.

Due to the risk of falling whilst walking, assistance was required for her ADLs, and the range of her activities was limited. She used diapers because she often could not get to a toilet on time.

[Kitahara-style intervention of chronic-phase rehabilitation]

During hospitalisation, rehabilitation was carried out for 1 hour every day for 14 days. After discharge, we had remote sessions using the Messenger app with the patient and the primary caregiver for 45 minutes each and discussed the suitable home-training practices in accordance with her actual life conditions and physical functions.

We set the goals in this case through the discussion with the patient and the primary caregiver:

- Within 2 months after discharge: walking indoors independently using a cane and toileting independently.
- Within 3 months after discharge: all ADLs indoors independent and walking outdoors independently.
- Within 1 year after discharge, return to work.

To achieve these goals, we created home rehabilitation programmes, including range of motion exercise, sit-to-stand and stand-to-sit movements, standing balance exercises, and walking practice. We also provided full instructions to the primary caregiver on the frequencies and critical points of the procedures.

MMT improved from 2 to 3 for the upper limbs and 2 to 3 for the lower limbs. Her walking ability improved, and she resumed a fully independent walking ability in 1 month after discharge both indoors and outdoors. Toileting had also become independent then. About a year after the onset, indoor walking was independent without a cane, and outdoor walking was independent using a cane. The patient could go out if accompanied with friends, however, she retired because of persistent upper limb paralysis and the necessity of a cane for walking outdoors. She lives using her savings supported by the primary caregiver and friends.

[Discussion]

In this case, intensive rehabilitation could be carried out during hospitalisation. After leaving hospital, remote communication was carried out once a week for 1 year between the rehabilitation professionals and the patient and the primary caregiver. As a result, the goal of outdoor independent walking was achieved earlier than expected.

Although she had severe paralysis as a sequela of stroke, the patient was motivated to receive rehabilitation. This may be partly because she had no cognitive impairment. In addition, the primary caregiver and neighbours were cooperative, and such support



enabled continued remote intervention. To achieve the full effect of rehabilitation, it is crucial to have opportunities for discussions on goal-setting based on the latest physical condition of the patient and mutual understanding about the procedures of home rehabilitation methods.

It was regrettable that she could not return to work. The severe paralysis of her upper limb was a challenging symptom in this case.

#### Case L2. A case of intracerebral haemorrhage with severe symptoms

[Present illness]

An 87-year-old male. On 2 January 2018, the patient had sudden consciousness disturbance. He was taken to Mittaphab Hospital by his family by car and diagnosed with a left intracerebral haemorrhage using a CT scan. He was subsequently admitted on the same day. The patient was treated in the intensive care unit (ICU) for 2 days and then transferred to the neurology ward on 4 January. The physician gave approval for starting rehabilitation from 5 January. The main symptoms were severe consciousness disturbance, right hemiplegia, and aphasia, and ADLs were totally dependent. For rehabilitation, the patient was transferred to a wheelchair with the full support of two assistants. After hospitalisation and treatment for 10 days, he was allowed to leave from hospital, but the ADLs were still fully dependent.

[First examination by the Kitahara rehabilitation team]

GCS: E1 V1 M1, MMT (Right side): Upper Limb 1 - Lower Limb 1, mRS: 5, BI 0/100.

Aphasia was observed.

[Challenges of this case]

The patient lived with five other family members. He had already retired and spent most of his time at home but could walk around the garden during the day before the onset.

In this case, the patient had severe consciousness disturbance and hemiplegia. Full assistance for his ADLs was still needed even after the discharge from hospital, so the possibility of secondary complications, such as bedsores and joint contracture, after discharge was high. The son was the primary caregiver but had no experience nor knowledge of caregiving.

[Kitahara-style intervention of chronic-phase rehabilitation]

During hospitalisation, rehabilitation was carried out 40 minutes every day for 5 days. After the discharge from hospital, we had regular video call sessions with the primary

caregivers and shared the living conditions and physical functions of the patient so that we could provide instructions on how to provide care and rehabilitation methods at home.

Through the discussions with the primary caregiver, we set the following goals which were to be achieved in 2 months after the hospital discharge: 1) improvement in consciousness disturbance, 2) prevention of secondary complications, 3) to be transferred to a wheelchair by the assistance of one person, 4) to keep sitting independently, and 5) to achieve oral feeding.

The rehabilitation programmes were created in accordance with the goals, which included range of motion exercise, practice of sit-to-stand and stand-to-sit, practice of standing, swallowing training, and seating on a wheelchair. We also provided the caregivers with instructions on how to implement the home care and home rehabilitation, including experts' know-how.

As a result of the 2-month intervention, GCS improved from E1V1M1 to E3V2M6, and MMT improved from 1 to 2 both for the upper and lower limbs, whereas full assistance was still required for his ADLs. He still spent most of time on the bed, but no secondary complications like bedsores or pneumonia occurred thanks to the appropriate care by the primary caregiver. The patient introduced a reclining wheelchair with a portable toilet function, which enabled toileting and bed bathing, so the burden of care on the primary caregiver had become lightened. The patient was becoming able to spend more time outdoors in the wheelchair.

In October 2019, his ADLs were still fully dependent, but he became able to understand what the caregiver said and reply by nodding. He could sit for one hour during the day and had been free from any secondary complications like bedsores or pneumonia.

[Discussion]

Tele-rehabilitation provides people in remote areas with opportunities for receiving quality rehabilitation services, but the effect has not been confirmed by systematic review (Laver et al., 2020). The progress of telecommunication tools like social media has brought the potential for patients to continue rehabilitation at home even after leaving hospital, and such technological advancement can reduce the length of stay of stroke patients at hospitals. In this case, the length of the hospital stay was only 10 days despite the severe symptoms of stroke, including consciousness disorder. Enough rehabilitation could not be provided whilst staying at the hospital, but after the discharge, regular intervention by Kitahara's chronic-phase rehabilitation team was continued. We had regular 40-minute remote sessions with the patient and the primary caregiver every 2 weeks, and the goals set at the beginning of our intervention had been achieved.

This is a typical example of effective tele-rehabilitation. Although the primary caregiver did not have knowledge or skills in caregiving, regular video call sessions enabled the primary caregiver to continue providing effective rehabilitation to the patient. We succeeded in achieving the pre-set goals, but the training of the swallowing function was

still challenging. He had not resumed his ability for oral intake even 1 year after the onset.

Case L3. A case of cerebral infarction where the resumption of independent life was successful

[Present illness]

A 62-year-old male. On 27 February 2018, the patient was struck with motor paralysis in the upper and lower right limbs and was admitted to a provincial hospital. On the following day, he was transferred to Mittaphab Hospital and diagnosed with left cerebral infarction from the result of a CT scan and clinical symptoms. He was admitted to the general ward of Mittaphab Hospital immediately. On 7 March, his doctor in charge gave approval for starting rehabilitation. When he started rehabilitation, his main symptom was right hemiparesis, and he could walk indoors 5 metres using cane, but he needed assistance for toileting. After 9 days of hospitalisation, when he left the hospital, his walking ability was improved to 30 metres walking using a quad cane, but assistance was still needed for toileting.

[First examination at the first rehabilitation by the Kitahara rehabilitation team]

GCS: E4 V5 M6, MMT (Right side): Upper Limb: 4 - Lower Limb: 3, mRS: 4, BI: 70/100, Berg Balance Scale: 49/56.

He could feed himself independently.

[Problems before the Kitahara-style intervention]

He lived with his wife who was the primary caregiver and nine children in a single dwelling. He had already retired and was no longer working. He could drive his own car.

At the time of hospital discharge, his BI was as high as 70/100, and he could walk using a quad cane, but assistance was required for walking and toileting due to his tremor and fear whilst walking. After the discharge, excessive caregiver assistance also hindered the recovery of his physical functions. He strongly desired to walk by himself and to be able to go out shopping by car, so intervention was continued as outpatient rehabilitation.

[Kitahara-style intervention of chronic-phase rehabilitation]

Outpatient rehabilitation was carried out 5 times a week for the first week after discharge, 3 times a week in the second week, and once a week in the fourth week. Self-exercise was carried out every day at home. We set the goals of intervention, which were supposed to be achieved in 1 month after the hospital discharge, based on the discussions with the patient and the primary caregiver: 1) independent walking indoors and outdoors without a cane, 2) toileting independence, and 3) ability to drive a car. We provided instructions

to the patient and the primary caregiver about the practical procedures of training, the number of reps, and frequency. We also called the attention of the caregivers to preventing the patient from falling down and managing his blood pressure. Too much caregiver assistance was strongly discouraged, and the caregiver was encouraged to let the patient carry out the ADLs as independently as possible.

Three weeks after discharge, MMT improved from 4 to 5 for the upper limb and 3 to 5 for the lower limb. The Berg Balance Scale improved to 56 points and fear whilst walking was eliminated. He resumed the ability of independent indoor/outdoor walking 1 month after discharge, and toileting also was independent then. Two months after discharge, he could confidently go outside within the town where he lives independently. As of October 2019, the patient could go shopping with his wife in a car driven by himself, and walking around the house was part of his daily routine.

[Discussion]

Caregivers' knowledge is crucial for unlocking the potential of people who need care. In this case, the primary caregiver did not have enough knowledge of care for older people and provided more assistance than was required. Excessive assistance limits the chances for people who receive care to practice ADLs independently, such as walking and toileting.

We showed both the patient and the primary caregiver the expected outcome of the rehabilitation. Letting the clients of rehabilitation understand the possible recovery level of their physical functions is crucially important to motivate them to practice their training. In this case, the patient resumed the ability to go out independently, even using a self-driving car. If rehabilitation succeeds in recovering the ADLs of clients, the caregiving burden on the family members and caregivers can be reduced, physically and economically. This case is one example of such a successful case.

#### Case L4. A putaminal haemorrhage case who could return to work

[Present illness]

A 42-year-old male. On 19 August 2018, the patient experienced motor paralysis in his lower left limb and was taken to a provincial hospital in Thailand by his family. He was diagnosed with a right putaminal haemorrhage according to a CT scan. After 3 weeks of hospitalisation there, he was transferred to and stayed at a rehabilitation centre in Vientiane for 4 weeks. He also received outpatient rehabilitation for 5 months after leaving the rehabilitation centre. He could walk independently without an assistance tool, but he was not satisfied that his condition did not allow him to work again. He consulted our facility and outpatient rehabilitation was started at Mittaphab Hospital in June 2019.

[First examination by the Kitahara chronic-phase rehabilitation team]

GCS: E4 V5 M6, MMT (Left side): Upper Limb 2 - Lower Limb: 4, ROM (Left side): shoulder flexion 100 degrees - elbow flexion 110 degrees - forearm supination 60 degrees - wrist flexion 70 degrees - wrist extension 40 degrees - 2nd to 5th distal and proximal interphalangeal extension 20 degrees, mRS: 3, BI: 95/100.

[Problems before the Kitahara-style intervention]

He lived with his wife and two children in a single dwelling. His profession was related to information technology, and he used a computer most of the time whilst working. He could drive his own car. He is a right-handed person.

At the first examination by us, most of his ADLs were independent, but the joint range of motion of the left fingers and forearm was restricted, leading to a restriction of voluntary movement. He had received rehabilitation training for several months, but it seemed that his training was not directly related to the skills that were required for his job. This was the reason why he could not return to work by then. He was the breadwinner of the family, so he had a strong desire to return to work.

[Kitahara-style intervention of chronic-phase rehabilitation]

Outpatient rehabilitation was performed for an hour, three times a week. This continued for 1 month. We sent the following goals which were supposed to be achieved 1 month after starting our rehabilitation services based on the discussions with the patient: 1) improvement in the voluntary movement of the upper left limb and 2) return to work. The rehabilitation programme included range of motion exercise, scapular mobilisation, muscle strengthening, and practice of in-hand manipulation. We shared the information on the procedures, number of reps, frequency, important points, etc. with the patient to let him practice the training at home. We also supported his return to work. We had regular meetings with his office and shared the information on the prognosis of his physical functions. We discussed the possible time of his return and the jobs he could be assigned whilst considering his status. We were also pleased to answer the concerns his office presented to us.

One month after starting intervention, MMT improved from 2 to 3 for the upper limb, and 4 to 5 for the lower limb. Range of motion (left side) also improved to 130 degrees for shoulder flexion, 130 degrees for elbow flexion, 80 degrees for forearm supination, 80 degrees for wrist flexion, 60 degrees for wrist extension, and -10 degrees for 2-5th distal and proximal interphalangeal extension. The patient had needed assistance for dressing before intervention but was completely independent after 1 month of intervention.

Two weeks after our series of intervention was completed, he returned to work but started with low labour intensity. His commuting was supported by his family. Two months later, although his operating speed was slower than before the onset, he could

work 5 days a week, from 9am to 4pm. In October 2019, 3 months after our intervention started, the patient could go to work using a self-driving car. Efficiency in his computer operation reached 80% of his previous skills before the onset. This case shows the importance of the assistance of co-workers for patients to return to the office.

[Discussion]

In this case, the Kitahara-style intervention began 10 months after the onset. The major problem of this patient was the decrease in flexibility of his fingers, not just paralysis. We administered the training focusing on the improvement in flexibility. More importantly, the main factors of the achievement of his goal, returning to work, were his motivation for self-exercise at home and the coordination with his office to realise his come-back.

Lao PDR has the facilities to provide functional training, ADL training, and vocational training for deafness, cerebral palsy, and spinal cord injury in Vientiane, but no agency provides support for stroke patients to return to work. The number of stroke patients is increasing in the Lao PDR, so such support services are urgently required.

#### Case L5. A case of old cerebral infarction who benefitted from effective community support

[Present illness]

A 70-year-old female. In 2011, the patient experienced paralysis in her upper and lower left limbs and was taken to Mittaphab Hospital by her family. She was diagnosed with cerebral infarction according to a CT scan and clinical findings. The main sequela of this case was mild left hemiparesis. Indoor walking was independent, but outdoor walking required support. She started Kitahara-style chronic-phase rehabilitation in June 2018.

[First examination by the Kitahara chronic-phase rehabilitation team]

GCS: E4 V5 M6, MMT (Left side): Upper Limb 4 - Lower Limb: 4, mRS: 3, BI: 85/100.

Outdoor walking for long distances was difficult due to low endurance.

[Problems before the Kitahara-style intervention]

She had four family members, including her, and lived in a single dwelling. Other family members had jobs out of the house, so the patient was alone at home during the daytime. She had few opportunities to go out and spent most of the time at home.

In this case, left hemiparesis and the resulting muscle weakness of her left side created an unbalance of her body whilst walking, and this was why mild support was required for walking outdoors. Other family members were too busy working to help her to go out. As a result, her social interaction was very limited, and her life heavily relied on her family, although her ADLs were independent.

[Kitahara-style intervention of chronic-phase rehabilitation]

She did not have any family members who could provide her with transport from her house to our rehabilitation office, but, luckily, another stroke patient who required rehabilitation lived in the same area. We suggested that both could receive rehabilitation services together and asked the local community members to provide transport to them.

Rehabilitation was carried out for 1 hour per visit, 2–4 days a week. We set the goals of this intervention together with the patient: 1) improvement in voluntary movement of the upper and lower left limbs and 2) independent outdoor walking. An intervention programme was created, and instructions to the patient were provided like in the other cases in the Lao PDR shown above. Self-exercise was encouraged to increase the patient's activities at home, and improvement of her walking balance which was impaired due to unbalanced muscle strength was sought.

Two months after the intervention was started, MMT improved from 4 to 5 for the upper limb, and 4 to 5 for the lower limb. Walking stability and improvement in standing position balance were achieved, and independent walking became possible. After outpatient rehabilitation was completed, interaction between the two patients who received rehabilitation services together increased, and they started to visit each other's houses.

As of October 2019, more than 1 year after intervention was completed, indoor and outdoor walking was independent, and the patient could live without falling.

[Discussion]

This case provides a good example in the following two points.

- Even for the case of old cerebral infarction, chronic-phase rehabilitation could bring an improvement in the quality of life of the client. In this case, the client started chronic-phase rehabilitation about 7 years after the onset.
- The support of the local community enabled the client to benefit from rehabilitation services. Without such support, she would not be able to come to our rehabilitation facility due to a lack of transport. Mutual support within local communities is a very important factor which can bring success in the intervention of chronic-phase rehabilitation.

### **2.4.3. Cases in Viet Nam**

#### Case V1. A case of subarachnoid haemorrhage provided with home-visit rehabilitation

[Present illness]

A female patient in her 60s. The patient suffered a subarachnoid haemorrhage and cerebral haemorrhage. She was admitted to Bach Mai Hospital and coil embolisation was performed for the cerebral aneurysm. Hematoma was observed in the left frontal lobe, putamen, and thalamus. She was hospitalised for 2 months. When she left hospital, she

still had moderate quadriplegia, disorders of diminished motivation, and attention deficit. She also had tracheostomy made. Nutrition was provided through a nasogastric tube. Four months after the onset, she consulted Kitahara's rehabilitation team and home-visit rehabilitation began on 28 December 2018.

[First examination by Kitahara's chronic-phase rehabilitation team]

GCS: E4 V1 M5, MMT: right upper limb 1 – right lower limb 1 - left upper limb 2 - left lower limb 2, mRS: 5, BI: 0/100.

Disorders of diminished motivation and attention deficit were observed, possibly due to frontal lobe dysfunction.

She was bedridden, and her ADLs were fully dependent on caregivers. She had difficulty in speaking due to tracheostomy, but she could understand simple instructions.

[Problems before the Kitahara-style intervention]

The patient spent most of her time in bed. The primary caregiver was a domestic worker and she took care of the patient 24 hours a day. Before the onset, the patient lived with her husband, whilst her son's family lived nearby. When she left hospital, she moved to her son's house rather than her house. Required care was mostly provided by the domestic worker not by the family members. They had a suction machine and nursing bed at home. The patient was dependent on nasogastric feeding.

Consciousness disturbance gradually improved for months after the onset. She continued rehabilitation at home instructed by a local hospital for 2 months after the hospital discharge. Due to the consciousness disturbance, disorders of diminished motivation, and attention deficit, she had very little voluntarily exercise. The caregiver provided any care required for her daily living without considering her residual functions even after the stroke, and the patient had few opportunities to regain her potential physical and mental functions. She did not have a wheelchair, so she could not move out of bed.

[Kitahara-style intervention of chronic-phase rehabilitation]

Rehabilitation was provided twice a week at home, and the duration of one session was 45 minutes from 28 December 2018 to 25 June 2019. We encouraged the caregiver as well as the family members to let the patient do whatever she could and to avoid over-assistance. We instructed them how to help the patient sit up, move from the bed to the wheelchair, and get in and out of a car to facilitate the movement of the patient. We showed them the practical training for feeding and dressing so that they could also practice at home. We also assessed the patient's swallowing function and the function of her respiratory system. As the consciousness disturbance was getting better day by day, the swallowing function and respiratory function were also improved. We consulted a



doctor from Viet Duc University Hospital asking if the tracheostomy tube could be removed and the tracheostoma could be closed to improve the swallowing function. The tracheostomy tube was removed on 16 January 2019. We continued to provide swallowing exercises even after the tracheostomy tube de-cannulation, and the patient was able to feed by mouth at the beginning of February 2019. We recommended them to purchase an easy-to-use wheelchair which had swing-away leg-rests because it could let her have a good posture on the seat and could be seated comfortably. To improve home accessibility using the wheelchair, a ramp was installed in front of the house.

As a result of our intervention, her tracheostomy was no longer needed and she could resume oral feeding. She became able to sit up and transfer to a wheelchair if assistance was provided. Opportunities to go out with the family or the caregiver by wheelchair increased.

[Discussion]

Kitahara's chronic-phase rehabilitation team started home-visit sessions 4 months after the onset of subarachnoid haemorrhage. Instructions to the caregiver and family members and the adjustment of the living environment could increase the opportunities for the patient to move around within and outside of the house. As of July 2019, almost 1 year after the onset, the physical function and communication ability of the patient were still improving.

In Viet Nam, some families employ domestic workers as caregivers, in case their family members' physical and mental functions deteriorate and they need care to maintain their daily lives. Most of these domestic workers do not have the necessary knowledge or skills required for caregiving, so it is not possible for them to provide suitable care in accordance with the functional status of the clients. The key to the success in this case was the education to the caregiver and family members through home-visit sessions so that they could understand the importance of letting the patient try to do as much as possible to maximise her residual functions.

#### Case V2. A case of old cerebral infarction whose main symptom was ataxia

[Present illness]

A male patient in his 60s. On 1 April 2018, the patient experienced a cerebral infarction during a trip to the United States and was admitted to a hospital there for 5 days. He was then discharged from the hospital and returned to his family's house in the United States. He returned to Viet Nam in August 2018. ADL was independent, however, mild right hemiparesis and ataxia were observed. He desired to walk faster and visited the outpatient department of Viet Duc University Hospital on 13 February 2019. He was referred to Kitahara's rehabilitation team on the same day.

[First examination by Kitahara's rehabilitation team]

GCS: E4 V5 M6, MMT (Right side): Upper limb 4 - Lower limb 4, mRS: 2, BI: 100/100.

Finger-to-nose test and heel-to-shin test showed he had dysdiadochokinesia.

Single-leg stance test: Right 3 seconds - Left 10 seconds.

10-metre walking test: 16 seconds (24 steps).

[Problems before the Kitahara-style intervention]

The patient lived with his son, his son's wife, and a grandchild. He had already retired and did not have a job. His daily routine was early-morning exercise outdoors. His ADLs were independent and could go up and down the stairs independently, but long-distance walks made him easily tired. The range of his outdoor activities was restricted due to his slower walking speed and impaired endurance whilst walking.

[Kitahara-style intervention]

Outpatient rehabilitation was carried out every day for 45 minutes per session for 10 days. We identified that his main problem was ataxic movement and hyperactivity of his left hip flexor muscles and trunk extensor muscles as compensation for ataxia, so we focused on the improvement of his body stability and posture support in our intervention. Specifically, our intervention aimed at the improvement of the flexibility of his body trunk and left hip joint so that his right hip muscles would be balanced with the other side. We also provided him with instructions on self-training at home. The contents of the self-training were created in accordance with the results of his posture and movement analysis.

On the last day of outpatient rehabilitation, the result of the single-leg stance test of his right leg was improved to 10 seconds, which was same as the unaffected left side. The 10-metre walking test was improved to 12 seconds (20 steps). The patient had understood the method of self-training and practiced it at home.

[Discussion]

In this case, the Kitahara intervention started 10 months after the onset, but improvement in body balance and gait speed was achieved through the implementation of the appropriate training, including self-training. We have found that some patients with mild symptoms do not like listening to the recommendations of rehabilitation professionals and perform training in their own ways. Such patients, in many cases, fail to improve their physical functions to their maximum potential, resulting in an increase in the burden on themselves. We administered to this patient a concentrated intervention of rehabilitation in a short period, and this case shows that such a short intervention could achieve a desirable outcome, even for the patients with mild symptoms and chronic cases.

Case V3. A case of recurrent cerebral infarction with hemiplegia and severely impaired ADLs

[Present illness]

A male patient in his 60s. The patient suffered cerebral infarction, resulting in right hemiplegia. Rehabilitation began on the 12th day from the onset. The patient was discharged after 64 days of hospitalisation at an acute care hospital and then returned home. After discharge, outpatient rehabilitation was carried out three times a week. He had been undergoing haemodialysis three times a week since before the onset of the cerebral infarction at the time. He had suffered another cerebral infarction 3 years before this attack, but no obvious physical functional disability had been observed after the previous attack.

[First examination by Kitahara's chronic-phase rehabilitation team]

GCS: E4 V2 M6, MMT (Right side): Upper limb 1 - Lower limb: 2, mRS 5, BI: 10/100.

Patient had slurred speech and aphasia.

His ADLs were almost fully dependent, and he was fed through a nasogastric tube.

[Problems before the Kitahara-style intervention]

The patient lived with his son and his son's wife. He had already retired. The house was a single dwelling with three stories. The patient's bedroom was on the middle floor, whilst the eating space of the family was on the ground floor. He did not go down to the ground floor for feeding because of difficulty in using the stairs as well as the incapability of oral feeding, which hindered him from enjoying mealtimes with the family. When he left hospital, he purchased a reclining wheelchair. Handrails were also installed along the stairs in the house.

From the onset, the patient was bedridden for 2 weeks. When he left hospital, he was using a wheelchair, but he could not walk on his feet even for a short distance. He needed to improve his endurance for physical activities, but it was not easy to increase the level of activities. His family members were more than willing to provide care for the patient, but their excessive assistance could have hindered his functional recovery after stroke.

[Kitahara-style intervention]

Outpatient rehabilitation was carried out 60 minutes per session, three times a week for a total of 28 sessions. Home-visit sessions were also implemented once a week. At outpatient rehabilitation, the training focused on improving the body balance function and gait stability. We encouraged the family members to continue the training as home care and increase the physical activities of the patient. During the home visit, we checked his living arrangements at home and advised them to install a handrail along the stairs

and renovate the bathroom to make his toileting and bathing easier. A special chair for the shower room was also installed. We also demonstrated actual training that could be done within the house for the improvement of his gait and ADLs, such as getting up from bed, walking through the narrow hallway, and going up and down the stairs.

We started to provide swallowing exercises on the 23rd day from the onset day. The patient resumed his oral feeding function on the 28th day from the onset day.

As a result of our intervention, mRS was improved to 4, and BI also increased to 60. He became able to walk within the house if assisted, and other ADLs were also improved, although he still needed some assistance. He stayed only on the middle floor of the house without coming downstairs when he returned home from hospital, but after our intervention, he more often comes downstairs to have meals with his family and his oral intake was resumed instead of using a tube feeding.

[Discussion]

Because of the long bed-ridden period, the patient lost his tolerance for physical activities. We tried to increase his capacity for physical activities through the training and the adjustment of his living environment, such as the instalment of handrails and the renovation of the bathroom. We also encouraged him and the family members to have meals together downstairs so that he could be motivated to go down the stairs from upstairs where he usually stayed. Before our intervention, his family had believed that the patient was not able to come downstairs, so he fed himself alone upstairs. He also became able to bathe using the shower chair with assistance from his family members thanks to the renovation of the bathroom.

During the home-visit rehabilitation, we always assessed his functions and his living arrangement and advised him and the family members on the renovation of his living environment based on our assessment. We believe the home-visit session was quite effective for the improvement of the ADLs of the patient because we could find solutions for the specific problems faced by the patient and his family. They could also understand how to practically carry out the training at home. This case shows the potential of rehabilitation services for patients who are severely disabled.

## **2.5. Suggestions for the improvement of QOL of the brain injury patients and families**

We reported the results of the questionnaire survey targeting the family members of brain injury patients, field surveys of selected hospitals, and case studies that were conducted in Cambodia, the Lao PDR, and Viet Nam. The strength of our studies is the data collected from the practical sites of chronic-phase rehabilitation. In this section, we would like to make several suggestions to improve the lives of brain injury patients and their caregivers, most of whom are family caregivers, which are derived from our experiences of the practical sites of rehabilitation.

## **1) Multi-stakeholder collaboration, telecommunication tools, and increase of awareness**

The healthcare systems in Cambodia, Lao PDR, and Viet Nam do not necessarily have enough capacity to provide satisfactory chronic-phase rehabilitation services, especially in rural areas. Coupled with the ignorance of the effect of chronic-phase rehabilitation amongst the people there, it is expected that insufficient healthcare systems fail to recover and optimise the residual functions of stroke patients whose ADLs are so impaired that care provision is required. In these countries, long-term care is mainly provided by family caregivers. As a result, quite a few families who have stroke patients with severe disabilities face an economic and social burden to take care of patients who have failed to improve their functions because of the lack of chances to undergo appropriate rehabilitation services.

Considering the sequelae of stroke which greatly restricts the ADLs of patients, stroke cases have a considerable impact on the families and even the communities, economically and socially. Particularly in such areas, as stated in the previous paragraph, where healthcare systems cannot necessarily provide enough services, collaboration amongst basic healthcare service providers is crucial, from the bodies involved with disease prevention, to acute care, rehabilitation, and long-term care. Not only the public sector but also private businesses have the potential to contribute to the improvement of services, for example long-term care services. Providing such basic services universally is more important than expanding specialised services.

Medical institutions and staff are often concentrated in urban areas, so the use of telecommunication tools has the potential to make it possible to deliver the services of urban areas to rural areas. For example, we succeeded in showing through the examples in this chapter that the instructions for continuous rehabilitation for stroke patients after hospital discharge could be provided even to patients in rural areas through online sessions. The education of medical staff personnel engaged in rehabilitation and long-term care could also be provided using telecommunication tools.

Improvement of the awareness of diseases and their prevention methods, as well as the skills and knowledge of long-term care, is also needed not only for healthcare personnel but also for the families of patients. Such educational activities will strengthen the capacity of societies and communities to mitigate the impacts of the increasing number of stroke patients that will take place as populations age.

## **2) Reintegration of patients with brain damage and social security**

Most patients with brain damage have disabilities, and the extent of their disabilities varies considerably. In Cambodia, the Lao PDR, and Viet Nam, such patients can somehow receive medical rehabilitation services at acute care hospitals, but most of them face difficulties in adjusting their daily lives to the impaired physical and mental functions after they leave hospital for home. Particularly in the case of the patients who are in the

productive-age population and who are breadwinners for their families, it can be a really critical issue whether they can resume working as before the attack or not. In these three countries, where social security systems are developing, it would be difficult for them to expect enough specific support that facilitates the social reintegration of the patients with brain damage, such as employment support, vocational rehabilitation, or other programmes aiming for promoting the independent lives of brain damage patients.

We believe proper assessment of the residual functions of the patients and the understanding of the needs of employers are the most important factors to encourage the employment of people with disabilities. Rehabilitation professionals are in the best position to mediate between them. Both patients and employers have concerns and anxieties regarding being employed and employing. Rehabilitation professionals can understand both concerns and bridge the gap between the two parties as stated in this chapter. All three countries have limited human resources for the promotion of the re-employment of stroke and brain trauma patients. We consider that rehabilitation professionals are required to be involved with not only medical rehabilitation but also social and vocational rehabilitation in societies with scarce human resources.

In Southeast Asia, which has one of the fastest growing aged population in the world, we can find some remarkable activities that promote the social inclusion of older people living with disabilities. For example, at the Cho Ray Hospital in Ho Chi Minh City, leisure activities such as group exercises and group singing are provided targeting patients who have received treatment for stroke or traumatic brain injury and left for home. The participants of these activities have improved self-efficacy and mobility. As another example, a NPO called Rehab-Care for ASIA has established a daycare centre in the Photharam District, Ratchaburi Province, Thailand, with the cooperation of the Ministry of Health, local governments, hospitals, and volunteer organisations to contribute to the promotion of the social participation of the community's frail and bedridden older people, and they are succeeding in reducing the number of bedridden people in the region. The key to the success of these cases is the collaborative approach, which integrates the activities of communities, local authorities, NGOs, hospitals, schools, and even the national government. Such an approach can strengthen the mutual support of communities and promote the social inclusion of people with disabilities.

Social security systems like disability pensions do exist in these three countries, but it cannot be said that the systems are fully utilised, probably because the expected beneficiaries do not know about the systems well. Many brain damage patients have difficulty in working due to the aftereffects, as well as the expenses, of treatment. It is encouraged to raise the awareness of social security programmes and services available amongst not only patients and their families but also healthcare providers so that the benefit of social security systems can reach the people who really need it.

### **3) Support for family caregivers**

In many countries and societies, the main caregivers for older people used to be or still are family members and community members. In the contemporary world where demographic transition and urbanisation are taking place, more people go to work outside of the house, including women who mainly take the role of caregiving in many cultures, and family size is shrinking as a result of demographic change. Such change in social structure undermines the capacity of caregiving of families and communities. The three study countries are not an exception.

Patients with severe brain injury often require considerable assistance in ADLs. Acute phase rehabilitation provided by acute care hospitals can improve the physical and mental functions of the patients to some extent, but in most cases, long-term care, which can be extensive care from toileting to bathing, etc. is still required even after they come back home, and such care work can impose a physical and mental burden on family caregivers. Family caregivers need the chance to take respite.

In countries that have developed welfare systems for older people, facilities that provide respite to family caregivers have been established, such as nursing homes, daycare centres, and short stay units, etc.

In Cambodia, the Lao PDR, and Viet Nam, only few such facilities can be found, but Sunrise Japan Hospital Phnom Penh in Cambodia offers a short-stay package for the respite of family caregivers. The hospital provides beds in a ward and rehabilitation services, but it charges lower prices than for regular hospitalisation.

Also, in Sunrise Japan Hospital Phnom Penh, individualised sessions to instruct how to provide care are provided to the patients and family members, such as care for bed-ridden people and those who need wheelchairs. For the severest cases, instructions are provided almost every day from admission to discharge. Even after leaving the hospital, family members are encouraged to participate in outpatient rehabilitation sessions so that they can learn how to let the patients exercise at home and how to interact with the patients.

The business of institutionalised care, like nursing homes, is still not easy to develop in these three countries because the number of people who can afford the high cost of private nursing homes is still very limited. Caregivers who have professional skills and knowledge are also scarce. Strong filial piety can also be considered to be a major reason for families' aversion to institutionalised care facilities.

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