

ARTICLE



Health care and rehabilitation services utilization, benefits and satisfaction: a community survey of individuals with spinal cord injury in Thailand

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STUDY DESIGN: Cross-sectional study.

OBJECTIVES: This study aimed to explore and report on health care and rehabilitation service utilization, rehabilitation service benefits, and levels of satisfaction of individuals with spinal cord injury (SCI) living in communities in Thailand.

SETTING: Four rehabilitation facilities in Thailand, two university hospitals (Maharaj Nakorn Chiang Mai Hospital in Chiang Mai Province and Siriraj Hospital in Bangkok), one large provincial hospital (Ratchaburi Hospital in Ratchaburi Province), and one national rehabilitation institute (Sirindhorn National Medical Rehabilitation Institute in Nonthaburi Province).

METHODS: This study was part of the International Spinal Cord Injury Community Survey (InSCI). Individuals with SCI completed a set of questionnaires, then data related to their health care and rehabilitation services were extracted and analyzed.

RESULTS: Of the 320 participants, most were male (71%), and the majority were living with paraplegia (73%). In cases of mild illnesses where hospitalization was not required, 46% went to a nearby health service hospital. In cases of serious illnesses where hospitalization was required, 39% went to a higher-level hospital. The majority (80%) were satisfied with their experience with health care services. The three top preferred products and services in descending order were wheelchairs and cushions, increased disability pension, medication and medical equipment including bladder relaxants, urinary catheters and urine bags.

CONCLUSIONS: Individuals with SCI living in communities in Thailand preferred treatment at a nearby district hospital for mild illnesses with one-third transferring to a higher-level hospital for serious illnesses. The majority were satisfied with the health care services and rehabilitation services.

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INTRODUCTION

Most published reports on spinal cord injuries (SCI) in Thailand have focused on epidemiology and outcomes of the acute phase and on post-acute rehabilitation and have been mainly from a single institute [1–5], with very few multi-center studies [6, 7]. The incidence of SCI in Thailand has been reported to be 23 cases per million per year [2]; however, that study was based on data from a single province. No prevalence or incidence rate of SCI have been reported for the entire country [5]. Length of stay for the acute phase was between 4 and 6 weeks, depending on the severity of the lesions, associated injuries, and complications such as infection [6]. Early post-acute rehabilitation and treatment at a specialized SCI rehabilitation facility (SSRF) showed better outcomes with fewer complications [6, 7]. However, there are few provincial level hospitals providing inpatient rehabilitation services [8] and no specialized centers dedicated solely to SCI [5].

Thailand is officially divided into six regions: Northern, Northeastern, Western, Central, Eastern, and Southern. There are three main health insurance schemes operating in Thailand,

the Civil Servant Medical Benefit Scheme (CSMBS) for government officers and their families; the Social Security Scheme (SSS) for workers, and the Universal Coverage (UC) scheme for individuals not included in either of the first two schemes. The National Health Security Office (NHSO) is responsible for individuals under the UC scheme, providing health security for 80% of the people living in the country [5]. In Thailand, health care facilities under the Public Health Ministry are divided into four groups: A, advanced-level; M, middle-level; S, standard-level and F, first-level hospitals. Another group of facilities are university hospitals, most of which have rehabilitation wards, primarily for neurological patients who need rehabilitation and treatment of related complications [5, 9].

Regarding post-acute rehabilitation services, the Ministry of Public Health and NHSO recently launched an intermediate care service plan, Intermediate Care (IMC). Initially, IMC was intended to improve accessibility to post-acute rehabilitation services during the first 6 months following the onset of a stroke, SCI, or traumatic brain injury (TBI). However, a recent report on IMC by the Health Resource

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Research and Development Office [10] indicated that inpatients received adequate rehabilitation services, but that those services had a high operating cost and poor accessibility. To improve access to rehabilitation services, outreach physical therapy services at a nearby district hospital or private physical therapy clinics has been suggested. Noteworthy, of the nearly 800 cases recruited for the IMC study reported by the Health Resource Research and Development Office, only 2% were SCI patients [10]. To evaluate the effectiveness of the IMC plan, especially for individuals with SCI, it was necessary to follow patients who had been rehabilitated primarily by physical therapists and compare their outcomes with those rehabilitated at a high-level hospital by specialized, comprehensive, and interdisciplinary rehabilitation teams.

According to World Health Organization (WHO) and International Spinal Cord Society (ISCoS) recommendations, there is a need to increase and improve data collection and research on SCI in order to improve health services [11]. To date, there have been no reports on the utilization of health care and rehabilitation services by persons with SCI living in Thailand. The objective of this study was to investigate health services utilization as well as the benefits received and levels of satisfaction of persons with SCI living in Thai communities to use as baseline data for comparison of the efficiency and effectiveness of rehabilitation programs before and after implementation of the IMC.

METHODS

This cross-sectional study was part of the International Spinal Cord Injury Community Survey (InSCI) project, which was designed to explore life experiences of people with SCI living in communities in 22 countries worldwide [12]. When the present study was initially planned, no national spinal cord injury registry had yet been established. For that reason, we planned to recruit individuals with SCI from at least one hospital in each of the six regions. However, physiatrists from only four facilities agreed to join the survey. These included one rehabilitation institute, Sirindhorn National Medical Rehabilitation Institute in the Central region, one large provincial hospital, Ratchaburi Hospital in the Western region, and two university hospitals, Maharaj Nakorn Chiang Mai Hospital in the Northern region and Siriraj Hospital in Bangkok, the capital of Thailand. The survey was conducted between February 1st, 2017 and August 31st, 2018. The study protocol was approved by the Institutional Ethics Committee of each of the participating health care facilities.

Thai citizens with either traumatic or non-traumatic SCI aged >18 years who lived in a community after their SCI and who had visited at least one of the above-mentioned hospitals during the study period were invited to participate, i.e., convenience sampling. No predefined sampling frame was applied. All individuals with SCI who were invited to join agreed to participate in the study, compatible with an acceptance rate of 100%. After receiving informed consent, each participant was asked to complete the InSCI questionnaire, the first part of which was the international module [13] and the second part was the Thai national module (Supplementary Information). The latter consisted of 10 groups of questions aimed at exploring health care and rehabilitation services utilization experience and benefits.

Participants were asked to complete the paper-based questionnaire in the outpatient clinic. If an individual preferred an in-person interview, one of the research team members would read each of the questions and the related choices to them one by one until all questions were completed. Responsible researchers at each study site scanned the paper questionnaires and sent the digital copies to the principal investigating center of the country where a trained research assistant input the data into the online system provided by the InSCI study center (Swiss Paraplegic Research, Switzerland). The study center checked all the submitted data, reporting suspected errors to the country leader (AK) who rechecked, corrected, and finalized the data. After all the data had been cleaned by the country leader (AK), the study center analyzed the data and sent a report of the first part of the InSCI questionnaire to the country leader. Data of the second part of the questionnaire, i.e., the Thai National Module, were cleaned by the country leader (AK) and were analyzed by the principal investigating center team (AK and SP). Demographics and SCI characteristics plus health care utilization experience, rehabilitation service benefits received, and satisfaction with the health care and rehabilitation

services were extracted from the first and the second parts of the questionnaire. It is noteworthy that since neurological examination of SCI patients was not performed, it was not possible to obtain a current American Spinal Injury Association (ASIA) Impairment Scale (AIS). For that reason, the level and severity of SCI was reported as either tetraplegia or paraplegia and as either complete or incomplete SCI. Health care services utilization by all participants was classified into two categories: mild illnesses which patients thought that they were probably treated with medications and not requiring hospital admission and serious illnesses which patients thought that they probably required hospital admission for treatment. The extracted data are reported as number and percent for categorical variables and as mean and standard deviation (SD) for continuous variables.

RESULTS

Demographics and SCI characteristics

Table 1 shows the demographics and SCI characteristics of the 320 participants included in the survey. The majority were males, middle aged, and living in urban areas or suburbs. Regarding health insurance status, 63% were included in the universal health coverage (UC) scheme and at the time of the survey 70% had already been registered as persons with disabilities (PWDs). As to SCI characteristics, 86% had a traumatic cause, 64% had a thoracic-lumbar spine injury, and 73% were paraplegia. In addition, 68% reported having normal hand function, 28% had useful but not normal hand function, and 5% no hand function at all.

Health care services utilization

Table 2 shows details of health care services utilization by all participants. For mild illnesses, 46% went to a nearby health facility, whereas 27% went to a very large provincial or a university hospital. The two main reasons for choosing a health service facility were being located near the participant's residence (63%) and that the hospital was registered as their primary hospital (32%). Most of the health service facilities (82%) were within 20 km of the participants' residence and 86% were less than an hour away. Most (70%) used a private motor vehicle, and 66% reported the cost of transportation to be 100 baht (~3.3 USD) or less.

For a more serious illness, 61% went to the same facility as for a mild illness, but 39% preferred going to a higher-level hospital. In the latter group, 68% went to a university or large provincial hospital. The two main reasons for choosing higher-level health service facilities were being cared for by specialists (64%) and good service (40%). In addition, 70% traveled to the facility in a private motor vehicle. Nearly half (47%) had to travel <20 km to the hospital, and of that group 83% reported the cost of transportation was about 500 baht (~16 USD) or less.

Experience and satisfaction with health care providers

Table 3 shows the categories of health care providers which the participants had visited in the 12 months prior to the survey. The top five were rehabilitation or SCI physicians (83%), physical therapists (39%), primary care physicians (general practitioner (GP) or family doctor) (37%), nurses (34%), and other specialist physicians (29%). Purposes of visiting rehabilitation physicians included obtaining medications and equipment, e.g., urinary catheters, urine bags, wound dressing materials, and antiseptics (84%), yearly urological check-ups (59%), and treatment of complications (43%). In terms of SCI severity, the percentages of persons with tetraplegia and persons with paraplegia who visited health care providers were comparable with the one exception of home health care workers (persons with tetraplegia 15% vs persons with paraplegia 7%) (Table 3). We found that ~10% of the participants needed health care but did not get it.

Figure 1 shows that over 90% of the participants reported a good to very good health care experience, i.e., being treated respectfully, receiving a clear explanation of the situation, and

Table 1. Demographic Data of Participants ($n = 320$).

Variables	
Sex, male, n (%)	228 (71)
Age at time of the survey, mean (SD)	45.0 (15.6)
Age at time of SCI, mean (SD)	36.6 (16.4)
Year since the injury, mean (SD)	10.0 (8.5)
Living with others, n (%)	307 (96)
Getting day-to-day assistance, n (%)	230 (72)
Years of education before injury, mean (SD)	9.48 (5.16)
Years of education after injury, mean (SD)	0.432 (1.91)
Region of living, n (%)	
North	219 (68)
Central	66 (21)
West	17 (5)
Others and not specified	18 (6)
Living place, n (%)	
Urban	77 (24)
Suburb	150 (46)
Rural	92 (29)
Not specified	1 (1)
Health insurance, n (%)	
Universal coverage scheme (disabled)	185 (58)
Universal coverage scheme	18 (6)
Social security scheme (disabled)	40 (12)
Social security scheme	18 (6)
Government service scheme	49 (15)
State enterprise scheme	7 (2)
Others (private insurance, self-payment, and not specified)	3 (1)
Cause of SCI, traumatic, n (%)	276 (86)
Level of SCI, n (%)	
Cervical	102 (32)
Thoracic	96 (30)
Lumbar	110 (34)
Not known	12 (4)
Severity of SCI, n (%)	
Tetraplegia, complete	23 (7)
Tetraplegia, incomplete	59 (19)
Paraplegia, complete	118 (37)
Paraplegia, incomplete	116 (36)
Not known	4 (1)

SD standard deviation, SCI spinal cord injury.

being involved in making decisions regarding their treatment. Overall, 80% were satisfied to very satisfied with their health care services experience.

Benefits of rehabilitation services

Participants were asked to rank the top five of 12 services, including medical, vocational and social rehabilitation, that they considered "benefitted" their lives. The rank scores were converted to rating scores. The five with the highest scores were, in descending order, wheelchairs and cushions, increased disability pension, medications and equipment such as urinary catheters, urine bags, and wound dressing materials, products for

Table 2. Health Services Utilization.

	Mild illness (No admission needed) ($n = 320$) Number (%)	Serious illness (Admission needed) ($n = 125$) Number (%)
(a) Type of hospital		
F-level (Health promoting center)	39 (12)	0 (0)
S-level (Small district hospital)	109 (34)	19 (15)
M-level (Large district/provincial hospital)	50 (16)	14 (11)
A-level (Large provincial/university hospital)	87 (27)	85 (68)
Private hospital/clinic	15 (5)	6 (5)
Other (drug store, self-treatment, not specified)	20 (6)	1 (1)
(b) Reasons of choosing a hospital*		
Near one's living place	201 (63)	34 (27)
Hospital registered according to health insurance	103 (32)	37 (30)
Specialization	82 (26)	80 (64)
Good service	73 (23)	50 (40)
Self-treatment	4 (1)	0 (0)
Others or not specified	0 (0)	6 (5)
(c) Distance to health facility		
<5 km	113 (36)	13 (11)
5–20 km	148 (46)	53 (42)
>20 km	55 (17)	59 (47)
Not specified	4 (1)	0 (0)
(d) Travel time to facility		
<0.5 h	184 (58)	28 (23)
>0.5–1 h	90 (28)	53 (42)
>1 h	42 (13)	44 (35)
Not specified	4 (1)	0 (0)
(e) Type of transportation		
Private motorcycle	42 (13)	10 (8)
Private motor car	183 (57)	77 (62)
Public transport/hired motor vehicle	25 (8)	16 (13)
Free ambulance service	31 (10)	13 (10)
Other/not specified	39 (12)	9 (7)
	Mild illness	Serious illness
(f) Cost of transportation		
100 baht (3.3 USD) or less	211 (66)	56 (44)
101–500 baht (3.3–6 USD)	68 (21)	48 (38)
>500 baht (6 USD)	37 (12)	21 (17)
Not specified	4 (1)	

Data of all participants for mild illness ($n = 320$) and of those who changed to higher-level facilities for treatment of more serious illness ($n = 125$). km kilometer, USD United State Dollar.

*Participants could choose more than one.

improving home living conditions and free transport to and from the hospital (Table 4). Weekly home therapy and weekly home visits by nurses were lower in the ranks of medical rehabilitation services, whereas employment for PWDs and a personal assistant

Table 3. Health Care Providers Visited in the Last 12 Months.

	Total (N = 320)	Spinal cord injury severity*	
		Tetraplegic (N = 82)	Paraplegic (N = 234)
Rehabilitation physician/SCI physician	265 (83)	68 (83)	193 (83)
Primary care physician/GP	118 (37)	30 (37)	86 (37)
Other specialist physicians	93 (29)	23 (28)	68 (29)
Dentist	36 (11)	5 (6)	31 (13)
Physical therapist	125 (39)	37 (45)	86 (37)
Nurse/midwife	108 (34)	35 (43)	72 (31)
Occupational therapist	76 (24)	26 (32)	48 (21)
Alternative medicine practitioner	34 (11)	8 (10)	26 (11)
Pharmacist	29 (9)	8 (10)	20 (9)
Home health care worker	29 (9)	12 (15)	16 (7)
Psychologist	18 (6)	6 (7)	11 (5)
Chiropractor	1 (1)	0 (0)	1 (1)
Social worker	0 (0)	0 (0)	0 (0)
Dietitian	0 (0)	0 (0)	0 (0)
Not visit any health care provider	9 (3)	5 (6)	4 (2)
Needed health care but did not get it	32 (10)	5 (6)	27 (12)

Number (%); *4 participants did not specify their severity of spinal cord injury.
GP general practitioner, SCI spinal cord injury.

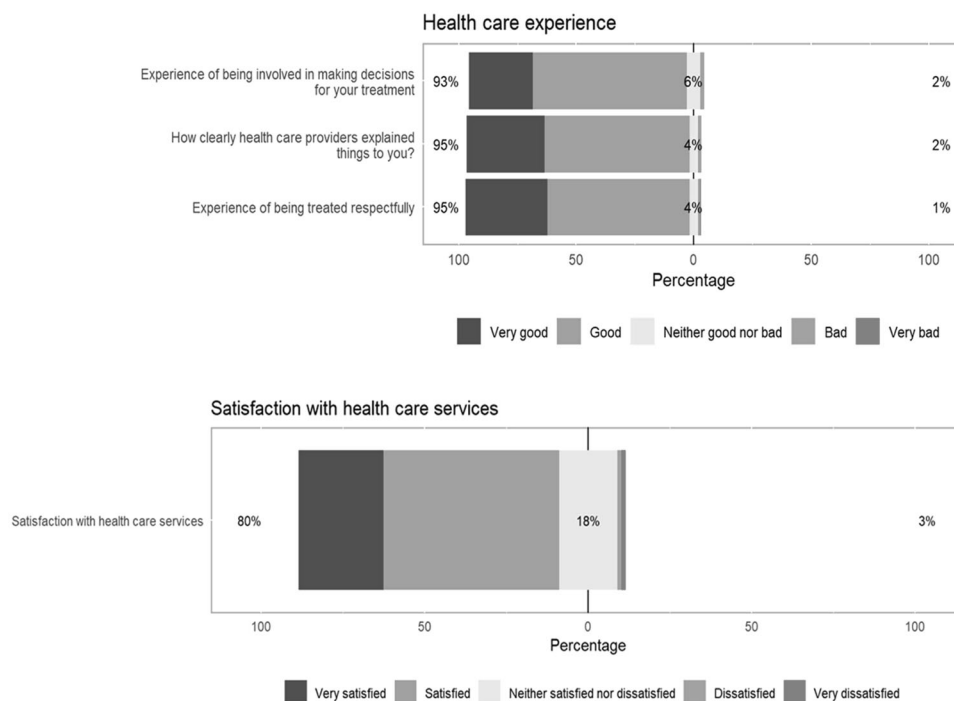


Fig. 1 Experience and levels of satisfaction with health care services of persons with spinal cord injury living in communities in Thailand. Upper: A percentage of persons with spinal cord injury who had different perspectives of health care experiences; Lower: A percentage of persons with SCI who had different levels of satisfaction with health care services.

were in the lower ranks of social and vocational rehabilitation services.

DISCUSSION

This is the first multi-center community survey aimed at exploring health and rehabilitation services utilization, levels of satisfaction, and benefits received by persons with SCI living in communities in

Thailand. The demographic characteristics of the participants were similar to those in previous reports, with most of the participants having either complete paraplegia (37%) or incomplete paraplegia (36%) followed by incomplete tetraplegia (19%) and complete tetraplegia (8%) [2, 6]. Most were included under the UC scheme which provides free treatment at registered hospitals and referral hospitals. The majority of respondents preferred going to a nearby health service hospital when having either a mild or a serious

Table 4. Benefits of Rehabilitation Services from Participants' Perspective.

	Total score	Rank	Type of Rehabilitation
Wheelchairs and cushions	688	1st	Medical
Increased disability pension	683	2nd	Social
Medications and equipment	497	3rd	Medical
Suitable products for living places	486	4th	Social
Free transportation service to hospital	440	5th	Medical/Social
Employment for person with disability	382	6th	Vocational
Personal assistant	357	7th	Social
Beds and mattresses	298	8th	Medical
Rehabilitation service in community	216	9th	Medical
Weekly home therapy	198	10th	Medical
Patient lifting hoists	179	11th	Medical
Weekly home visiting nurses	134	12th	Medical

The participants were asked to ranked top 5 services that benefitted them. The 1st Rank was scored 5, the 2nd rank 4, the 3rd rank 3, the 4th rank 2 and the 5th rank 1; the total score for each service was summed. The highest total score was ranked 1st followed by the lesser scores of 2nd to 12th ranks.

illness, with about 40% preferring a higher-level hospital for specialized treatment. Overall, 80% were either satisfied or very satisfied with the health care services received. This satisfaction level (80%) is comparable to results of studies in high-income countries. For example, a study in Switzerland reported 70% of individuals with SCI were satisfied with the healthcare services received for SCI-related health conditions [14]. Another study investigating satisfaction with primary care services of persons with SCI in Canada, the United State of America (USA), and the United Kingdom (UK) reported 76% of the participants were satisfied [15]. Another study from the USA reported that 66% were satisfied with primary care services and 100% were satisfied with rehabilitation services [16]. The similarly high percentage of satisfaction with health care and rehabilitation services by persons with SCI in our study might be resulted from an implement of the nationwide UC scheme to all people who have Thai nationality, including PWD, regardless to the region they live since 2002.

Under the UC scheme, registered PWDs have the privilege of transferring to a higher-level government hospital without first receiving a referral letter from the hospital at which they registered. This privilege might be beneficial for persons with SCI, e.g., since clinical manifestation of serious diseases [17] can be difficult to evaluate and treat due to the alterations of pain sensation and autonomic responses after SCI. Those conditions might be more accurately diagnosed and appropriately treated by SCI specialists at an A-level hospital. However, not all the participants in this study were registered as PWDs. According to the Promotion and Development of Quality of Life of Persons with Disability Act of 2007 as revised in 2013, PWDs have the right to be registered or not registered. Criteria for identifying PWDs under this act are in accordance with the International Classification of Functioning, Disabilities, and Health (ICF) framework [18], which includes only those who have an activity limitation or participation restriction regardless of body function and structure impairments. Reasons for not being registered might include incomplete SCI or unwillingness to be classified as a disabled person because of self-unacceptance and/or afraid of social unacceptance.

This study also found that most individuals with SCI still visited rehabilitation physicians for medications and equipment, e.g., urinary catheters, urine bags, wound dressing materials, and antiseptics as well as for yearly urological check-ups and treatment of complications. They appreciated the significant benefits of the medications and the equipment. A recent study of the quality of life of people with SCI and of the health systems in 22 countries reported that the health system in Thailand needs improvement in the area of provision of medications, assistive

devices, and transportation to and from health facilities [19]. In Thailand, medications such as anticholinergics for controlling detrusor overactivity, reusable self-catheter sets, active or adjustable wheelchairs, urodynamic tests, and chemoneurolysis for controlling spasticity are necessary but are available only at A-level or university hospitals with rehabilitation physicians. From this study, the result showing the benefit of medications and equipment indicates that the Ministry of Public Health may have to consider provision of specific medications and assistive devices necessary for persons with SCI at S- or M- level hospitals which have rehabilitation physicians.

Weekly home visits by nurses providing managements, such as changing an indwelling catheter or checking secondary health conditions and giving advice regarding the health conditions and complications, were considered to be of less benefit, but the number of visits to persons with tetraplegia by home health care workers was twice that of persons with paraplegia. Although few of the study participants were persons with tetraplegia, most of all participants needed day-to-day assistance. These results indicate that some persons with paraplegia were not as independent as expected functional outcomes for their level of SCI [20]. This is consistent with a previous study by the authors which found that nearly half of caregivers of persons with SCI Thailand looked after persons with paraplegia [21]. Further studies focusing on recruiting bed-bound persons with SCI conducted using outreach visits to the patients' homes is needed to explore this issue further and to determine potential avenues for improvement.

Wheelchairs and cushions were ranked as the top product beneficial to persons with tetraplegia's lives. In Thailand, registered PWDs with physical disability and mobility limitation can request a new wheelchair free every 3 years. Another role of rehabilitation physicians is to prescribe suitable wheelchairs and cushions to encourage both indoor and outdoor activities. Even with a wheelchair, persons with SCI cannot freely access many public places where wheelchair access is not provided. Data from the international questionnaires of the InSCI survey demonstrated that people with SCI in Thailand still face barriers to access public locations [22]. Increased public awareness of the rights of PWD as well as the necessity for designing environments for universal access should be encouraged.

In terms of benefits, employment for PWDs was ranked sixth by the participants in this study. This is compatible with a recent report on employment among people with SCI in 22 countries. That study reported that the employment rate of Thais with SCI was 40% whereas the employment rate of the population as a whole was 75% [23]. In addition, a recent around the world survey

of health systems and of the quality of life (QoL) of persons with SCI in communities included a suggestion for additional improvement in vocational rehabilitation to increase the QoL of persons with SCI in Thailand [19]. Reasons why some participants did not consider employment beneficial to themselves might be due to having adequate support from family, negative attitudes towards individuals with disabilities, lack of self-efficacy, low education, or being severely disabled. Rehabilitation physicians should be concerned with psychosocial issues and provide patients more information, e.g., about access to vocational training and employment, availability of start-up loans to PWDs for self-employment work, and information on policies related to employment of PWDs in both the private and public sectors.

While employment for PWDs was ranked 6th among benefits, increased disability pension was ranked 2nd. This indicates that the respondents preferred a passive social rehabilitation service to an active vocational rehabilitation service, and that many still could not be “agents of change” as had been anticipated by the Asia-Pacific Development Center on Disability (APCD) [24]. In 2009, APCD recommended promoting empowerment of PWDs and provision of a barrier-free environment so that PWDs could change from being “recipients of welfare” to being “agents of change” [24]. To encourage a positive attitude of self-efficacy, rehabilitation physicians in Thailand should promote the concept of community-based rehabilitation (CBR), be active facilitators, and work together with local administrative organizations in empowering PWDs, forming self-help groups, and sharing knowledge of successful PWDs [24].

In Thailand, transportation service for patients is organized by local administrative organizations and is funded by the National Health Security Office for those under the UC scheme. Under the social security scheme, PWDs would receive 500 baht (~16 USD), regardless of the number of trips to the hospital, in a month when they have to go to the hospital for treatment. In this study, 10% of the participants said they had accessed to free transportation to the hospital although this benefit was only ranked 5th. This suggests that free transportation service is widely needed, but not widely available. It may be argued that this assistance is not necessary as the cost of transportation to a local health facility is less than 100 baht (~3.3 USD) and not more than 500 (~16 USD) baht to more distant higher-level health facility. Presently, registered PWDs in Thailand receive a monthly disability pension of 1000 baht (~33 USD) if they are younger than 18 years old and 800 baht (~25.7 USD) if they are older than 18 years old with an additional 200 (~6.6 USD) if they are poor. These small amounts of money are expected to be spent on necessary products such as diapers for urinary/fecal incontinence which are not covered by any health insurance schemes. This represents a challenge for Thailand since most of the countries providing free hospital transportation service to PWDs are high-income countries such as Norway [25] and New Zealand [26]. We propose that in Thailand, it might be possible to use the nationwide emergency transportation system, which includes a per-head reimbursement system from the government, as a model for developing free hospital transportation for PWDs.

Study limitations

First, in this study, convenience sampling was used as currently there is no national SCI registry established in Thailand. Although the participation acceptance rate was 100%, there could have been selection bias as only individuals with SCI who regularly visit a hospital were invited to participate. Persons with SCI who were totally independent (extremely high functions) such as those with incomplete tetraplegia and thus had no scheduled hospital visits as well as those who had difficulty visiting a hospital (extremely low functions), such as those with complete tetraplegia, might not have been included in this study. In addition, we also missed a kind of persons with SCI who are at risk of early mortality, such as

persons with complete tetraplegia [11]. These might result in relatively low percentage of persons with tetraplegia when compared with those with paraplegia (26% vs 73%, respectively). Therefore, the sample of this study might only be a representative of persons with SCI who did not have extremely high or extremely low functions, as well as who regularly visited to the hospital. In this study, the percentage of persons with paraplegia was highest, followed by those with incomplete tetraplegia, whereas the percentage of persons with complete tetraplegia, who potentially had extremely low functions, was least. These results were compatible with results from the whole InSCI cohort, as well as results from almost all participating countries, such as Malaysia, Australia, and Switzerland [12].

The lack of a national SCI registry also meant that it was not possible to determine that the participants of this study were representative of individuals with SCI in Thailand. In addition, data was collected from only 4 rehabilitation institutes/facilities located in three of the six regions of Thailand. For those reasons, care should be taken when applying these results to groups of individuals with SCI living in different situations and different regions of the country. To increase generalizability, a future community survey should introduce a predefined sampling frame to include both persons with SCI who do and those who do not regularly visit a hospital as well as individuals living in all regions of Thailand. Next, as no psychometric tests were used to evaluate the newly developed questionnaire on health care and rehabilitation service utilization in the Thai context, the reliability of this questionnaire has not been established. However, the questionnaire used simple, non-technical language which should be readily understandable by non-medical participants. A future study using a validated tool for evaluating health care and rehabilitation service utilization with cross-cultural adaptation might be appropriate.

The next limitation is the difference in the data acquisition methods, i.e., 55% interviews vs 45% self-administered questionnaires. That might have introduced a bias as the interviews might have precluded negative responses. However, as most of the interviews were conducted by research assistants who were not directly involved in the participants' care, the potential interview bias may have been mitigated. Another limitation is that most participants in this study were from A-level and university hospitals and 70% from the principal investigating center, which is an SSRF facility [6, 7]. Thus, the findings are not representative of individuals rehabilitated at S-level hospitals which have recently become the main medical rehabilitation services providers for patients in the post-acute SCI phase according to the IMC service plan. The results from this study could, however, be used in future comparisons with the current IMC policy that most SCI patients be rehabilitated in a non-SSRF by non-specialized rehabilitation personnel, mainly physical therapists. As described in our earlier report, it has been demonstrated that being treated and rehabilitated in an SSRF provides better outcomes than being treated at a non-SSRF [7]. In a future survey, we plan to recruit persons with SCI from every region to be more fully representative of the entire SCI population in the country. In addition, this study was not designed to report details on health outcomes which have been reported using the international module of the InSCI questionnaire, which has already been reported in other studies [18, 27]. Moreover, since we followed the methods of the InSCI survey, we did not collect the current AIS. We plan to additionally collect the AIS, which further adds more information regarding the health utilization issues in each severity of SCI, in our next survey.

CONCLUSIONS

In Thailand, health care and rehabilitation services provide benefits for individuals with SCI living in communities. Most of the participants of this study who were individuals with SCI had a

good experience with health care and rehabilitation services and had been satisfied to very satisfied with the health care providers' visits in the previous 12 months. Currently, efforts to improve rehabilitation services include promoting engagement of PWD in work and in community life. Increased disability pensions would be beneficial and implementation of a nationwide free transport service to hospitals should also be considered. Taken together, the results of this study could be a case study for health policymakers in Thailand and other countries in the region regarding how health care and rehabilitation services are utilized by and provide benefits for persons with chronic SCI in communities and how those services could be improved in the future.

Data archiving

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

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AUTHOR CONTRIBUTIONS

AK was responsible for designing the research question, collecting and analyzing the data, drafting the manuscript and writing the final version of the manuscript. SP, PK, CC, NK and RM were responsible for designing the research question, collecting the data and commenting on the final version of the manuscript.

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The authors declare no competing interests.

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