Assessing Patient Needs for the Enhancement of Stroke Rehabilitation Services: A Customer Value Perspective

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Abstract. Continuous participation in stroke rehabilitation programs enables function recovery and quality of life. However, research showed that stroke rehabilitation services do not necessarily meet the needs and the expectations of stroke patients. To address this issue, in this study, patient needs was assessed from the perspective of customer value. Customer value was defined using the service dimensions in SERVQUAL. Contextual Inquiry (CI) was conducted with three stroke patients and their therapists. Critical incidents (i.e., service gaps) were identified and categorized by the service dimensions. A follow-up survey was conducted with 11 stroke patients and 11 therapists to obtain subjective ratings on the critical incidents to provide quantitative insight that corroborated the findings from the CI in improving current stroke rehabilitation services. Results of the CI revealed that most occurred critical incident was related with reliability when therapists provided instructions on the rehabilitation activities. Results of the survey showed that (1) for stroke patients, all service dimensions were equally important; responsiveness was the least satisfied dimension; (2) Therapists believed that all service dimensions were addressed by their services; assurance was the most important dimension. The perceptual differences of the two groups on customer value led to recommendations on the current rehabilitation services. The outcomes of the study provided insight on critical stroke patient needs and contributed to the design of stroke rehabilitation therapy services.

Keywords: Stroke rehabilitation · Customer value · Service quality

1 Introduction

Nowadays the advancements in medical technologies have reduced the stroke death rate. However, the number of stroke patients did not drop accordingly [1]. It was found that the age of first-ever stroke decreased gradually [2]. The stroke recovery rate depends on the severity of stroke and individual patient's unique situation. Most patients recovering from a mild stroke can recover most function within 3–6 months of rehabilitation. The recovery rate starts to decline after 6 months [3]. Stroke recovery is not limited by time. Research

shows that continuous participation in rehabilitation programs enables function recovery and quality of life [4], even for severe stroke patients [5, 6]. Thus, for stroke patients, to improve health and adjust to life at home, actively joining rehabilitation programs becomes necessary. This suggests that effectively engaging patients in their recovery process through adequate rehabilitation services is critical.

Studies showed that stroke rehabilitation services do not actually meet the needs and the expectations of stroke patients. For example, Klein [7] and Newborn [8] indicated that most rehabilitation services did not incorporate patients' life interests and goals in their rehabilitation activities. Brandriet et al. [9] revealed that the efficacy of rehabilitation services was not assessed with regards to preparing patients returning to their lives. Moreover, Shapero [4] noted that stroke rehabilitation services were not holistically designed to meet patients' needs after inpatient rehabilitation, particularly how follow-up rehabilitation should be provided to make great strides in recovery.

For identifying patients' needs and preferences on the stroke rehabilitation, Laver [10] found that patients cared about functional recovery, preferred one-on-one rehabilitation services, and showed less preference on intensive rehabilitation as well as computer-assisted therapies. In addition, Jones et al. [11] identified four patient needs for developing stroke rehabilitation services: (1) offering the information on stroke prevention, (2) providing unobstructed counseling channels, (3) long-term supports, and (4) integrating therapies into patients' daily life activities.

In fact, patients' opinions become increasingly important in assessing rehabilitation service and are considered to be the indicators of the quality of rehabilitation services [11]. According to Crawford et al. [12], patients' participation in the planning and development of healthcare service is important. In a similar vein, Ashworth et al. [13] and Guadagnoli and Ward [14] showed that integrating with the views and needs of both professional therapists and patients could not only shorten the gap between the services and patient actual needs but also help to improve the quality of rehabilitation services.

In practice, there is few attempt developing/improving stroke rehabilitation services on the basis of customer value [15] – i.e., patients' needs and expectations in exchange for what they pay in the service. In most cases, patients' needs, wants, and expectations were not seriously considered or understood, eventually leading to low service quality and patients' complaints [16]. Despite that researchers proposed innovative rehabilitation services, however, most of which lacked inputs from both field experts (i.e., professional therapists) and stroke patients, thus making the service outcomes deviate from actual patients' expectations [17].

The above studies suggested that (1) most stroke rehabilitation services were not adequately designed to reflect patient needs and customer value in the field [18]; (2) in addition to adopting opinions of professional therapists, taking into account the customer value is imperative for improving/developing stroke rehabilitation services. In reflecting these findings, the purpose of this study, therefore, was to assess patient needs (from the perspective of customer value) for the enhancement of stroke rehabilitation services. First, CI (observations with follow-up interviews) was conducted with both stroke patients and their therapists to ethnographically uncover patients' latent needs and their gaps - defined as critical incidents - with the customer values (i.e., the dimensions of service quality identified in SERVQUAL). Second, survey was conducted to reveal

which critical incidents deviated the most from the customer values and which should be first improved. The survey data were used to provide quantitative insight that supported the findings in CI in improving current stroke rehabilitation services.

2   Literature Review

2.1   The Need to Understand Work Practices to Develop Medical Innovations

Conventional interview and needs assessment techniques are limited to demographic data and end-user opinions. However, detailed information about actual work processes and practices can provide critical information for developing relevant and useable systems [19]. The most-used technique for understanding work practice information is Contextual Inquiry (CI) [20]. It is an ethnographic based method that integrates observation and semi-structured interview to investigate field challenges that influence users' interactions with technologies/services/systems. CI provides tacit, explicit, and implicit qualitative details of work practices. It is a user-centered design method that helps designers in the design process to do in-depth understanding and exploration of user needs.

In the medical domain, CI has been massively used to identify innovative spaces and systems. For example, Cawood et al. [21] attempted to create an optimal cross-department office space for hospital staff. In their study, Cawood et al. [21] conducted contextual inquiries with 21 staff (such as examining the work behaviors and their related attitudes, needs, and processes, etc.). Cawood et al. [21] also conducted static observations over 12 locations (such as watching movement and interactions that occurred around and through and in every place, etc.). In addition, co-design workshops were conducted to explore the functional and emotional needs of the staff, as well as innovative office space solutions. This study used a human centered design process (involving 'hear', 'create', deliver' phases) that can not only produce an effective design, but also improve employee engagement and the level of satisfaction with the final workspace.

Gurses et al. [22] attempted to identify hazards in the cardiovascular operating room (CVOR) to guide improvement efforts to improve patient safety. Gurses et al. [22] conducted direct observations (including 20 on-pump cardiac surgeries) and contextual inquiries with 84 healthcare providers to identify and classify safety hazards in the CVORs in five hospitals. Results of the study revealed 55 types of hazards related to the five components of the CVOR work system. They are related with provider, task, tools and technologies, physical environment, as well as organization. Results of the study identified common hazards across operating rooms: non-compliance with evidence based guidelines, usability problems of tools and technologies, practice variations among care providers within the same institution, poor teamwork, and hierarchical nature of the organizational culture. Gurses et al. [22] suggested that, to improve patient safety in the CVOR, efforts should focus on: (1) creating a culture of safety, (2) increasing compliance with evidence based infection control practices, (3) improving communication and teamwork, and (4) designing better tools and technologies through partnership among all stakeholders.

The above studies demonstrated the potentials of CI in identifying contextual challenges and eliciting explicit and latent needs of patients in the medical environment.

2.2   Customer Value in Stroke Rehabilitation Services

Delivering value to customers is important to healthcare and service providers. According to Woodruff [15], customer value can be generally defined as: "a customer perceived preference for and evaluation of those products attributes, attribute performances, and consequences arising from use that facilitate (or block) achieving the customer's goals and purposes in use situations." Simply put, value is what a customer gets in exchange for the price he/she pays. In the context of stroke rehabilitation, to be willing to pay, patients would derive value from the service they get. Patients' needs are the values that patients want and desire from paying their medical/insurance bills.

In the literature, studies were conducted to explore the rehabilitation needs of stroke patients. For instance, Jones et al. [11] conducted semi-structured interview and focus group to unveil service priorities in stroke rehabilitation. Results showed that, from the viewpoints of stroke patients and caregivers, service priorities included: (1) offering information on stroke prevention, (2) providing unobstructed counseling channels and long-term supports, (3) integrating therapies into patients' daily life activities. In addition, to find out the problems in stroke rehabilitation and needs of stroke patient, Kamalakannan et al. [23] administered questionnaire and in-depth interview with stroke patients, caregivers, and nursing professionals. Kamalakannan et al. [23] found that establishing easily accessible treatment services, offering patient-centered rehabilitation services, and taking into account cultural backgrounds were critical to customer satisfaction. Moreover, to uncover stroke patients' preferences for rehabilitation, Laver et al. [10] performed face-to-face interview with stroke patients. Results showed that most stroke patients were concerned about functional recovery, strongly preferred one-on-one treatment, and less preferred intensive rehabilitation and computer-assisted therapies. Furthermore, with respect to the gaps between patients' expected services and their received ones in stroke rehabilitation, Parasuraman [24] administered SERVQUAL (a multidimensional questionnaire to measure patients' perceptions of service quality). Results showed that reliability, responsiveness, assurance, empathy, and understanding/knowing the customer, were five key measures to predict patients' satisfactions on stroke rehabilitation.

To sum up, patients' needs reflect the value that patients want/desire in the rehabilitation. The benefits that patients get have to outweigh what they pay. In general, patients desire to understand the details of the rehabilitation programs, to receive customized rehabilitation, to recover from functional deficits, to become functional independent in daily and social life, and to obtain unobstructed counseling channels and long-term supports. In addition, to understand the performance of a service in regards to customer satisfaction, reliability, responsiveness, assurance, empathy, and understanding/knowing the customer are important dimensions to look at in stroke rehabilitation.

3   Method

The purpose of this study was to assess patient needs (from the perspective of customer value) to enhance stroke rehabilitation services. CI (observations with follow-up interviews) was conducted in the first place with both stroke patients and their therapists to ethnographically understand patients' latent needs and the gaps between the needs and the provided rehabilitation services. The service quality dimensions suggested in SERVQUAL [24] were used to guide CI to identify the service gaps. The service gaps were treated as critical incidents and were then shown to patients and therapists via survey. Both participant groups were asked to rate on the critical incidents with regards to satisfaction and importance. The data were used to provide quantitative insight that supported service design decisions in improving current stroke rehabilitation services.

3.1   Contextual Inquiry: Identification of Needs

Participants
A convenience sample of three stroke survivors and their onsite occupational/physical therapists participated in this study. Inclusion criteria required that stroke participants be at least 6 month post-stroke, experience upper-extremity hemiparesis, and receive rehabilitation services more than one time. Exclusion criteria included inability to give informed consent, a diagnosis of any cognitive deficits. The therapists were required to have at least 6 month work experience related with stroke rehabilitation. Both participant groups were recruited in the occupational therapy rehabilitation center in a teaching hospital in the Tainan city in Taiwan.

Procedure
Two trained observers followed the participants throughout the whole rehabilitation process (from checking in to leaving the rehabilitation center). Patient participants were observed during their scheduled time slots for rehabilitation. Prior to CI, the observers ensured that participants understood the goals of the study and were comfortable with the process. This protocol helped the observer attain a certain level of trust and openness. The CI would not start until obtaining participants' consents. In addition, during the observation, the observers were taught to identify 'critical incidents' using the critical incident technique [25]. A critical incident in this study was defined as any observable rehab service elements (either tangible or intangible) or incidents that were against the customer value – including the following five dimensions of service quality in SERVQUAL [24].

- **Assurance** means knowledge of competence, courtesy of staff, and respects of customers.
- **Empathy** means treating the customers as individual and understanding their needs and wants, customer easily access to the staff of the organization and to their service and information.
- **Reliability** means providing the promised service regularly, consistently, timely and accurately to the consumers.

- **Responsiveness** means the prompt attention to requests and questions, and willingness to sort customers' problems and help.
- **Tangible** means visual appealing, physical facilities, equipment, employees and communication materials.

In this study, the observers noted participants' emotional reactions to the critical incidents. They also asked the patients and the therapists follow-up/clarification interview questions about the observed critical incidents (e.g., whys or/and attitudes and motivations behind needs and behavior). These interview questions were used to get a deeper understanding of the patients' latent needs. Therapists' responses helped identify the gaps and disconnections between patients' needs and the rehabilitation services. During the CI, one observer was responsible for asking questions and the other took notes on any critical information relevant to this study.

3.2 Subjective Quantification of Critical Incidents (Service Gaps)

Participants
A convenience sample of 11 stroke survivors and 11 occupational/physical therapists participated in this study. The inclusion and exclusion criteria for the stroke participants were the same with those indicated in the CI. The screening criterion for the participated therapists was the same with that in the CI as well.

Procedure
After the CI and before investigating the service gaps, researchers explained the purpose of the study to the participants. Descriptions of the critical incidents (i.e., service gaps between patient expectations and the rehabilitation services provided at different stages) were provided to every participants. Participants were then instructed to rate their levels of satisfaction (1–5, from the least satisfied to the most satisfied) and their perceived importance (1–5, from the least important to the most important) on each critical incident related with the service quality dimensions in SERVQUAL.

4   Results and Discussion

The purpose of this study was twofold: (1) to elicit patients' rehabilitation needs from the viewpoint of customer value and conducting CI and (2) to make recommendations on stroke rehabilitation services. This study looked at inpatient/outpatient rehabilitation services where therapists mainly helped patients maintain and refine motor skills physical functions. The participants being observed were aged 25–71 acute/chronic patients and senior therapists with averagely 13 years of work experience. The CI identified the following 5 stages for the current stroke rehabilitation therapy services:

- **Check-in:** Nurses confirmed patients' identity, accessed records of patients' rehabilitation progresses, and informed therapists of patients' arrival.

- **Warm-up:** Therapists gave massages to patients to reduce their muscle tension and help patients relax. Some patients were directed to do basic level exercises (e.g., slow walking) and warm-up stretching.
- **Preparation/Instructions:** Therapists explained training the session, and the exercises, and prepared patients to get ready to perform rehabilitation activities.
- **Rehabilitation/Treatment:** Therapists engaged patients, depending on their disabilities, in passive/active exercises, and/or progressively helped patients perform complex and demanding tasks.
- **Assessment:** After the treatment, therapists identified decline or changes in patients' physical function and cognition that may or may not respond well to treatment and then entered the information into the computer system. Therapists might also review patients' stroke discharge check-list and go through follow-up assessment on patients' recovery and address points where patients may need help.

Table 1 shows the identified critical incidents. There were a total of 14 critical incidents identified from the observation and interview with three stroke patients and their therapists. Among these incidents, eight fell under reliability that occurred while therapists prepared patients for their rehabilitation exercises. Most of them were about therapists failing to regularly/consistently explain how the selected modalities, equipment, and movement related with patients' paralysis, spastic and involuntary muscle movement. Such problem not only made patients less engaged in the rehabilitation activities, but also lowered patients' motivations to continue receiving the rehabilitation therapy services.

The problem of reliability could be found from the utterances of three patients in the interview:

- *"I had no idea where the admission form and the doctor's order were. They might be probably handed to my family members."*
- *"When I started a new treatment, my therapist would explain what hand functions were to be improved. However, along the way in the rehabilitation process, he did not explain every adjustment he made. I would anyway ask him about it as I wanted to do the same thing at home."*

The most common incident (happening 3 times) was that therapists failed to do good care and understand patient wants on an individual level (falling under empathy). This issue was respectively found in the stages of warm-up, therapists' preparation for rehabilitation, and patients' rehabilitation exercises.

In addition, our CI also identified incidents related with responsiveness (e.g., nurses and therapists did not promptly respond to patients' requests), tangible (e.g., equipment was not set up properly before patients began exercises), and assurance (e.g., therapists did not necessarily provide instant feedback and clear discharge instructions needed for patients to transit into their next stage, such as referrals to community resources, dietary instructions, medication instructions, and home therapy schedules and programs, etc.).

To further understand which gaps deviated the most from customer values and which should be first improved, our study conducted a survey with 11 patients and therapists on each of the critical incident relevant to patients' customer value. Table 2 shows the demographic information of the participants. From Table 2, most participants were elder people (around the age of 60) with chronic disorders (for above 1 year). Half of them were males

Table 1. Critical incidents (service gaps) in the stroke rehabilitation service

Service stage	Deviation from customer value	Critical Incident (CrI) (s)
Check-in	Reliability	CrI 1 - Patients did not always bring with them their patient admission forms and their doctor's signed orders. Therapists could not have critical therapeutic information needed for rehabilitation in the first place
	Responsiveness	CrI 2 - Nurses were busy and did not respond to all patients' requests promptly. Depending on the situation, nurses might let patients wait in the waiting area until they finished their job at hand
Warm up	Empathy	CrI 3 - Therapists did not actively show patients their cares with respect to their recovery progress
Preparation/ Instructions	Empathy	CrI 3 - Therapists did not actively show patients their cares with respect to their recovery progress
	Reliability	CrI 4 - Therapists did not always thoroughly explained to the patients how to properly use the rehabilitation equipment, making patients possibly exercise with the wrong posture. Patients also had no idea when the exercise would finish and when to move to the next rehabilitation exercise
		CrI 5 - Therapists did not always explain whether the treatments patients received would help them reach the preset goal. Therapists sometimes explained about it after being asked
		CrI 6 - Therapists did not always or in the first place explain how each physical movement was linked to their functional recovery. Patients' willingness to participate in the rehabilitation program might be decreased accordingly
		CrI 7 - Therapists did not particularly explain to patients the modalities they used in the treatment. Therapists normally would not explain until being asked
	Tangible	CrI 8 - In the beginning, therapists did not set up all tools/equipment in the right place
Rehabilitation/ Treatment	Empathy	CrI 3 - Therapists did not actively show patients their cares with respect to their recovery progress
	Reliability	CrI 9 - Exercises and activities were not planned according to patients' physical strength and the session timeframe, making patients easily feel exhausted after the treatment
		CrI 10 - Therapists did not always provide patients with or suggested adequate treatments according to their post-stroke conditions
	Responsiveness	CrI 11 - Therapists were not able to perform one-on-one rehabilitation because of the shortage of man power, making them hard to instantly keep track on patients' activity progress. Dealing with multiple patients at one time also made patients feel ignored
Assessment	Assurance	CrI 12 - Therapists did not provide summative feedback on patients' recovery progress right after the therapy session unless being asked
		CrI 13 - Therapists did not provide patients' with practical advices/ tips on caring themselves at home unless being asked
	Reliability	CrI 14 - Patients did not regularly receive assessments in stroke recovery every time after their rehabilitation

and half were females. One half of the participants had left-side paralysis while the other half had right-side paralysis. Most participants were in Brunnstrom stage 3 of stroke recovery. On the other hand, most therapists were young (in the age of 30 s) and had sufficient work experiences (generally around 8 years).

Table 2. Characteristics of the participants responding to the identified critical incidents

	Stroke patients (n = 11)	Therapists (n = 11)
Female/Male	5/6	2/9
Age (mean ± SD)	60 ± 12.3	32.6 ± 10.8
Onset duration (mean ± SD) (months)	40.9 ± 24.4	
Paretic Limb (left/right)	6/5	
Brunnstrom-upper	3.6 ± 1.1	
Work Experience (mean ± SD) (years)		8.6 ± 9.4

Table 3 shows participants' ratings to all the incidents under the five customer values. Overall, participants' ratings were greater than 3, suggesting that participants thought that the identified customer value, i.e., service quality, were important and that participants generally felt satisfied with the rehabilitation therapy services. Both patients and therapists tended to rate assurance the most important value (Mean = 4.41, SD = 0.66; Mean = 4.82, SD = 0.40). In terms of satisfaction, empathy was rated highest by both group of participants. It appeared that empathy was addressed by the current services. In addition, the least important customer value for the patients appeared to be different than that for the therapists. Empathy was rated the lowest by the patients while tangible was rated the lowest by the therapists. Both groups gave responsiveness the lowest satisfaction ratings.

To verify which customer value was considered the most important/the least satisfied and to be particularly addressed by the current rehabilitation services, inferential statistics were conducted (in Minitab 15) on the rating scores of the participants. The one-way ANOVA tests indicated that, for the stroke patients, their ratings on importance were not significantly different across the 5 customer values, $F(4, 50) = 0.16$, $p = 0.957$. However, their ratings on satisfaction were significantly different across the values, $F(4, 50) = 3.12$, $p = 0.023$. Despite that the ratings for the 5 customer values were generally high, the Tukey pairwise comparisons showed that the ratings for responsiveness was significantly lower than those for empathy. This suggests that, from the perspective of stroke patients, despite that the importance of the 5 values were not considered different, responsiveness could be improved in the current rehabilitation services. In fact, there were participants complained about therapists' lack of responsiveness in the interview.

- For instance, as one patient articulated, *"My therapist usually treated 2-3 patients. I sometimes needed to wait. It might be due to the lack of manpower…"*
- In addition, empathy appeared 3 times in the CI. Some patients stressed its importance in the interview, *"My therapist always chatted with me during my training session. It made me feel relax and happy."*

Table 3. Participants' subjective ratings on the identified critical incidents and the service quality dimension

Customer value – service quality dimension	Critical incident	Stroke patients				Therapists			
		Importance		Satisfaction *		Importance *		Satisfaction	
		Mean (SD)		Mean (SD)		Mean (SD)		Mean (SD)	
Assurance	CrI 12	4.55 (0.93)	4.41 (0.66)	4.55 (0.93)	4.27[a,b] (0.61)	4.82 (0.40)	4.82[a] (0.40)	4.27 (0.47)	4.18 (0.34)
	CrI 13	4.27 (1.27)		4.00 (118)		4.82 (0.40)		4.09 (0.30)	
Empathy	CrI 3	4.09 (1.38)	4.09 (1.38)	4.82 (0.40)	4.82[a] (0.40)	4.18 (0.60)	4.18[a,b,c] (0.60)	4.36 (0.50)	4.36 (0.50)
Reliability	CrI 1	3.36 (0.92)	4.34 (0.35)	3.64 (0.67)	4.40[a,b] (0.46)	4.09 (114)	4.55[a,b] (0.36)	4.00 (0.63)	4.17 (0.26)
	CrI 4	4.73 (0.65)		4.36 (0.92)		4.91 (0.30)		4.27 (0.47)	
	CrI 5	4.45 (0.82)		4.09 (114)		4.82 (0.40)		4.09 (0.54)	
	CrI 6	4.36 (1.03)		4.45 (0.93)		4.91 (0.30)		4.18 (0.40)	
	CrI 7	4.55 (0.82)		4.55 (0.69)		4.36 (0.67)		4.09 (0.30)	
	CrI 9	4.82 (0.40)		4.73 (0.90)		4.00 (0.63)		4.00 (0.63)	
	CrI 10	4.82 (0.40)		4.55 (0.69)		4.55 (0.52)		4.18 (0.40)	
	CrI 14	3.64 (1.36)		4.82 (0.40)		4.73 (0.65)		4.55 (0.52)	
Responsiveness	CrI 2	4.09 (1.38)	4.27 (1.01)	4.55 (0.93)	4.09[b] (0.83)	3.73 (0.90)	3.86[b,c] (0.67)	4.27 (0.65)	3.86 (0.67)
	CrI 11	4.45 (1.21)		3.64 (1.75)		4.00 (0.89)		3.45 (0.93)	
Tangible	CrI 8	4.18 (1.40)	4.18 (1.40)	4.73 (0.47)	4.73[a,b] (0.47)	3.73 (0.90)	3.73[c] (0.90)	4.27 (0.65)	4.27 (0.65)

Note: * denotes significant difference of participants' ratings among the 5 customer values (i.e., service quality dimensions), $p < 0.05$; Means that do not share a letter are significantly different.

The one-way ANOVA tests also indicated that, for the therapists, their ratings on satisfaction were not significantly different across the 5 customer values, $F(4, 50) = 1.49$, $p = 0.218$. However, their ratings on importance were significantly different across the 5 values, $F(4, 50) = 6.28$, $p = 0.000$. The Tukey pairwise comparisons showed that tangible received the lowest ratings and was the least important customer value. The most important customer value was assurance. Regarding assurance, both groups of participants confirmed its importance in the interview.

- As articulated by one therapist, "*Patients are more willing to complete the training session after they were shown the purpose of the activities.*"
- Two patients made similar comments, "*I would like to know what daily exercises I can do with my affected hand at home as my rehabilitation recovery supplement.*"

"I preferred doing activities rather than doing the assessments. Now I don't have to do the assessment often, and I think it's good. Besides, my therapist always let me know if I made good progress on my hand function. I felt being cared."

The above analyses yielded interesting findings and service recommendations:

- First, the analyses showed that therapists believed that their therapy services universally addressed and satisfied the 5 customer values. However, from the viewpoint of the stroke patients, despite that they felt satisfied with the overall service quality, the 5 customer values were not consistently addressed in the services. Particularly, *responsiveness* is the 1 among the 5 values that could be looked at and make improvements. In other words, therapists and/or nurses should react to patients' requests, wants, and needs more promptly and proactively during patients' rehabilitation process.
- Second, the analyses revealed that, for the therapists, (1) the 5 customer values were not equally important; (2) among the 5 values, a*ssurance* is the one that comparatively was the most critical in the services (with the mean rating of 4.82, almost close to 5). The findings contradicted with what we observed in the CI, meaning that although *assurance* was considered important, there were still 2 critical incidents related with it. In other words, what the therapists believed as important did not reflect what they actually delivered in the field. From our interview with the therapists, the lack of manpower and the heavy workload could have been the causes making them have difficulties addressing assurance in their services. Thus, to resolve the problem, the management of the rehabilitation center should revisit the work and task design to balance patients' demand and therapists' capabilities so that therapists are more able to provide instant feedback to help patients progress their training and recovery.
- Third, the CI found that 8 out of 14 critical incidents were related with *reliability*, especially while therapists prepared patients for their rehabilitation activities. It appeared that therapists did not necessarily provide individualized instructions on the treatment, the equipment, as well as the rehabilitation plan/goal/timeline/process, etc., thus easily making patients lose patience, motivation, and trust in the services. To deal with this problem, therapists should provide the needed instructions to patients in a consistent manner to maintain good service quality.

5   Conclusions

Taking care of patients is what healthcare is all about. It may be hard for some people to think of patients as customers, but they definitely are. The goal of this study was to assess patient needs (from the perspective of customer value) for the enhancement of stroke rehabilitation services. CI (involving observation and interview) was conducted with 3 stroke patients and their therapists to identify the critical incidents (i.e., service gaps) in the rehabilitation services related with the customer values (i.e., the service quality dimensions identified in SERVQUAL). A survey was conducted with 11 stroke patients and 11 therapists to obtain subjective ratings on the critical incidents to provide quantitative insight that supported the findings in CI in improving current stroke

rehabilitation services. Results of the study revealed 14 critical incidents, most of which were related with reliability, occurring when therapists prepare patients for rehabilitation activities. Empathy was another customer value deserving the attention as it occurred multiple times throughout the rehabilitation services. Results of the survey showed that, overall, participants' ratings were greater than 3. Patients generally thought that the 5 customer values were equally important. Patients were less satisfied with the responsiveness of the therapists (compared with other customer values). In addition, therapists thought that, among the customer values, assurance tended to be the most important; tangible tended to be the least important. However, all customer values were equally addressed by their services and were satisfied by stroke patients. The recommendations to the current rehabilitation services were as follows:

- Therapists and/or nurses should react to patients' requests, wants, and needs more promptly and proactively during patients' rehabilitation process.
- The management of the rehabilitation center should revisit the work and task design to balance patients' demand and therapists' capabilities so that therapists are more able to provide instant feedback to help patients progress their training and recovery.
- Therapists should provide the needed instructions to patients in a consistent manner to maintain good service quality.

Most healthcare services were mainly developed from the perspective of the healthcare providers, causing the gaps between the patient needs and the provided services. Few services were developed from the angle of customer value. The outcomes of the study provided insight on critical stroke patient needs and contributed to the design of stroke rehabilitation therapy services.

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