

Chedoke Arm and Hand Activity Inventory-9 (CAHAI-9): Perceived Clinical Utility Within 14 Days of Stroke

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Purpose: The Chedoke Arm and Hand Activity Inventory-9 (CAHAI-9) is an activity-based assessment developed to include relevant functional tasks and to be sensitive to clinically important changes in upper limb function. The aim of this study was to explore both therapists' and clients' views on the clinical utility of CAHAI-9 within 14 days of stroke. **Method:** Twenty-one occupational therapists actively working in stroke settings were recruited by convenience sampling from 8 hospitals and participated in semistructured focus groups. Five clients within 14 days of stroke were recruited by consecutive sampling from 1 metropolitan hospital and participated in structured individual interviews. The transcripts were analyzed thematically. **Results:** Six themes emerged from the focus groups and interviews: collecting information, decisions regarding client suitability, administration and scoring, organizational demands, raising awareness, and clients' perceptions of CAHAI-9 utility. All therapists agreed CAHAI-9 was suited for the stroke population and assisted identification of client abilities or difficulties within functional contexts. Opinions varied as to whether CAHAI-9 should be routinely administered with clients who had mild and severe upper limb deficits, but therapists agreed it was appropriate for clients with moderate deficits. Therapists made suggestions regarding refinement of the scoring and training to increase utility. All clients with stroke felt that the assessment provided reassurance regarding their recovery. **Conclusion:** The findings indicate that CAHAI-9 shows promise as an upper limb ability assessment for clients within 14 days of stroke. **Key words:** occupational therapy, stroke, upper extremity

Acute stroke care is characterized by a focus on rapid, thorough assessment and early management, and the upper limb is a common focus for assessment by occupational therapists. Upper limb assessment practices in the acute care setting need to be applicable to a population that displays a wide range of abilities as a result of differing levels of stroke severity.¹ This article reports on a study investigating perceptions of the utility of an upper limb assessment, the Chedoke Arm and Hand Activity Inventory-9 (CAHAI-9),² within 14 days of stroke.

Often multiple tools are used throughout the upper limb assessment process due to the variation in stroke manifestations and the clients' changing needs as they recover.³ Two approaches to upper limb assessment are common.³ First, current upper limb assessment practice is often focused on assessment at a body function level,⁴ because clients with acute stroke are often unable to tolerate the activity demands of a self-care assessment as they typically fatigue quickly and have reduced sitting tolerance.⁵ Assessment at the

body function level includes assessment of muscle power (eg, through manual muscle testing⁶), range of movement, tone (eg, using Modified Ashworth Scale⁷), grip strength (eg, measured with a dynamometer⁸), and speed and dexterity (eg, using the Nine Hole Peg Test⁹). There are a number of problems with occupational therapists relying on assessments at a body function level to determine the impact of the stroke-affected upper limb on functional ability. The relationship between difficulties at a body function level and ability to use the affected upper limb is not linear.¹⁰ The use of the affected upper limb depends on a complex interaction between the degree of recovery and the compensatory behaviors of the client.¹¹ Assessments at a body function level are often not sensitive enough to detect small changes in motor recovery.^{12,13}

As clients with stroke become more medically stable and able to tolerate activity demands, a second approach is often used in which general observations of the upper limb are made at an activity level⁴ (eg, within the context of self-care and independent living skills). However, there are a number of problems with using this approach to assess the upper limb following stroke. Activity of daily living (ADL) assessments such as the Barthel Index¹⁴ (BI) are not sensitive enough to detect deficit with higher functioning clients and have a ceiling effect,¹⁵ and the FIM™ scale¹⁶ can show a plateau in ADL function that does not reflect the recovery of motor function in the affected upper limb.¹³ Global assessments of function such as the FIM¹⁶ and BI¹⁴ are designed to measure basic ADLs. As independence in ADLs is influenced by variables other than motor function, both measures allow clients to use compensation or adaptive strategies to achieve independence.¹⁷

Assessments at a body function level and general assessment of the upper limb in the context of a self-care assessment do not specifically measure the client's ability to use the upper limb in a functional manner. An alternative to these 2 approaches is an assessment of upper limb ability. Upper limb ability is defined as the use of the arm in meaningful activity and incorporates ADLs,¹⁸ for example, using cutlery, fastening clothing, using a pen, or opening containers. Assessments at this level are designed to specifically measure upper limb recovery following stroke by assessing at the activity level. Fasoli¹³ advocates that upper limb ability assessments may assist therapists to commence upper limb therapy programs earlier, better understand the impact of movement losses on daily tasks, and make a more informed clinical decision regarding the client's future treatment needs.

CAHAI-9

The CAHAI-9 is 1 assessment that examines upper limb ability for clients with stroke. CAHAI-9 is an activity-based assessment developed to include relevant functional tasks and to be

sensitive to clinically important changes in upper limb function.¹⁹ The inventory includes 9 real-life functional tasks and is accompanied by a detailed instruction manual.²⁰ The test items include the following: opening a jar of coffee, calling 911 on a telephone, drawing a line with a ruler, pouring a glass of water, wringing out a washcloth, doing up 5 buttons, putting toothpaste on a toothbrush, drying back with a towel, and cutting medium-resistance putty with a knife and fork.²⁰ Each test item uses a 7-point quantitative activity scale to assess functional recovery of the upper limb. **Table 1** provides a description of the levels of function for the activity scale. The level of function for each test item is summed for a total raw score, which can be converted to a percentage.²¹ The minimum score is 9 and the maximum is 63, with a higher score indicating less disability.²⁰ According to the developers, CAHAI assists in establishing a baseline picture of upper limb function and guides treatment decisions.² Test items were generated by clients with stroke and judged by a team of experts in stroke rehabilitation to be representative of upper limb function.²¹ The rigor of standardization studies for reliability and validity was rated as excellent.¹⁸ However, the assessment tool needs to be tested in clinical practice to ascertain therapists' and clients' appraisal of its usefulness in managing the upper limb of clients affected by stroke. Currently, there is minimal documentation of CAHAI-9's clinical utility.

Clinical Utility

Clinical utility addresses the question, "Will the results of this assessment provide me with information that can be used in the management of this client?"^{22(p134)} Clinical utility also refers to how easy an assessment is to use²³ and includes issues such as the target population, purpose of assessment, and task descriptions.²⁴ Other aspects include assessment availability, cost, training, ease of administration, scoring, interpretation, and administration time.²⁵ Clinical utility is one of the most significant influences on the actual use of an assessment in a clinical situation.²⁵ A number of studies have addressed clinical utility using a wide variation in methods.^{24,26–39} Focus groups and interviews are commonly employed for

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Table 1. Description of the levels of function for the Chedoke Arm and Hand Activity Inventory-9

Score	Level of function
7	Complete independence: All of the tasks are performed safely; without modification, assistive devices, or aids; and within reasonable time.
6	Modified independence: Activity requires any 1 or more of the following, an assistive device, more than reasonable time, or there are safety (risk) considerations.
5	Supervision: The client requires no more help than standby, cuing, or coaxing, without physical contact. A helper sets up needed items or applies orthoses.
4	Minimal assistance: With physical contact, the client requires no more than touching, and client expends 75% or more of the effort.
3	Moderate assistance: Weak limb manipulates and stabilizes during the task. The client requires more help than touching or expends half (50%) or more (up to 74%) of the effort.
2	Maximal assistance: Weak limb stabilizes during task. The client expends less than 50% but at least 25% of the effort.
1	Total assistance: The client expends less than 25% of the effort.

Data from Barreca SR. *Chedoke Arm and Hand Activity Inventory: Administration Manual*. Hamilton, Ontario, Canada: McMaster University, School of Rehabilitation Science; 2004.

clinical utility studies^{33–36,38,39} because they present an opportunity for in-depth analysis of behavior and opinions, allowing the researcher to probe responses and observe reactions.⁴⁰ The aim of this study was to explore therapists' views on the clinical utility of CAHAI-9 within 14 days of stroke using qualitative methods.

Methods

This qualitative study was completed between September 2007 and February 2008. It elicited perspectives from therapists working across 8 settings and was the final phase of a larger study exploring the clinical utility of CAHAI-9.⁴¹

Participants

The main participant group comprised occupational therapists who were working with clients within 14 days of stroke, were able to participate in the CAHAI-9 training program, and had the opportunity to administer the CAHAI-9 assessment to stroke clients with upper limb difficulty within 14 days of admission. Six months prior to participation in the qualitative study, therapists watched a 90-minute DVD produced by the CAHAI-9 authors⁴² that covered theory, administration/scoring procedures, and case studies. The therapists were given an opportunity to score videotapes of client with strokes completing CAHAI-9 tasks. After completing the

training, 32 therapists assessed clients using the CAHAI-9 over a period of 6 months. Twenty-one of these therapists agreed to participate in the qualitative study. **Table 2** summarizes the occupational therapists' characteristics.

In addition to the occupational therapists, 5 clients with stroke were recruited by consecutive sampling from 1 metropolitan hospital to check how they had experienced being assessed using the CAHAI-9. Although the tool was originally developed from client identification of potential test items,¹⁹ it was important to confirm that

Table 2. Occupational therapist characteristics (n = 21)

Characteristics	N (%)
Neurological experience, years	
<1	6 (29)
1–5	9 (42)
5+	6 (29)
Main caseload	
General medicine	11 (52)
Acute stroke	4 (19)
Rehabilitation	6 (29)
No. of CAHAI-9 administrations	
1	7 (33)
2	2 (10)
3	4 (19)
4	3 (14)
5+	5 (24)

Note: CAHAI-9 = Chedoke Arm and Hand Activity Inventory-9.

Table 3. Client with stroke characteristics (n = 5)

Characteristics	Client with stroke				
	1	2	3	4	5
Age, years	70	45	59	67	49
Gender	Male	Male	Male	Female	Male
Diagnosis	POCS	PACS	LACS	PACS	LACS
Hand affected	Right	Left	Right	Left	Right
CAHAI-9 score	45/63	43/63	63/63	63/63	37/63

Note: CAHAI-9 = Chedoke Arm and Hand Activity Inventory-9; LACS = lacunar syndrome; PACS = partial anterior circulation syndrome; POCS = posterior circulation syndrome.

clients found the assessment requirements manageable. Clients were included if they had a diagnosis of stroke, were assessed with CAHAI-9 within 14 days of their admission, and were willing and capable of providing informed consent to participate. Clients were excluded if they had communication difficulties (as verified by speech and language therapist assessment), had cognitive impairment (as verified by occupational therapist assessment), were medically unwell, or were admitted for palliative measures. **Table 3** summarizes the characteristics of the 5 clients with stroke.

Data collection

Prior to data collection, ethical approval was granted by the appropriate hospital and university ethics committees, and written informed consent was obtained from participants. To gain insight into the perceived utility of CAHAI-9, we collected qualitative data from occupational therapists using focus groups and from clients with stroke through individual interviews. Focus groups are a time-efficient and practical way of exploring experiences⁴³ and have been commonly used to investigate clinical utility.^{34–36,38} The use of focus groups allowed us to explore therapists' perceptions of clinical utility in a way that provided more in-depth information than would be available from a questionnaire, with exploration of comments and experience to assist understanding. Structured individual interviews have also been used to investigate clinical utility^{30,33,39} and were conducted with clients with stroke to obtain a record of the client experience of the CAHAI-9

assessment. Individual interviews enabled data collection within 24 hours of CAHAI-9 assessment.

Occupational therapists initially completed questionnaires recording their demographics and then participated in a focus group. Five focus groups of 1-hour duration were conducted by an experienced facilitator independent of the research team. Three groups were held at metropolitan hospitals, with 2 groups of 4 therapists and 1 group of 5 therapists. For therapists who were more geographically dispersed, 2 groups with 4 therapists each were conducted via teleconference. All focus groups were audio recorded. Semistructured questions were used for focus groups to ensure research questions were directly addressed, and the data gathered were consistent across the groups while allowing for further investigation of issues raised.⁴⁴ The questions were informed by the quantitative data collected in a larger study.⁴¹ For example, the quantitative data analysis from the occupational therapists of the study raised additional questions about scoring and interpretation of the CAHAI-9 results and the influence of organizational demands on upper limb ability assessment, and these were included in the question schedule. At the conclusion of the focus groups, the facilitator summarized the issues raised to check her understanding of the issues and invited therapists to clarify or make additional comments.

As clients with acute stroke are likely to experience a lower tolerance for activity,²⁵ individual interviews approximately 10 minutes long were conducted by the facilitator of the focus groups. Two interviews were conducted face-to-face, whereas the remaining 3 clients

participated in telephone interviews. All interviews were audio recorded and conducted within 24 hours of CAHAI-9 assessment. Clients with stroke were asked whether the CAHAI-9 administration time, instructions, and tasks were relevant to their acute care needs. The facilitator asked for comments on how CAHAI-9 assisted clients to understand their functional difficulties resulting from stroke. Clients' perceptions were included to explore the correspondence of client experiences with occupational therapists' perceptions of CAHAI-9's clinical utility.

Data analysis

Audio recordings from each of the focus groups and individual interviews were transcribed verbatim. Transcripts were examined by thematic analysis to identify themes that would facilitate an understanding of the clinical utility of CAHAI-9. The analysis began with 2 authors reading the transcripts several times and identifying all sections relevant to the research questions. Consequently, initial coding categories had a high correspondence with the question guide, as the data appeared to be structured well around these topics. After dialogue and comparison of initial coding categories generated by 2 authors, the transcripts were coded by the first author. A coding check was completed on a randomly selected 10% of the data by the second author to evaluate the robustness of the coding categories. Differences in coding were resolved by consensus, and alteration and clarification of coding categories were undertaken. The data were recoded using the revised coding categories.

Results and Discussion

This section outlines the results of the study and discusses them in relation to current occupational therapy literature. Examples of written comments are followed by a code, for example, F1P4 (focus group 1, participant 4) or I2 (interviewee 2). For parsimony, discussion points are incorporated after the results as appropriate.

Six themes emerged from the focus groups and interviews. Four themes related to using the CAHAI-9 as it was designed: collecting information, decisions regarding client suitability,

administration and scoring, and organizational demands. The theme raising awareness developed because the responses also indicated that CAHAI-9 was used for purposes other than assessment. The final theme reports clients' perceptions of being assessed using the CAHAI-9.

The range of levels of therapist experience, organizational demands, and familiarity with CAHAI-9 administration was considered when analyzing the data. These analyses are not referred to in the results when there were no clear trends. For the themes of collecting information, administration and scoring, and organizational demands, there were trends that are described and discussed further.

Collecting information

In the first theme, the therapists spoke of how the CAHAI-9 was considered useful for collecting information about the clients and their upper limbs that readily identified abilities and difficulties and provided useful information for clinical decision making.

In particular, therapists described the identification of abilities and difficulties within a functional context as an important contribution of the CAHAI-9. For example, "CAHAI-9 was practical and gave a visual idea of which components of activities were difficult" (F5P3). All therapists agreed that CAHAI-9 was a suitable assessment for the stroke population and, apart from 1 therapist, felt CAHAI-9 represented a good balance between gross and fine motor components.

Four therapists commented that CAHAI-9 represented a range of functional activities that therapists working in acute caseloads would find useful but might not ordinarily assess because of time restrictions or clients' inability to participate in a self-care assessment, as illustrated by the following quotes: "I feel it can be quite useful because it looks at the range of activities the therapist in the acute setting might not be otherwise able to do" (F2P3) and "It was a good range of tasks, including fine motor, gross motor, and strength components. I thought that was very good for the stroke population" (F5P1).

In the acute setting, therapists may be able to screen only areas of primary concern and use that

information to recommend continued assessment or treatment in an alternative setting.⁴⁵ Therapists commented on how CAHAI-9 allowed them to collect information that influenced their decisions about ongoing client care. Three therapists recounted instances when CAHAI-9 helped them identify the most appropriate setting for follow-up. For example, “[CAHAI-9] potentially could be a good way of highlighting more specific deficits that should be addressed at least in an outpatient role if not inpatient care” (F3P1) and “There is also a danger of overlooking component deficits and focusing on compensation and safety in functional activities” (F3P1).

In the settings in which this research was undertaken, it is common for therapists working in general medical caseloads to have frequent caseload rotation. As professional reasoning styles depend on experience within a specific context,⁴⁶ therapists experiencing frequent caseload rotations may need additional support for their reasoning. Therapists reported that the CAHAI-9 supported them in making clinical decisions, such as about postdischarge care. In the study, the less experienced therapists were particularly positive about the tool's use. This may be because the tool helps therapists to systematically identify salient cues, a task that can be difficult for therapist with lower levels of experience.⁴⁶

“If you are looking at a component view [deficits at a body function level], sometimes it's hard to translate that into function but by doing the CAHAI-9 you can clearly see how [the stroke] is going to impact on their day-to-day activities and what that might mean for home. [For example] how much assistance are they going to need?” (F4P4)

Therapists identified nonmotor deficits that could be affecting client performance. Despite the CAHAI-9 being an assessment of upper limb ability, 5 therapists stated that CAHAI-9 was useful as a “general screening tool” (F1P2) and for “ruling out other deficits” (F5P3). However, opinions varied about the effectiveness of the tool for identifying specific nonmotor deficits. Cognitive, perceptual, and visual difficulties were commonly identified, followed by the impact of client motivation on recovery.

“I also found that I gained more information about their attention, use of objects, perception, vision, and those range of things as well. It wasn't purely a motor [deficit]

that I was looking for. I used it to look for a whole range of deficits that they may or may not have, so that was good.” (F4P3)

Although CAHAI-9 is designed to facilitate comprehensive assessment of upper limb ability,²¹ it also appears to provide occupational therapists with the opportunity to observe nonmotor deficits. This may help them to better understand the impact of stroke on performance of daily tasks, resulting in better identification of discharge care requirements.

The aim of formal assessment is to collect information to support clinical decision making. The developers of CAHAI-9 aimed to develop an assessment that helps to identify client abilities or difficulties within a functional context.²¹ The results from our study suggested that the CAHAI-9 did assist therapists in this way.

Decisions regarding client suitability

In this second theme, therapists talked about how they decided which clients to assess with CAHAI-9. Considerations related to the severity of upper limb impairment, timing of assessment, and the presence of other deficits. With respect to upper limb impairment, therapists talked in terms of mild, moderate, and severe upper limb deficits.

Opinions varied as to whether CAHAI-9 should be routinely administered with clients who had mild upper limb deficits. Three therapists felt CAHAI-9 may not be sensitive enough to identify high-level difficulties: “Some of the items were a bit easy at times and so it didn't really tell me anything new. For people with fairly mild deficits, we already knew they could do basically everything” (F1P4). “Most of the people I've used it with were quite high level and they could certainly complete all tasks so it added little” (F1P1). In contrast, 5 therapists reported CAHAI-9 was effective, particularly in attending to fine-motor assessment, and that its routine use may prevent these difficulties being overlooked: “I still think it's got the ability to pick up those fine motor, grasp, and in-hand manipulation [deficits]. It's still useful I think even if someone has a mild difficulty” (F4P3). “It is a good little tool if it is someone who you think is fine, because often fine motor [difficulties] can be masked” (F4P1).

Two therapists identified CAHAI-9's utility for observing the quality of movement in clients who are motivated to remediate high-level deficits, which allows therapists to provide quite specific feedback and engage in goal setting with the client: "It allows you to work on the quality and the method of how they do their activities of daily living if that is important to them" (F1P3).

Seven therapists agreed that CAHAI-9 was an appropriate assessment for clients with moderate upper limb deficits. However, 12 therapists felt CAHAI-9 had limited utility for clients with severe upper limb deficits within 14 days of stroke. One therapist explained, "It wasn't very sensitive to [clients with severe upper limb deficits] because they weren't able to complete any of the tasks in a bilateral way" (F1P2), and another suggested, "Their function is so limited they would not be able to attempt [CAHAI-9] tasks . . . this group is working on scapular and proximal control and may not have any hand function" (F5P1).

Therapists identified a number of other considerations when determining client suitability. The most frequent comment was timing of the assessment to ensure that "clients were not set up to fail" (F2P1). The client's emotional adjustment and level of insight were reported by 6 participants as important considerations when determining the appropriate timing for assessment with CAHAI-9.

"You wouldn't be putting [clients] in activities where they are going to fail when you know that they are going to find that a really de-motivating factor." (F4P1)

"In certain situations it probably was a bit less appropriate for [clients with severe upper limb deficits] if you already knew that they were going to respond badly to assessment." (F1P4).

"She was the sort of [client] who would have got quite upset to see her deficits and quite down. And I decided not to do that to her; but then as she started to improve I did [CAHAI-9] later on and she really could see the improvements." (F3P4)

Two therapists reported instances when clients found the assessment increased their frustration about their limited abilities.

"I think some [clients] found it challenging and confronting because the CAHAI-9 looks at maximal use of the affected arm in bimanual tasks. They were frustrated because they couldn't compensate by using the unaffected arm or stabilizing [items] with their knees." (F3P2)

Three therapists questioned the validity of the results when clients had severe visual, cognitive, and/or perceptual impairments. Another 2 therapists questioned the cultural applicability of some tasks following their experiences assessing refugees, and 4 therapists reported difficulty when assessing clients with severe communication difficulties, such as significant receptive aphasia and those who did not speak English. "If someone has difficulty following the instructions, which is one of the key aspects, then it's a little bit of a time waster and it doesn't give you the information you want" (F2P4). Three therapists reported confusion and agitation as reducing CAHAI-9's utility. For example, "If they are confused and agitated then you are not really going to know if you are getting accurate results" (F4P4).

The results demonstrate a trend toward agreement for CAHAI-9 suitability for clients with moderate upper limb deficits, whereas therapists generally viewed CAHAI-9 as unsuitable for clients with severe upper limb deficits. Therapists appeared reluctant to use CAHAI-9 if clients were likely to be unsuccessful.

Administration and scoring

The third theme of administration and scoring was dominated by negative impressions as therapists described their experiences of scoring CAHAI-9 in the clinical setting. A range of issues were raised, including perceived reliability, the clinical importance of the score, the relationship between familiarity with the assessment and scoring, and effectiveness of training.

Regarding the selection of a version of the CAHAI for clients within 14 days of stroke, all therapists agreed they would select the CAHAI-9 over the CAHAI-7, stating the additional test items would have negligible effect on total test administration but would be of value. One therapist commented, "It doesn't lengthen the assessment to any significant amount and they're tasks that are so important that [clients] will do two or three times a day" (F4P4).

Twelve therapists had low confidence that they would score reliably over time or consistently with others. As 1 therapist commented, "With experience we have found that [clients] assessed

by different therapists had quite different scores” (F4P5). To increase utility, 5 therapists suggested the addition of a comments section to the score sheet to capture why they scored a particular way, to which they could refer back later. When therapists were asked if familiarity with CAHAI-9 assisted administration and scoring, 2 therapists experienced with CAHAI-9 agreed with other therapists that this skill in scoring develops with experience. They also described an increased ability to observe other deficits (such as nonmotor) simultaneously. For example, 1 therapist stated,

“The interrater reliability may have improved because we are using it on a regular, consistent basis because of the caseloads we’re in. But I agree, I think it takes a little while to get used to administering and then scoring [CAHAI-9] accurately. You need to have a bit of experience using it.” (F4P4)

When asked about the clinical importance of the assessment, all therapists felt that observing clients performing functional tasks was very useful and that it was more important than the score itself. As 1 therapist stated, “It is important to document the [client’s] score and to observe it change over time but in terms of planning treatment and understanding the impact [of the stroke] on the [client], observing functional activity is more important” (F1P1). Five therapists felt that the clinical significance of the score could be improved if it was accompanied by descriptors, similar to other standardized assessments. Six therapists felt the CAHAI-9 was a valid method of reporting results to the multidisciplinary team. For example, “CAHAI-9 is an objective way of describing upper limb function which can then be easily interpreted for other team members” (F4P1).

Regarding the effectiveness of the training DVDs, 3 therapists desired “more examples of each task” (F3P1), particularly examples of the score at each level for each test item. Four therapists felt it was necessary to view the training DVDs before attempting CAHAI-9 administration because occupational therapists typically tend to focus on whether a client can do the task, whereas the assessment measures how the client uses the upper limb in performing the task. One therapist suggested, “People just need to be aware that [CAHAI-9] has a slightly different focus in how

you score . . . which is what makes it so unique” (F4P2).

These results suggest that the current self-directed training resources are not meeting the needs of the therapists in the study. Because the results suggested that familiarity with CAHAI-9 improves confidence with scoring, the fact that 62% of therapists had completed 3 or fewer CAHAI-9 assessments may contribute to the overall feeling of reduced confidence in scoring reliability reported in this study.

Organizational demands

Therapists were asked to discuss the circumstances influencing their decisions regarding whether to use CAHAI-9 in the first 14 days post stroke. It became clear from therapists’ responses that the main influencing factors were linked to the settings that therapists were working in. This included general medical wards, acute stroke units, and rehabilitation units and was exemplified by the therapist who stated, “It greatly depends on your caseload and the focus of your treatment” (F5P4).

Therapists working in general medical wards reported that clients with stroke were often transferred to an acute stroke or rehabilitation unit within a few days of admission. Seven therapists working in these settings reported focusing on “general screening [of deficits]” (F3P4), assessing the upper limb at a body function level⁴⁷ (“positioning, tone, oedema”) (F2P2), and “addressing any immediate concerns” (F2P1). This group felt it was necessary to assess immediate concerns, with the expectation that assessment at an activity and participation level⁴⁷ would occur on transfer to an acute stroke or rehabilitation facility. Two therapists felt they would incorporate CAHAI-9 in the early phase because “it’s a good indicator of how they might perform on self-care activities more generally” (F2P3). These therapists described limited opportunity to conduct self-care assessments and felt the CAHAI-9 was a time-efficient way to screen functional ability.

Therapists working in acute stroke and rehabilitation units described an environment that was less discharge-focused and more conducive to thorough assessment of upper limb ability.

One therapist described an environment in which “there is time to investigate the upper limb in more depth” (F4P3). With regard to the upper limb, 1 therapist felt there was a “shared focus on impairments [body function level] and function [activity/participation level]” (F1P3). Two therapists agreed that CAHAI-9 was easy to incorporate into their assessment battery.

The findings are consistent with the wide variation in approach to assessment typical of acute care settings with different models of care. The results do not offer a prescription regarding the utility of CAHAI-9 for the different acute settings because this appears to be influenced by factors such as focus of assessment, length of stay, clients’ ability to participate, and the time available to therapists. However, these findings may assist therapists to determine the potential utility of CAHAI-9 for their setting by outlining some of the assessment benefits.

Raising awareness

This theme of raising awareness describes therapists’ experiences of using the CAHAI-9 for purposes other than that for which it was designed. When asked about the clinical utility of the CAHAI-9, therapists discussed raising awareness in clients, caregivers, and other members of the multidisciplinary team of the functional impact of stroke. One therapist suggested CAHAI-9 was useful for increasing the confidence of clients who perceive themselves as very dependent by demonstrating they were capable of some tasks. For example, “One [client] thought, ‘I can’t do anything, it’s a weak arm, it’s useless,’ to then say, ‘Well, why don’t you have a go at doing this?’ It increased the [client’s] confidence a little bit” (F3P2). Another therapist described a client who required encouragement to complete the assessment because, through the assessment process, the client became aware he/she was more capable than he/she had thought. Five therapists felt that clients with limited insight benefited from increasing their awareness of their difficulties. One therapist commented, “I think for many of our [clients] tackling the CAHAI-9, it did give them a bit more insight into what things were difficult or what things might be difficult”

(F2P4). Thirteen therapists described positive responses with clients, whereby improvement in their CAHAI-9 score was motivating and provided objective feedback to clients, such as “It’s great feedback for the client to see objective improvement” (F3P1).

Therapists also identified the process of educating clients and caregivers as a useful aspect of the tool. One therapist commented, “The intervention aspect is really strong, as you’re doing the assessment you’re raising their awareness and pointing things out, so it overlaps with treatment and has education value as well” (F3P1). Three therapists felt that assessing at the activity level made it easier for clients to see the link between assessment and treatment. One therapist commented, “CAHAI-9 probably highlighted to [clients activities] they couldn’t do, better than if we were just doing [tasks] with cones or other upper limb activities” (F1P3).

Clients’ perceptions of CAHAI-9 utility

A few clients were asked about the process of being assessed using the CAHAI-9 to check its utility from their perspective. All clients with stroke found the CAHAI-9’s instructions easy to understand, the test administration time to be reasonable, and the idea of reassessment to be agreeable. Similarly, all clients agreed the test items were relevant to ADLs. One client stated, “It was probably more useful than anything else, rather than start me off on something that I don’t really need to do, just concentrate on the areas that I actually need [activities of daily living]” (I5). Clinical utility encompasses the appropriateness of the assessment to the client population,²² and the results suggest that CAHAI-9 is well matched to the needs of clients within 14 days of stroke. This may be attributed to the CAHAI-9 developers’ commitment to including test items generated by clients with stroke.²¹

Clients were asked if CAHAI-9 helped them to understand their difficulties caused by the stroke. Four of the 5 clients responded positively, and changes in strength, dexterity, and speed were commonly recalled. For example, “Well, I realized that the more fiddly things are my problem rather than the bigger things” (I5). It is necessary to

highlight that clients and therapists concur that CAHAI-9 assists identification of client ability or difficulty within functional context and described this as important.

Clients were also invited to comment about CAHAI-9's utility, and all respondents discussed how CAHAI-9 provided some reassurance that their hand had made some recovery. For example, "Once I'd done all those things [CAHAI-9 test items], well, I was sort of relieved that I had full use of it [hand] back again" (13) and "My overall confidence is a bit more positive" (12).

Therapists were unsure whether they would routinely use CAHAI-9 with clients with mild upper limb deficits. This is in contrast to the clients' responses, which indicate that CAHAI-9 provided some reassurance that their hand had made some recovery.

Conclusion

This study investigated the clinical utility of CAHAI-9 within 14 days of stroke from the perspective of therapists and a small number of clients. All therapists agreed CAHAI-9 was suited for the stroke population and assisted identification of client ability or difficulty within functional context. Although clients with mild impairments talked positively about the CAHAI-9, the therapists were divided about its appropriateness and preferred to use it for clients with moderate impairment. The vast majority of therapists felt CAHAI-9 had limited utility for clients with severe upper limb deficits within 14 days of stroke. Therapists suggested areas of refinement to the scoring and training in order to increase utility. Opinions of therapists working in acute stroke service delivery models with a range of neurological experience were varied, while the opinions of clients were similar. Therapists were unsure about the routine use of CAHAI-9 in general medical caseloads (in which clients are admitted to a general medical ward and then transferred to a rehabilitation setting), whereas those working in acute stroke or rehabilitation-focused caseloads felt CAHAI-9 was easy to incorporate into practice. With respect to providing feedback to clients, therapists varied in their views, whereas comments related to client

and caregiver education were positive. All clients with stroke felt CAHAI-9 was clinically useful and found the assessment provided reassurance regarding their recovery.

Limitations and recommendations for further research

This study aimed to elicit the perceptions of therapists' and clients' experiences of CAHAI-9 to broaden therapists' understanding of the assessment's utility in acute stroke care. As this study demonstrated, each hospital organizes acute stroke service delivery differently, and therapists are encouraged to consider the organization of their own service context when interpreting the results.

The small sample of clients with stroke is unlikely to be representative of the range of clients who are assessed with CAHAI-9 within 14 days of stroke. Additional sampling may have provided confirmation of the themes or revealed additional ones. Another limitation of the study was that 9 respondents in this study had not assessed clients along a continuum of upper limb deficits, and 7 therapists had completed 1 CAHAI-9 administration. All therapists practiced in metropolitan hospital settings, thereby limiting the generalizability to regional and rural settings. A strength of the study was the collection of data within different types of settings, representing the different arrangements of acute stroke delivery and range of therapist experience.

These findings indicate that CAHAI-9 shows promise as an upper limb ability assessment for clients within 14 days of stroke. Further research is required to supplement the CAHAI-9 training program to meet the needs of Australian therapists and to expand the understanding of the broader aspects of upper limb ability management within 14 days of stroke.

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