

Facilitator and barrier factors to participation of Thai people with spinal cord injury in urban areas: A qualitative study
ปัจจัยส่งเสริมและอุปสรรคต่อการมีส่วนร่วมของผู้ป่วยบาดเจ็บไขสันหลังในประเทศไทย
เขตเมือง: การศึกษาเชิงคุณภาพ

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ABSTRACT

Background: People with spinal cord injury (SCI) encounters some impairments which inhibit activities of daily living and participation. Low participation level could lead to low quality of life and psychological problems.

Objective: To study the facilitator and barrier factors to participation of people with spinal cord injury.

Methods: Eight adults with spinal cord injury living in the community in Bangkok and metropolitan areas, Thailand. Participants who have experience in using wheelchairs to do activities in the past 6 months were interviewed.

Results: Six themes of facilitator factors for people with spinal cord injuries to perform home activities and participation are independent living thought, family support, appropriate physical environment and wheelchair, physical therapy and occupational therapy, support from others, and recreation and sport. Five themes of barrier factors for people with spinal cord injuries to perform home activities and participation are inappropriate physical environment and wheelchair, impairment of body function, individual's negative attitude, the natural environment, and inconvenience of public transportation.

Conclusion: Physical environment could be both facilitator and barrier factors for Thai people with spinal cord injury. Supports from family and others, rehabilitation programs, and recreation and sport are facilitator factors in home activities and participation. The natural environment, inconvenient transportation, physical function, and individual's negative attitude are barriers. Therefore, healthcare professionals should consider these factors to minimize barriers and encourage participation of people with spinal cord injury.

Keywords: Spinal cord injury, Participation, facilitator, Barrier

บทคัดย่อ

ที่มาและความสำคัญ: ความบกพร่องด้านร่างกายของผู้ป่วยบาดเจ็บไขสันหลัง อาจมีข้อจำกัดในกิจวัตรประจำวันและการมีส่วนร่วม ซึ่งการมีส่วนร่วมที่ลดลงสามารถนำไปสู่การมีคุณภาพชีวิตที่ลดลงและเกิดปัญหาทางสภาพจิตใจ

วัตถุประสงค์: ศึกษาปัจจัยส่งเสริมและอุปสรรคต่อการมีส่วนร่วมของผู้ป่วยบาดเจ็บไขสันหลัง

วิธีการวิจัย: สัมภาษณ์ผู้ป่วยบาดเจ็บไขสันหลัง ในเขตกรุงเทพมหานครและปริมณฑล จำนวน 8 คน ที่มีประสบการณ์การใช้รถเข็นนั่งในการทำกิจกรรมอย่างน้อย 6 เดือน

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Received: 3 April 2022; Revised: 08 Nov 2021; Accepted: 09 Nov 2022

ผลการวิจัย: ผู้ป่วยบาดเจ็บไขสันหลัง รายงานปัจจัยส่งเสริม 6 ปัจจัย คือ ความคิดในการใช้ชีวิตอย่างอิสระ การสนับสนุนจากครอบครัว สภาพแวดล้อมทางกายภาพ และรถเข็นนั่งที่เหมาะสม การทำกายภาพบำบัดและกิจกรรมบำบัด การสนับสนุนจากผู้อื่นและกิจกรรมนันทนาการและการกีฬา ส่วนปัจจัยอุปสรรค มี 5 ปัจจัย คือ สภาพแวดล้อมทางกายภาพ และรถเข็นนั่งที่ไม่เหมาะสม ความบกพร่องของการทำงานของร่างกายทัศนคติส่วนบุคคลเชิงลบ สภาพแวดล้อมทางธรรมชาติ และความไม่สะดวกของการขนส่งสาธารณะ

สรุปผล: สภาพแวดล้อมทางกายภาพเป็นปัจจัยส่งเสริมและอุปสรรคต่อการทำกิจกรรมภายในบ้านสำหรับผู้บาดเจ็บไขสันหลัง การสนับสนุนของครอบครัวและบุคคลอื่น โปรแกรมการฟื้นฟู กิจกรรมนันทนาการและกีฬา เป็นปัจจัยส่งเสริม ส่วนสภาพแวดล้อมทางธรรมชาติ ความไม่สะดวกของระบบขนส่ง ความบกพร่องทางร่างกาย และทัศนคติส่วนบุคคลเชิงลบ เป็นปัจจัยขัดขวาง ดังนั้นบุคลากรวิชาชีพ ควรพิจารณาปัจจัยดังกล่าว เพื่อส่งเสริมการมีส่วนร่วมสำหรับผู้บาดเจ็บไขสันหลัง

คำสำคัญ: บาดเจ็บไขสันหลัง การมีส่วนร่วม ปัจจัยส่งเสริม ปัจจัยขัดขวาง

Introduction

Spinal cord injury (SCI) is a major cause of disability that impacts physical, mental and social well-being. In Thailand, the annual incidence of SCI was reported approximately 23 cases per million. The incidence rate of Thai people with SCI has tended to increase in recent years¹. People with SCI encounter many physical impairments, for example, muscle weakness, spasticity and sensory impairment. These

problems cause activity limitation and participation restriction².

Participation is defined as an involvement in a life situation or the lived experience of people in the actual context, for example, domestic life, work and employment and social interaction³. Participation is important because it is one of the factors that helps improve mental health and increase self-satisfaction and quality of life⁴. Participation is related to better life satisfaction, self-esteem, sense of agency, and positive affect⁵.

Previous studies found that SCI led to substantial costs and restrictions in participation. Participation such as limited access to employment opportunities, family role functioning, limited access to recreational and leisure activities and difficulty to maintain or establish social relationships was reported^{6, 7}. People with SCI who had low participation level showed psychological problems such as depression and anxiety^{2, 4}. Also, the negative psychological problem affects the quality of life⁸. Therefore, self-acceptance and participation in society are the main goals for SCI rehabilitation⁹.

Many barrier and facilitator factors have been reported to affect participation¹⁰⁻¹⁴. The barriers affecting participation in people with SCI are muscle weakness, bowel problem, pain, movement limitation, difficulty in transportation, natural and built environment, health services problems and the loss of financial benefits^{8, 12, 13}. In contrast, the facilitator factors of people with SCI to participate in society reported are employment situations, personal care, assistance from others, social support, specialized equipment,

occupational therapy, physical therapy, transportation, and caregivers¹⁰⁻¹⁵.

Barrier and facilitator factors of participation are dependent on culture, climate, way of life, and ability of rehabilitation services in the countries¹¹. In Thailand, social support and individual functional performance are revealed to be important in the participation of people with SCI while the environmental factors showed a small effect. This might be because limited measures are specifically designed according to the social context¹⁶. A qualitative study may help understand life experiences and factors affecting participation for people with SCI. Therefore, the objective of this study was to identify facilitator and barrier factors of participation in people with SCI in Thailand by using a qualitative study design.

Methods

The semi-structured interview was conducted after the list of open-ended questions had been developed^{4, 10-14} and reviewed by 2 physical therapists experience more than 10 years with SCI. The contents of the semi-structured interview consisted of questions about facilitator and barrier factors to performing home activities and participation from the perspective of people with SCI. The questions are shown in Table 1.

The inclusion criteria were patients with traumatic or non-traumatic SCI with the age of at least 18 years, able to communicate in Thai, living in Bangkok and metropolitan areas of Thailand and have been using a wheelchair to go out or to do social activities at least once in the past 6

Table 1 List of question

คำถามหลักสำหรับการสัมภาษณ์ (Main interview questions)
1. คุณต้องเผชิญความยากลำบากหรืออุปสรรคอะไรบ้างเมื่อคุณพยายามทำกิจกรรมขณะอยู่บ้าน ? (What are difficulties or obstacles you encountered when you do home activities?)
2. คุณคิดว่าอะไรเป็นแรงกระตุ้นให้คุณทำกิจกรรมขณะอยู่บ้าน ? (What are facilitators when you do home activities?)
3. เมื่อคุณออกไปทำกิจกรรมนอกบ้าน หรือทำกิจกรรมทางสังคม คุณพบอุปสรรคหรือปัญหาอะไรบ้าง ? (What problems or obstacles did you find when you go out or go for any social events?)
4. แรงส่งเสริมใดที่ทำให้คุณมีส่วนร่วมในการทำกิจกรรมนอกบ้าน ? (What are facilitators that make you participate outdoor activities?)

months. Exclusion criteria were those who had other neurological disorders, had Mini-Mental State Examination < 23 scores, and had anxiety and depression problems (Hospital anxiety-depression scale (HADS) Thai version ≥ 11)¹⁷. The participants were recruited using the purposive sampling method. The protocol of the study was approved by the Human Research Ethics Committee of Thammasat University (Science), (HREC-TUSc) number 091/2563.

Data collection

The study has been conducted between December 2020 and May 2021 at the Thai red cross rehabilitation center, Samut Prakarn province. Participants were in-depth interviewed by the researcher (TM). The interviewer was a physical therapist who did not relate with the participants. Participants were interviewed in a private room. The interview duration was approximately 60-90 minutes depending on the participant's tolerance or completeness of the interview. The data were audio recorded and noted by the main researcher. The researcher (TM) transcribed the audio records verbatim and verify the accuracy of the transcript.

Data analysis

Data were analyzed using the content analysis method¹⁸ by two researchers independently (TM & NP). The researchers who analyzed the data had experience in analyzing the data by conducting data extraction experiments before the study. Each text was read many times to identify and mark the words and sentences that described the facilitator and barrier factors. Information was assigned to various topics according to the International Classification of Functioning, Disability and Health (ICF) categories. Then the categories were grouped into the main theme. The order of the theme was

arranged by using the frequency of coding. When any disagreement occurred, the consensus was made by the third researcher (PTE). Data collection continued until the saturation of categories was reached. Data were considered saturated when no more codes emerged and categories were coherent (less than 5 % of new theme emerge)¹⁹.

Results

Eight wheelchair users were recruited into the study. All participants used wheelchair to perform activities of daily living or work. The characteristics of the participants were presented in Table 2. Facilitator factors for home activities and participation consisted of 6 themes: 1) Independent living thought, 2) Family support, 3) Appropriate physical environment and wheelchair, 4) Physical therapy and occupational therapy, 5) Support from others and 6) Recreation and sport. The last two themes were found only in participation.

Five themes of barrier factors to performing home activities and participation were 1) Inappropriate physical environment and wheelchair, 2) Impairment of body function and 3) Individual's negative attitude or anxiety, 4) Natural environment and 5) Inconvenience of public transportation. The last two themes were found only in participation. The example of the quotes in each theme for facilitator and barrier factors were shown in Table 3-4.

Table 2 Demographics and characteristics of the participants (n = 8)

No	Gender	Age (Years)	Marital status	Type of family	Post injury time (Years)	Cause of injury	Level of injury	AIS	Highest level of education	Profession	Wheelchair type
P1	Male	27	Single	Nuclear family	4	Accident	Cervical level 5	C	University	Self-employed	Power wheelchair
P2	Male	30	Single	Extended family	7	Accident	Thoracic level 4	C	Vocational education	Unemployed	Active wheelchair
P3	Male	33	Single	Nuclear family	6	Accident	Thoracic level 10	C	Junior high school	Self-employed	Active wheelchair
P4	Male	19	Single	Extended family	1.3	Accident	Lumbar level 1	C	Junior high school	Student	Active wheelchair
P5	Male	24	Single	Nuclear family	1	Accident	Thoracic level 9	A	University	Employed	Active wheelchair
P6	Male	56	Single	Nuclear family	16	Tumor	Thoracic level 1	C	Senior high school	Employed	Active wheelchair
P7	Male	20	Single	Nuclear family	3	Accident	Thoracic level 7	A	Senior high school	Student	Active wheelchair
P8	Male	20	Single	Extended family	3	Accident	Thoracic level 8	C	Junior high school	Student	Active wheelchair

Note: AIS = American Spinal Injury Association Impairment Scale; A=complete (no sensory or motor function is preserved in the sacral segments S4-5.), C=incomplete (motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a muscle grade less than 3 (grades 0-2)).

Table 3 The example quotes of facilitator factor in home activities and participation

Themes of facilitator	Home activity	Participation
1. Independent living thought	P2 (age 30, paraplegia) said <i>"I think we need to adjust our attitude. Although people help to adapt our home environment, it's still hard to do things if we don't have self-motivation."</i>	P3 (age 33, paraplegia) mentioned the concept of life after SCI. <i>"If I was embarrassed, it would have been hard to spend my daily life and work."</i>
	P7 (age 20, paraplegia) described that he needed to show, he could live like an ordinary person. <i>"I wanted to prove that I can live on my own at the dorm and am able to participate in the community. I tried to show to my parents that I can live normally."</i>	
2. Family support	P4 (age 19, paraplegia) mentioned that encouragement from mother and father facilitate his activities. His mother and father said to him that <i>"Don't give up. Everything's fine."</i>	P3 (age 33, paraplegia) mentioned family are ready to help if he wants to participate. <i>"Going out is not a problem, because my uncle always has free time for me. He helps me to drive a car (to other places) and helps me to work at the shop."</i>
	P6 (age 56, paraplegia) said that <i>"I could not do anything, everything in myself was zero after the surgery. My mother helped me to do all activities for example, lifting, toileting, transferring between wheelchair and bed."</i>	P4 (age 19, paraplegia) mentioned that <i>"My family encourages and tells me not to be embarrassed and not to mind other people, ...kind of, if they want to look at you, just let them do."</i>

Table 3 The example quotes of facilitator factor in home activities and participation (Cont.)

Themes of facilitator	Home activity	Participation
3. Appropriate physical environment and wheelchair	P3 (age 33, paraplegia) mentioned about the benefits of physical environment adjustment. <i>"When I adjusted my place to make it easy (for me) to do daily activities and to use the wheelchair, it is easy to do my home activities."</i>	P5 (age 24, paraplegia) mentioned convenience in public restrooms. <i>"The restroom at the airport is big and comfortable, even better than those in the shopping malls."</i>
	P2 (age 30, paraplegia) said that <i>"When I went to train at the rehabilitation center, I got a new wheelchair which is a sport wheelchair. It makes me do my home activities easier. home activities."</i>	P6 (age 56, paraplegia) said <i>"When I use an active wheelchair I do not look like a sick person." "... A large wheelchair is heavy and needs a lot of energy to push so I cannot push it so far away. But this active wheelchair is light, agile, and is turn able in the limited areas."</i>
4. Physical therapy and occupational therapy	P3 (age 33, paraplegia) mentioned the benefits of training at a rehabilitation center. <i>"I practiced movement and activities of daily living skill from a rehabilitation center. I got the knowledge and skills from there. When I came back home, I did what I learnt there, and I can do it."</i>	P4 (age 19, paraplegia) mentioned that <i>"When I know how to get into the car (trained by physical therapists at the rehabilitation center) so I can go out."</i>
		P3 (age 33, paraplegia) mentioned that <i>"Some people with SCI couldn't go outdoor activities like me because some of them didn't get the wheelchair skill training or agility training. When they go outside (in the community), it becomes a barrier."</i>

Table 3 The example quotes of facilitator factor in home activities and participation (Cont.)

Themes of facilitator	Home activity	Participation
5. Support from others		<p>P1 (age 27, tetraplegia) mentioned the kindness of the people in the society made it easier for him to participate. <i>"People are kind. If I need any help, others would help me. For example, when I go to the market, at the different path level. I called out bro help me, please. I just called one person, but many people came (to help)."</i></p>
		<p>P6 (age 56, paraplegia) said that. <i>"... I kept telling my friends how to lift the wheelchair. After a while ..., I do not have to tell them. When I went to play kite at the beach, my friend designed a rope to support my back and the wheels for pushing wheelchair onto the soft surface."</i></p>
6. Recreation and sport		<p>P2 (age 30, paraplegia) is a fitness enthusiast. He mentioned the facility and environment in the park is a facilitator. <i>"I go to exercise in the park because there is a weightlifting bar, dumbbells, good environment, good weather, so I feel of wanting to go for exercise."</i></p>

Table 4 The example quotes of barrier factor in home activities and participation

Themes of barrier	Home activities	Participation
1. Inappropriate physical environment and wheelchair	P2 (age 30, paraplegia) mentioned about inconvenience for using the bathroom. <i>"The entrance of the bathroom was so narrow..., the wheelchair couldn't get into the bathroom. So, I had to wash my body outside, at the front of the house."</i>	P1 (age 27, tetraplegia) said <i>"...inappropriate walkway for wheelchair... blocking electricity posts or trees, rough road, and no ramp, these cover all the obstacles (I found). Some places have no ramp."</i>
		P7 (age 20, paraplegia) told the problems when using the sky train service. <i>"... there was no ramp between the footpath and the way to go to the elevator. I have to detour to another side of the main road. I Sometimes, I could push a wheelchair onto the curb (to use the elevator) but the walkway was too narrow to pass (with a wheelchair). And sometimes I found obstacles, electric posts, kinds of things, both narrow and dangerous, like walls with barbed wire fences..."</i>
		P6 (age 56, paraplegia) mentioned the wheelchair experience. <i>"... a big wheelchair needs a lot of energy to push. it will not go very far. But the sport (active) wheelchair, it is light and agile to turn in narrow spaces."</i>
2. Impairment of body function	P1 (age 27, tetraplegia) mentioned physical change after injury affected his ability to perform activities of daily living at home. <i>"...When I got sick, I could not sweep the floor of the house because I could not grab the broom and balance in standing. ...I could not pick up the dish and hold the dishwashing sponge to rub on and clean the dishes as I could not hold the dishes."</i>	P3 (age 33, paraplegia) mentioned disadvantages of physical change. <i>"Because I am a bedridden people from a SCI, my lower half part is paralyzed that makes me unable to go out."</i>

Table 4 The example quotes of barrier factor in home activities and participation (Cont.)

Themes of barrier	Home activities	Participation
3. Individual's negative attitude or anxiety	P1 (age 27, tetraplegia) mentioned dissatisfaction in doing home activities. <i>"...I don't satisfied with the results (in doing home activities)."</i>	P4 (age 19, paraplegia) mentioned the feelings and worries when participating. <i>"...I am embarrassed to be handicapped person..." "...The looking from others.... When I sit in front of (my) house or go out (into the community), other people often look at me. It made me feel embarrassed."</i>
4. Natural environment		P1 (age 27, tetraplegia) said <i>"The rain was definitely a barrier because the powered wheelchair was not recommended to be wet because the battery or some parts (of the powered wheelchair) might be damaged."</i>
5. Inconvenience of public transportation		P7 (age 20, paraplegia) mentioned the difficulty to use public transportation service. <i>"Some taxi drivers did not welcome wheelchair users. Some served us, but we could not keep the wheelchair in the rear compartment of the car because of the gas tank (occupied the space). So, they took my wheelchair in the cabin, and some asked for more charge. Sometimes, they did not know much about the wheelchair. I tried to tell them that it is foldable, but they did not fold it and tried to push it as it is."</i>

Discussion

The present study supported the important facilitator factors for home activity and participation related to independent living thought and family support. Nevertheless, inappropriate physical environment and impairment of body function were the barrier factors that mostly suggested by participants.

Independent living thought was found to be facilitator factor to perform home activities and participation. For home activities, participants mentioned their feelings of not being burdened and not being helped by their families which facilitate them to perform home activities. This may be because the participants live with their families and are young, so they prefer freedom and want to do various activities on their own. For participation, participants mentioned that they preferred talking with other people, traveling or living on their own. In a high-resource country, self-esteem and self-efficacy were strongly correlated with participation. Self-efficacy relates to belief in one's capabilities to organize and execute courses of action required to produce given attainments. Self-esteem is a general evaluation of the self-concept and the sense of personal worth or worthiness²⁰.

In a middle-income country like Thailand, independent living was found in people with SCI who accept their condition and have a fighting spirit²¹. The result of the present study suggests that the thought of living independently is one of the personal factors that could influence home activities and participation. Personal factors could enhance the understanding of functioning, improve services for people with disabilities, and

strengthen the individual's perspective on health care.

Family support, including physical and mental support, is a facilitator factor related to the ability to perform home activities and participation. All participants in this study live with their families and receive support from family members to participate. Family support had a positive impact on the social reintegration of people with SCI in South Korea²². Therefore, health professionals should consider family support in order to facilitate participation, for example, suggestion to family members about how to provide appropriate physical and mental support to enhance confidence when patients participate in the community¹⁶. Although the type of family in the study was different (nuclear and extended family), all participants reported that they receive support from their family members. Further research exploring the effects of type of family on participation in patients with SCI is still required. Although Thai family culture is more in extended families than nuclear families, especially in rural areas as found in a Thai survey between 1987-2013²³, all participants in this study lived in the nuclear families. This may reflect that in the metropolitan areas, there might be slightly different from the rural areas. Additionally, other family members who lived in other places could be an important facilitator factor for the participation of people with SCI in Thailand.

Physical environment and wheelchair were facilitator factors. Home environments are mentioned in terms of home modification such as bathrooms, ramps, kitchen counter heights and

wheelchair. Wheelchairs help increase mobility which is a prerequisite to performing other life habits²⁴. Moreover, the participants also mentioned wheelchair training, especially active wheelchairs, as facilitators for their activities and participation. All participants were recruited from rehabilitation centers and the wheelchair skills had been trained therefore the training was reported to be a facilitator to perform activities and participation. In addition, wheelchair selection and home modifications for people with SCI are crucial for these people. Therefore, health professional teams should focus on the type of wheelchair and the wheelchair skills in rehabilitation for people with SCI.

Toilets in the workplace or in public were reported as facilitator factors in outdoor environments. Not surprisingly, people with SCI have secondary conditions related to urinary tract complications that require urinary catheterization²⁵. If universal toilets are available in public, the participation of people with SCI would not be difficult.

Support from health professionals in helping with home modification, education, activity training and wheelchair training could facilitate home activities and participation. People with SCI trained by health professionals are one of the keys to performing home activities and participating in the community. Treatment of healthcare professionals resulted in self-esteem and self-efficacy which is very important for participation²⁶. Additionally, ability to perform wheelchair skills was a predictor for community participation²⁷. People with SCI who had high scores on the

wheelchair skill test had better participation²⁷. Therefore, health professionals play an important role to facilitate people with SCI to participate in the community.

Support from others such as friends was a facilitator factor as found in this study related with the previous study in people with SCI in Thailand¹⁶. Support from friends and others includes physical and mental support. The previous study suggested that close friends should be involved to facilitate people with SCI participate with social and communities' activities¹⁵. Therefore, support from friends both physically and mentally is one of the facilitator factors in performing activities and participation²⁸. One of the goals of rehabilitation is lifestyle satisfaction which will assist the person in regaining confidence and skill in sports or recreational interests²⁶. Recreation and sports were reported as facilitator factors for participation in this study, similarly reported in the previous study¹¹.

The occupation is a facilitator factor for participation. Employment paid or unpaid was reported to be an important factor in participation¹¹. Having goals such as work, or study is a facilitator factor to participation. Moreover, the employed people desired to resume their work regardless of their physical condition and their disability⁸.

Although the physical environment and wheelchair are reported as the facilitator factors, this is sometimes a barrier factor depending on the circumstances. Physical environment and wheelchair were important barrier factors for both

home activities and participation. Home environments are mentioned in terms of inconvenience such as narrow entrance, and kitchen counter heights. The physical environment is not suitable for doing activities at home. Therefore, participants cannot do the activities by themselves. For outdoor environments, inconvenient walkway, bathroom in the hotel, and difficulty of using wheelchair are mentioned.

In Thailand, people with mobility impairments have problems with inappropriate walkways, making it difficult to use wheelchairs due to rough walkways, obstacles such as electric poles, trash²¹. This problem leads to difficulty in public transportation such as train or taxi, because wheelchair users have to push wheelchairs on the walkway before using the service²¹. An Empowerment of Persons with Disabilities Act in Thailand regarding the right to access and use public facilities, and welfare such as medical services, education, living environment adjustment was launched in 2007²⁹. However, the enforcement may not be practically effective. The government should have appropriate policies to encourage people with SCI to participate in society.

Physical impairment of people with SCI might cause embarrassment which inhibits home activities and participation. The physical impairment including pressure ulcers, shoulder problems, and bladder and bowel dysfunction was the factor often reported as barrier factor to participation². Bladder and bowel incontinence as part of their physical experiences, make people with SCI unable to participate and were unable to

meet their religious obligations as a result of the bladder and bowel incontinence⁸.

Individual's negative attitude and anxiety were barrier factors to perform home activities and participation respectively in this study. Psychological outcomes including anxiety, perceived disability, and low self-efficacy play the negative effects on participation⁸. It may be caused by the sudden onset of their injury and the accompanying symptoms. Moreover, others' negative attitudes toward people with disability, and altitude of focusing on limitations rather than abilities toward people with SCI is barrier factor to participation³⁰. Social support has a correlation with health and well-being, stress and mortality, and encourages behaviors that enhance health and self-reliance of people with SCI. If people with SCI have insufficient support, depression and isolation is increased³⁰. In this study, the individual's negative attitude was reported as a barrier factor only in the early stages of the injury. This might be because participants received rehabilitation from a healthcare professional at a rehabilitation center and the professional assisted in boosting their self-efficacy and self-esteem. Therefore, the health professional team should provide both physical and mental support. When people with SCI are mentally encouraged, it would possibly minimize this barrier and maximize their participation.

Natural environment, especially rain, is a barrier factor for participation. Thailand is located in the tropics near the equator. The climate is characterized by hot and humid conditions. People with SCI in this study perceived that the

rain could damage the power wheelchairs. Moreover, the inappropriate physical environment could cause difficulty to propel the wheelchairs. The bumpy pavement after the rain also causes water puddles which may cause difficulty in propelling wheelchairs.

Inconvenience of public transportation is a barrier factor that affects participation in people with SCI using wheelchairs. People with SCI in a middle-resource country, Thailand preferred to use private cars rather than using public transportation because of the convenience issues for wheelchair users. For example, buses have too-high stairs, crowded and have no space for wheelchairs³¹, the elevators in some sky train stations are not available, and taxi drivers refuse to pick up wheelchair users. Being forced to use a private car, people with SCI require training and adjusting their car. People with SCI identified transportation to be the primary barrier they encountered when participating in the community³¹.

The problem of taxi service was also reported by participants in the study. Regarding the refusal of taxi drivers to serve wheelchair users, the drivers might be anxious to transfer people with disabilities in and out of the car and lift the wheelchairs into the taxi. The refusal was reported as a barrier in a previous study conducted in Thai children with cerebral palsy reflecting inappropriate public transport for wheelchair users in Thailand³². Moreover, participants reported that when people with SCI accepted to get into the taxi, they also encountered some barriers such as the limited

space to fit the wheelchair and additional charges. The lack of wheelchair-handling knowledge of the drivers could also lead to service refusals for people with SCI. Therefore, providing education sessions in wheelchair handlings for taxi drivers may possibly be one solution to encourage drivers in assisting wheelchair users, especially people with SCI.

The present study has some limitations. All people with SCI in the study were males. Females might have different perspectives regarding facilitator and barrier factors. Moreover, most of them were paraplegic people with a higher level of function to participate than people with tetraplegia. The results of this study could not represent the views of people with low levels of function. The study was conducted only in urban areas which might have different characteristics from rural areas, for example, facilities, environment and policy. Therefore, the results may not be generalized to participants who had differences in environmental accessibility. A further study should be conducted in rural communities, females, and a low level of function people with SCI.

The physical environment could be facilitator and barrier factors in home activities and participation in Thai people with SCI. Supports from family and others, rehabilitation programs, and recreation and sport would facilitate home activities and participation. While the natural environment, inconvenient transportation, physical function, and individual's negative attitude and anxiety are reported as barriers. Therefore, healthcare professionals should consider these

factors to minimize barriers and encourage participation of people with SCI.

Acknowledgements

We would like to thank all participants with SCI and gratefully acknowledge the support of the Faculty of Allied Health Science Thammasat University and Rehabilitation center Thai red cross.

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