Disability and Rehabilitation

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/idre20

Assessment and rehabilitation of acquired communication disorders in aboriginal and Torres strait islander adults with stroke or traumatic brain injury: a retrospective chart review

Frances Cochrane, Samantha Siyambalapitiya & Petrea Cornwell

To cite this article: Frances Cochrane, Samantha Siyambalapitiya & Petrea Cornwell (2022): Assessment and rehabilitation of acquired communication disorders in aboriginal and Torres strait islander adults with stroke or traumatic brain injury: a retrospective chart review, Disability and Rehabilitation, DOI: 10.1080/09638288.2022.2055160

To link to this article: https://doi.org/10.1080/09638288.2022.2055160

Published online: 27 Mar 2022.

DISABILITY AND REHABILITATION
https://doi.org/10.1080/09638288.2022.2055160

Taylor & Francis
Taylor & Francis Group

ORIGINAL ARTICLE

Assessment and rehabilitation of acquired communication disorders in aboriginal and Torres strait islander adults with stroke or traumatic brain injury: a retrospective chart review

Frances Cochrane[a,b,c], Samantha Siyambalapitiya[a,c] and Petrea Cornwell[a,c]

[a]Menzies Health Institute Queensland, Griffith University, Gold Coast, Australia; [b]College of Healthcare Sciences, James Cook University, Townsville, Australia; [c]School of Health Sciences and Social Work, Griffith University, Brisbane, Australia

ABSTRACT

Purpose: Speech-language pathologists' (SLP) management practices for Aboriginal and Torres Strait Islander adults with acquired communication disorder (ACD), following stroke or traumatic brain injury (TBI), are not well understood. This study explores SLPs' management approaches for ACDs for Aboriginal and Torres Strait Islander adults post-stroke or TBI.

Materials and methods: SLPs' documented notes were analysed from a two-year retrospective medical record review of Aboriginal and Torres Strait Islander adults (≥18 years), admitted to a regional Queensland hospital with principal diagnoses of stroke or TBI.

Results: SLPs frequently used informal approaches to assess ACDs. English-language formal assessment tools were also used in conjunction with the informal approaches. ACD diagnosis was more common in stroke than TBI patients. One-third of patients with ACD received inpatient rehabilitation at the study site. SLPs infrequently documented cultural or linguistic adaptions to assessment or interventions.

Conclusions: Informal approaches to assess ACDs were commonly employed which may be because they are perceived to be more culturally appropriate. Clinical guidelines for stroke and TBI should accommodate the diversity of cultures and languages. Better consideration of Aboriginal and Torres Strait Islander communication styles and incorporation of these into SLP ACD management approaches may facilitate accurate diagnosis and culturally safe rehabilitation services.

ARTICLE HISTORY
Received 5 May 2021
Revised 8 March 2022
Accepted 13 March 2022

KEYWORDS
Aphasia; stroke; acquired brain injury; Aboriginal; communication; speech-language pathology; rehabilitation

➤ IMPLICATIONS FOR REHABILITATION

- Informal approaches for assessment and intervention of ACDs, that incorporate yarning and salient tasks, are likely to be more culturally appropriate and safe for Aboriginal and Torres Strait Islander peoples.
- More flexibility and guidance in the use of culturally and linguistically appropriate alternative assessment approaches are required in the National stroke guidelines for Aboriginal and Torres Strait Islander peoples.
- The adoption of enhanced models of culturally secure ACD service provision, that incorporate frequent SLP engagement with an Aboriginal or Torres Strait Islander support person during assessment and rehabilitation, are needed.
- There is an imperative for health professionals to actively account for culture and language difference in rehabilitation practices to ensure Indigenous peoples worldwide receive equitable and culturally-responsive services.

Introduction

Acquired communication disorders (ACDs), including aphasia, apraxia of speech, dysarthria and cognitive communication disorders, commonly occur following neurological injury such as stroke and traumatic brain injury (TBI) [1,2]. Aboriginal and Torres Strait Islander peoples experience stroke and TBI at significantly higher rates compared to non-Indigenous Australian populations [3–5]. It is likely therefore that a large percentage of Aboriginal and Torres Strait Islander peoples may experience ACDs following stroke or TBI.

Australian Aboriginal peoples with acquired brain injury have identified the significance of communication and yarning for maintenance of relationships, social interactions, sharing stories and culture [6–8]. Yarning is a form of storytelling where there is a two-way exchange of information [9]. Communication is certainly affected by ACDs; and this, along with communication difference and poor access to culturally safe rehabilitation services [10], may exacerbate the level of impact following stroke and TBI in some instances for these populations.

Australian speech-language pathologists (SLP) have reported a lack of confidence and experience in the provision of assessment and intervention services to Aboriginal and Torres Strait Islander peoples with ACDs [11,12]. This lack of confidence may in part be due to the immense diversity of Aboriginal and Torres Strait

CONTACT Frances Cochrane frances.cochrane1@jcu.edu.au College of Healthcare Sciences, Division of Tropical Health and Medicine, James Cook University, Townsville, 4814, Australia

Islander peoples. This immense diversity, particularly in terms of culture, communication and geography, may not be well understood by non-Indigenous SLPs and may present challenges in ACD assessment and intervention practices. Aboriginal and Torres Strait Islander peoples' communication and interaction styles, worldviews and beliefs may not align with the ACD assessment and intervention approaches used by non-Indigenous SLPs. For example, the direct questioning approach often used during assessment or case history interviews may result in silence as the appropriate response from an Aboriginal or Torres Strait Islander person [13]. English does not typically accommodate silence as an appropriate response to a question, therefore, misunderstandings or communication breakdown may occur between the SLP and the Aboriginal or Torres Strait Islander person [13]. To highlight the linguistic diversity, approximately 145 languages are spoken by Aboriginal and Torres Strait Islander peoples with each language group having its own traditions and beliefs [14]. SLPs have identified challenges in working with such a diverse patient group, including the lack of culturally and linguistically appropriate ACD assessment tools, and lack of access to interpreters for Aboriginal and Torres Strait Island languages [11,12]. Non-Indigenous SLPs have expressed a lack of specific knowledge regarding aspects of Aboriginal and Torres Strait Islander peoples' communication including characteristics of speech and language (e.g., speech sounds, grammar and semantics) as well as non-verbal communication [11]. This lack of knowledge, as well as interpreting challenges may impact SLPs' ability to accurately diagnose ACDs and subsequently provide culturally safe ACD rehabilitation services.

Aphasia is experienced by around one-third of people post-stroke [1,4] and up to 75% of people post-TBI may experience ACDs [15]. Only two studies provide insight into ACD diagnosis post-stroke and TBI for Aboriginal and Torres Strait Islander peoples [4,5]. Aphasia diagnosis was more common in the 15 to 44 year age group for Australian Aboriginal stroke survivors compared to non-Aboriginal stroke survivors [4]. Other ACDs, including apraxia of speech and dysarthria, were diagnosed at similar rates for Aboriginal and non-Aboriginal survivors [4]. ACD diagnosis for Australian Aboriginal TBI patients was rare [5]. These two studies explored ACD diagnoses using administrative codes; therefore, it is still unclear what specific ACD diagnostic approaches SLPs adopt for Aboriginal and Torres Strait Islander stoke and TBI populations. Administrative codes are applied by a coder at the hospital site and are based on conditions or diagnoses that are either present on admission or arise during the episode of admitted patient care. These codes are based on the terminology or diagnoses used by health professionals in a patient's medical chart. If terminology is vague or non-specific, an accurate administrative code might not be applied.

Communication connections are integral to Aboriginal and Torres Strait Islander peoples' well-being, particularly with respect to sharing of culture, yarning and maintenance of social relationships [6,7,16]. It therefore seems reasonable to suggest that accurate ACD diagnosis is essential in order for appropriate rehabilitation services to be offered, since untreated ACDs may impair an individual's ability to participate in social interactions and undertake life roles. However, Aboriginal and Torres Strait Islander peoples with ACD post-stroke or TBI are underrepresented in rehabilitation services [7,16–18]. Australian Aboriginal peoples with ACDs have identified that this under-representation may be due to reasons such as the lack of a feeling of cultural security as well as racism within many health services, communication difficulties with some health service providers, and frequent dislocation from country, home and family when rehabilitation services are located many kilometres from the persons home [6,7,16]. Australian Aboriginal peoples with ACDs have identified several approaches that contributed to their feeling of cultural safety during rehabilitation. These included the involvement of an Aboriginal support person (for example, an Aboriginal Health Worker or Indigenous Liaison Officer) and engaging in yarning during the rehabilitation sessions [18]. It remains unclear if SLPs do adopt these approaches during ACD rehabilitation in the hospital setting and what other approaches they may employ when providing services to Aboriginal and Torres Strait Islander peoples.

The aims of this study were to (1) examine the ACD assessment and intervention practices SLPs provided to Aboriginal and Torres Strait Islander adults with stroke or TBI during hospital admission; and (2) to evaluate how these assessment and intervention practices may align with the preferences of Aboriginal and Torres Strait Islander people, and brain injury management guidelines. To investigate these aims, SLPs' documented patient medical chart notes were examined.

Materials and methods

Study design and participants

A two-year retrospective descriptive review was undertaken of Aboriginal and Torres Strait Islander adult patients' electronic medical records. These patients were admitted to a regional Australian tertiary hospital due to stroke or traumatic brain injury (TBI). For a comprehensive review of the patients' demographic and clinical profiles, see Cochrane et al. [19].

The study received ethical approval from the relevant health service and university Human Research Ethics Committees. As part of the ethics approval process, the research site's Aboriginal and Torres Strait Islander Health Leadership Advisory Council provided advice, guidance and endorsement of the study. These collaborations and ethical approvals were congruent with the principles for the ethical conduct of research with Aboriginal and Torres Strait Islander peoples and communities [20]. A Public Health Act application approval was also obtained for the release of confidential health information (medical records) without the participants' consent. The research was guided by the principles outlined by Laycock et al. [21] and reported with reference to The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement [22].

Data was abstracted for all patients who were recorded as being of Aboriginal and/or Torres Strait Islander descent, were at least 18 years of age, and who were admitted to the research site hospital due to one of the following World Health Organisation International Classification of Diseases-10 (ICD-10-CM) principal diagnosis codes: I63 (cerebral infarction), I60 (sub arachnoid haemorrhage), I61 and I62 (non-traumatic intracerebral haemorrhage [ICH] & other & unspecified non-traumatic ICH), I64 (Stroke, not specified ischemic or haemorrhagic) and S06 (traumatic brain injury, intracranial injuries). Patients who did not meet the above criteria were not included in the review.

Data collection

The chart notes documented by the SLP in the electronic medical record during the patient's admission (i.e., from initial hospital admission until discharge from the hospital), were reviewed. To ensure consistency, a standardised data abstraction instrument, using Microsoft® Excel, was developed that contained headings

based on the logical flow of existing medical records and the SLP-patient interaction during a patient's admission (e.g., SLP ACD assessment approach; ACD diagnosis; rehabilitation approaches). Use of specific participant inclusion and exclusion criteria and a data abstraction form aligned with the methodologies for conducting retrospective chart review research outlined by Gearing, Mian, Barber and Ickowicz [23] and Vassar and Holzmann [24]. A total of 132 participants were eligible for inclusion in this study. Each patient chart note documented by an SLP was reviewed by the first author. Data relating to SLPs' interactions with, or about the patient, including communication assessment and intervention approaches and interactions with the patient's family or other health professionals involved in the patient's care, were extracted. An independent reviewer randomly checked 10% of the extracted data using the standardised data abstraction form to ensure reliability and accuracy. No discrepancies were identified by the reviewer.

Data analyses

Descriptive statistics were used to describe key features of the data, including percentage and type of ACDs for stroke and TBI, number of days until initial SLP review, communication assessment approach, acquired communication disorder diagnoses, communication intervention approach, length of stay (LOS) and post-discharge referral. Length of stay was inclusive of weekends and public holidays. Qualitative data pertaining to SLP service delivery was also extracted to enrich the quantitative information; for example, SLPs' explanations regarding assessment type (e.g., "informal observations") or ACD diagnosis (e.g., "expressive language difficulties"). Assessment approaches were considered in terms of whether they were 'formal' or informal', as per the definitions provided by Papathanasiou and Coppens [25]. Formal assessment is defined as "any published quantification tool" [25, p.82] that may include communication screeners or more detailed batteries and include detailed administration procedures. Informal assessment includes any "clinician-generated informal procedures" [25, p. 82] and may include observation and interaction with the patient.

Results

The medical records of 132 Aboriginal and Torres Strait Islander adults who were admitted to hospital during the two-year period with the principal diagnoses of either stroke ($n = 64$; 48.5%) or TBI ($n = 68$; 51.5%) were reviewed. Patients were from 26 diverse geographical locations across northern Australia, including remote or very remote areas. Despite the cultural and geographic diversity, the language background for all patients was recorded as English only. An indication of severity of neurological injury was reported using the Glasgow Coma Scale (GCS). The GCS is a commonly used clinical scale to measure an individual's level of consciousness following neurological injury. For the stroke and TBI patients, the mean GCS on admission was 13 and 12 respectively. Patients' demographic and clinical profiles are comprehensively reported in the Cochrane et al. [19] paper.

Speech-language pathology initial contact

The majority ($n = 49$; 76.5%) of stroke patients were reviewed by an SLP within 2 days of hospital admission (Figure 1). Of the eight stroke patients who were not reviewed by an SLP, seven died within the first two days of hospital admission and one patient self-discharged within the first day of admission, prior to SLP review. Over half of the TBI patients ($n = 36$; 53%) were not reviewed by an SLP during their hospital admission. Of the TBI patients who were not reviewed, almost 70% were only admitted to hospital for up to one day, and primarily had principal diagnoses related to concussion or short losses of consciousness. Of the TBI patients who were reviewed by an SLP, the majority were reviewed within the first five days of admission.

Communication assessment approaches

For the stroke ($n = 56$; 87.5%) and TBI ($n = 32$; 47%) patients whose communication skills were assessed by an SLP, a range of assessment approaches were used. "Informal observation" or "informal assessment" of patients' communication skills, undertaken in conjunction with initial dysphagia assessment, was used with all patients during initial communication assessment for both stroke and TBI. These informal approaches were documented by SLPs as observations of the patient's communication and

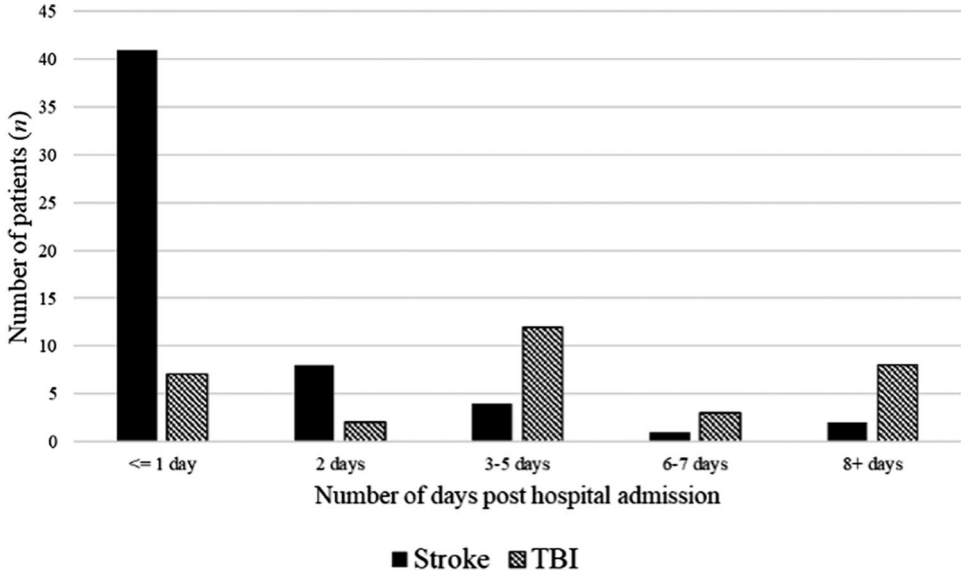

Figure 1. Number of days until initial SLP review for stroke and TBI patients.

Table 1. Initial and subsequent SLP communication assessment approaches for stroke and TBI patients ($N = 88$).

	Stroke *n*		TBI *n*	
Type of communication assessment	Initial	Subsequent	Initial	Subsequent
Informal assessment	56	8	32	9
Formal assessment				
Published communication screening tool	7	16	3	1
Local SLP-developed language screener	4	0	1	0
Published language assessment or battery	1	9	1	4
Published motor speech assessment battery	0	1	0	0
Published cognitive-linguistic assessment	0	0	0	1

interaction during dysphagia assessment and/or in conversation with the SLP. Comments documented in the patient charts related to SLP's "informal observations" and included aspects of the patient's ability to follow single and/or multistep directions, understand yes/no questions, conversing in sentences, ability to stay on topic during conversation, orientation to person and place, naming tasks, informal reading tasks (e.g., from newspaper), verbal repetition, picture description tasks (e.g., cookie theft) and oro-motor examination. There was no indication in the chart notes of whether these informal assessment approaches were undertaken in any language other than English, nor was there any documentation reporting cultural adaptions to the assessment stimuli.

SLPs often used formal communication assessment tools in conjunction with the informal approaches, both during initial and subsequent assessment sessions (see Table 1). The numbers reported in Table 1 are not mutually exclusive; for example a published communication screening tool and a published motor speech assessment battery may have been administered for a patient in the subsequent assessment sessions. SLPs used formal communication assessment tools more frequently with stroke compared to TBI patients. Published communication screening tools were the most commonly used formal assessment approaches for stroke. All formal and informal communication assessment tools were English-language based.

Documentation indicated that family members were engaged by the SLP in the communication assessment process for approximately one-third of patients (see Table 2). Chart notes indicated SLPs engaged with an Indigenous Health Liaison Officer (IHLO) for four patients during the patient management process; however, the notes did not specifically comment on the reasons for engagement or the outcomes. There was no documented evidence of engagement with an Aboriginal or Torres Strait Islander interpreter service; however there was no state Government interpreter services for Aboriginal or Torres Strait Islander languages at the time of the chart review.

Acquired communication disorder diagnosis

Of those patients whose communication skills were assessed by an SLP, stroke patients were more frequently diagnosed by an SLP with at least one ACD compared to patients with TBI (see Table 2). As outlined in Table 3, dysarthria was the most commonly diagnosed ACD for both stroke and TBI patients. Aphasia was the next most commonly diagnosed ACD for stroke patients, whereas the broad terms of "receptive" and "expressive language difficulties" were the next most commonly diagnosed ACDs in the TBI populations. Approximately one third of stroke and TBI patients were not diagnosed with an ACD. The use of the term "functional communication" was also accompanied by descriptors such as "basic language" or "communication appears intact", "language WNL [within normal limits]" or "nil concerns" to describe the communication of these patients who were deemed not to have an ACD.

Table 2. ACD assessment and diagnoses processes for stroke and TBI patients ($N = 88$).

	Stroke *n* (%)	TBI *n* (%)
Communication assessed by SLP	56 (63.6)	32 (36.4)
At least one ACD diagnosed	36 (64.3)	12 (37.5)
Did not present with an ACD	17 (30.3)	15 (46.9)
Nil communication diagnosis recorded	3 (5.3)	5 (15.6)
Family engaged in communication assessment	20 (35.7)	9 (28.1)

Rehabilitation of acquired communication disorders

Of patients diagnosed by an SLP with at least one ACD, 33% ($n = 12$) of the stroke and 25% ($n = 3$) of the TBI patients received inpatient rehabilitation at the research site focused on their communication disorders. Rehabilitation of ACDs was delivered in a range of ways, including one-on-one (patient with an SLP, allied health assistant or SLP student), small groups and computer-based. Communication therapy approaches and tasks were diverse and included single word to discourse level tasks. Documented notes did not indicate the primary language used during the intervention tasks. Tasks were adapted for each client depending on their ACD presentation. Examples of language-based tasks documented in patients' electronic medical charts by SLPs included word-picture matching, comprehension, semantic feature analysis, categorisation, synonyms/antonyms, naming, sentence construction, functional reading (e.g., newspaper), conversation therapy, and problem solving. Examples of speech-based tasks included non-speech oromotor exercises, speech sound drills, singing and reading aloud. For all patients, only one stroke patient had documented evidence of cultural or linguistic adaptations to ACD therapy. In this case, the therapy adaptations included holding the session in an outdoor garden space and communication topics focused on "bush tucker". [Note: "bush tucker" is a term used to describe traditional foods, such as animals, insects or plants, used by Australian First Nations peoples as food or medicine]. For these patients diagnosed with at least one ACD, 25% ($n = 9$) of stroke patients and 33% ($n = 4$) of TBI patients were referred to either local hospital outpatient or community-based SLP services, or were transferred from the research site hospital to their local hospital for ongoing rehabilitation post-discharge.

Discussion

The primary aim of this study was to describe SLP ACD assessment and intervention practices provided to Aboriginal and Torres Strait Islander adults with stroke or TBI during their hospital stay, as documented in the patient's electronic medical record. SLPs used a range of ACD assessment approaches,

Table 3. Summary of ACD diagnoses for stroke and TBI principal diagnoses ($N = 48$).

Principal Diagnosis (ICD-10)	Dysarthria	Aphasia	High Level Language	Acquired Apraxia of Speech	Dysphonia	Receptive language difficulties	Expressive language difficulties	Cognition difficulties including language of confusion	Cognitive Communication Disorder	"Reduced word fluency"	"Difficulties with semantic links and word repetition"
Stroke											
I63 – Cerebral Infarct	14	11	6	3		1		1		1	
I61 – Intracerebral Haemorrhage	3	2	2	1	1						
I64 – Stroke Not Spec Haemorrhage Or Infarct	2				2						
I60 – Subarachnoid Haemorrhages	2		1		1			1			
I62.0 – Subdural Haemorrhage (Acute) (Nontraumatic)	2							1			
TBI											
S06.5, 6 – Traumatic Subdural/Subarachnoid Haemorrhage	6	2	1	1		2	2	1	1		1
S06.00, 01, 02 – Concussion/Loss of Consciousness											
S06.21, 23, 31 – Cerebral Contusion/s; Cerebellar Haematomas						1	1				
S06.8, 9 – Other Intracranial Injuries or Unspecified											

however informal methods were most frequently employed. ACDs were more commonly diagnosed in stroke compared to TBI patients. Approximately one-third of patients diagnosed with an ACD received inpatient rehabilitation at the research site focused on their communication difficulties. There was minimal documentation reporting SLPs' engagement with patients' families, IHLOs and interpreters during ACD assessment and therapy. Evidence of cultural or linguistic adaptations to ACD therapy was rarely documented.

The majority of Aboriginal and Torres Strait Islander adult stroke patients were assessed by an SLP within two days of hospital admission, which is consistent with the recommended national best-practice guidelines for all stroke patients outlined by the Stroke Foundation [26] and previous reports by Australian and New Zealand SLPs [27]. These statistics are also considerably more positive than those reported in an Acute Care National Stroke Audit [28], where less than 50% of Aboriginal and Torres Strait Islander stroke patients were assessed by a speech pathologist within 48 h of admission. Contributing factors to the positive statistics at the research site may be that the hospital has a dedicated acute stroke unit where SLP services are provided seven days per week. Multidisciplinary care within a dedicated stroke unit, and early assessment by SLPs may improve stroke patient outcomes [29].

More than half of the patients admitted with a TBI did not have their communication skills reviewed by an SLP during their hospital admission. There may be several reasons for this lack of SLP assessment. Firstly, a substantial proportion of TBI patients had principal diagnoses related to concussion or short losses of consciousness. Subsequently these patients were admitted mainly for symptom monitoring, typically of up to one day prior to discharge. These cases of TBI may be typically referred to as mild TBI [30]; therefore, may not be referred for SLP assessment. Lack of referral of mild TBI patients to SLP services, regardless of their cultural or linguistic background, has been reported previously [31]. However, there is increasing evidence that a person with mild TBI may experience persistent long-term impairments associated with post-concussion symptoms that may impact social communication, including cognitive (e.g., memory, information processing) and emotional (e.g., anxiety) difficulties [32]. Return to work and pre-injury functioning difficulties during the six months post-injury may be experienced by up to one third of people with mild TBI [33]. It therefore appears appropriate that patients with mild TBI should be provided with verbal and written discharge advice about monitoring possible changes to their communication, or their communication is screened by a health professional within three months of discharge from hospital, to identify potential communication impairments [34].

A second reason for the lack of SLP assessment for TBI patients may be that unlike stroke [26], there are no national Australian clinical guidelines that specifically outline allied health professionals' roles, actions and timelines relating to assessment and intervention of communication disorders following TBI for all adult populations, regardless of cultural or linguistic background. There is a lack of access to evidence-based and reliable TBI-specific communication assessment tools [35] and a lack of guidance as to when a patient's communication skills should be assessed by an SLP (i.e., number of days post-hospital admission or stage of patients' recovery). Subsequently, assessment of TBI patients' communication skills may be less prioritised or perceived as more challenging compared to stroke patients. The New Zealand TBI best practice guideline [36] may be a useful adjunct in the absence of an Australian alternative. Notably, this guideline

includes specific consideration for Mā ori peoples, in particular consideration for cultural and linguistic diversity. For example, the guideline specifies that any TBI assessment should have been standardised for Mā ori populations where possible, and Mā ori with TBI should have access to health workers who are fluent in their language [36].

Thirdly, whilst not specifically explored in this study, there is possibility that some TBI patients may have discharged against medical advice (DAMA) prior to SLP assessment. DAMA rates are significantly higher in Australian Aboriginal populations compared with non-Aboriginal populations [37,38], with DAMA patients known to have poorer health outcomes, such as increased morbidity and mortality, as well as higher rates of readmission [39]. In a Western Australian study, DAMA was four times higher for Aboriginal patients compared with non-Aboriginal patients with TBI [5]. Patients with mild TBI admitted to hospital for only a short period, and those who DAMA, may not be receiving adequate multidisciplinary care, which may subsequently place them at risk of undiagnosed and untreated ongoing social communication challenges in the community, and reduced access to SLP services.

SLPs employed a range of ACD assessment approaches; however, the use of informal approaches, either alone or in combination with formal assessments, were most commonly documented for the Aboriginal and Torres Strait Islander stroke and TBI patients. This finding is in accord with results of a survey study where Australian SLPs similarly reported that informal assessment approaches were the most common approach for assessing acquired communication disorders in Indigenous Australian adult populations [12]. SLPs have also reported that they use informal communication assessment approaches more frequently for all TBI populations primarily due to the time constraints, and the lack of assessment tools that provide appropriate sensitivity and specificity to detect TBI-related cognitive communication disorders [40]. Stroke or TBI severity may have also been a further reason SLPs adopted informal approaches. The severity of patients' neurological injury in the current study were commonly mild. Informal or non-standardised assessment may be more commonly used particularly where SLPs are exploring deficits in the cognitive-communication domain. The effects of cognitive-communication disorders can be subtle, particularly in mild TBI, therefore an informal approach where SLPs observed and engaged in discourse with patients is likely to be appropriate [41]. Informal communication assessment approaches may have also been employed more frequently in the current study due to the general absence of culturally and linguistically appropriate ACD assessment tools for Aboriginal and Torres Strait Islander populations [4,5,11,42,43]. In the current study, the formal assessments used by the SLPs during the diagnostic process are typical of assessments used in clinical settings to determine if a person who has experienced stroke or TBI presents with an ACD [44–46]. In regards to stroke, the formal communication assessment approaches used do comply with the Australian national Clinical Guidelines for Stroke Management [26] which require SLPs to use communication screening tools that are valid and reliable and subsequent formal, comprehensive assessment for those people who have suspected communication difficulties. However, all of the formal assessments used by the SLPs were English-based utilising the language of the United Kingdom, United States of America or Standard Australian English dialects and were not specifically developed for, or normed on, Aboriginal and Torres Strait Islander peoples. The assessment questioning approach, the test stimuli (for example, pictures and question context), and the language and communication structures assessed may not be culturally or linguistically appropriate for Aboriginal and Torres Strait Islander peoples due to the potential for language and cultural difference.

There was limited documented evidence of engagement with an Aboriginal or Torres Strait Islander language interpreter service, IHLOs or family members during the communication assessment process. As highlighted in the Cochrane et al. [19] paper, the patients in this study were from diverse cultural and likely linguistic backgrounds. Therefore, it is highly likely that patients did not share the same cultural and language background of the SLP undertaking the assessment. Legally and ethically, SLPs are required to assess and provide rehabilitation for all languages of patients with ACDs [47]. When there isn't a shared language background between the SLP and the patient, SLPs should engage with professional interpreters to ensure equity in services and language barriers are overcome [48]. Whilst this appears to be a reasonable approach, there are a number of challenges in engaging with appropriate language interpreter services for Aboriginal and Torres Strait Islander languages. An initial challenge is that the language diversity of Aboriginal and Torres Strait Islander patients may not be identified and recorded [19]. Acknowledging patients' language background is a sign of respect and is an essential first step in providing culturally-responsive and patient-centred care [19,49,50]. Another challenge is that interpreter services simply do not exist for the diversity of Aboriginal and Torres Strait Islander languages, or they may be difficult to access [19,51,52]. When a professional interpreter service is not available, SLPs have identified that they rely on family members to assist with interpretation of language [11]. However, SLPs have expressed ethical concerns about using family members, particularly in relation to confidentiality, misinterpretations [11]. Australian Aboriginal patients identified a preference for using a familiar person, such as family member or known Aboriginal Health Worker, as their interpreter [52]. There is a clear ongoing need to address the language interpreter service challenges that exist within the hospital setting to ensure Aboriginal and Torres Strait islander peoples have access to equivalent services. Due to the lack of access to culturally and linguistically appropriate speech and language assessment resources (both human and tangible), it is possible that diagnosis of ACDs may not always be accurate for this population. Due to the limitations of documented patient chart notes, the reasoning or decision process employed by the SLPs when determining why additional assessment tools were selected to assess particular patients' communication skills, remains unclear. There also appears to be a need for more flexibility and guidance in the use of culturally and linguistically appropriate alternative assessment approaches for Aboriginal and Torres Strait Islander peoples in the Australian national Clinical Guidelines for Stroke Management [26].

The informal assessment approaches used by the SLPs in this study, that commonly included observation of the patients' communication interactions and conversations with the SLP, are likely more culturally appropriate approaches, akin to clinical yarning [53], than use of formal assessment approaches normed on non-Indigenous populations. Clinical yarning is a communication approach that incorporates a more informal, relaxed and conversational style of interaction with the patient and is more consistent with Indigenous Australian communication styles for sharing information [53]. While the informal assessment approaches used by the SLPs are more likely to be aligned with clinical yarning, due to the lack of detail included in medical record notes, it is difficult to ascertain if clinical yarning was actually employed. Further analysis of interactions (e.g., *via* observation) would need to be undertaken in future research to determine what

constituted 'informal assessment' in terms of interaction style. Clinical yarning is an approach to assessment, information gathering and intervention adopted and recommended by Armstrong, McAllister et al. [42] and Ciccone et al. [18] in their development of a screening tool and rehabilitation model for ACDs in Aboriginal Australian populations. Similarly, Bohanna et al. [54] recommend the incorporation of yarning as a more culturally appropriate assessment approach for Aboriginal and Torres Strait Islander people with TBI. The yarning approach has been applied in research settings [9,55,56], SLP paediatric clinical practice [57] and more recently in post-stroke acquired communication disorder SLP interventions with Australian Aboriginal adults [18]. The yarning approach may contribute to development of the therapeutic relationship, including trust and rapport, between the patient, family and health professionals, which may subsequently contribute to enhanced patient outcomes and a more culturally-safe healthcare environment [9,18,42,53,58].

ACD diagnoses were considerably more common for stroke than TBI patients. The higher ACD diagnosis for stroke is commonplace for all populations due to the heterogenous nature of ACDs in TBI populations. ACDs in TBI populations are more likely associated with aspects of cognition (e.g., information processing, discourse, social communication); therefore, making SLPs' diagnosis of ACDs in TBI populations more challenging overall [33,59]. Additionally, SLPs have reported reduced confidence when working with patients with TBI, particularly those with mild TBI [60]. Therefore on a whole, SLPs may lack sufficient knowledge, skills and evidence bases to accurately diagnose and treat communication difficulties associated with TBI [60]. This appears to be a practice area that continues to be challenging for SLPs and requires further research and evidence guidelines. A further contributing factor to the lower ACD diagnoses in the TBI population is the shorter length of stay for TBI patients due to mild TBI. The shorter length of stay, and known reduced referrals of mild TBI patients to SLP services [31], are likely to have contributed to less assessment by SLPs and therefore likely lower ACD diagnoses in the TBI population. The overall percentage of ACD diagnoses in the current study (Stroke = 64.3%; TBI = 37.5%) are higher than those reported in studies that explored ACD prevalence in Western Australian Aboriginal stroke and TBI populations (33% and 1.7% respectively) [4,5]. There may be several reasons for this disparity. Firstly, in the current study, the determination of ACD diagnosis was extracted from documented SLP notes made in the patients' records, whereas the ACD prevalence data reported in the Katzenellenbogen et al. [4] and Katzenellenbogen et al. [5] papers were obtained based on administrative codes, rather than SLP notes. A limitation of administrative codes is that they do not comprehensively, nor necessarily accurately, capture the range of possible ACD presentations and the subsequent change in diagnoses throughout the patient's admission. Secondly, in the current study, SLPs may be more familiar with providing services to the population of interest due to the higher numbers of Aboriginal and Torres Strait Islander peoples living in the hospital's catchment area compared to other areas of Australia [61,62]. Subsequently, SLPs at the study site may have been more familiar with Aboriginal and Torres Strait Islander culture and communication difference; therefore, SLPs may have been better able to accurately diagnose ACDs. However, familiarity does not necessarily ensure the provision of culturally appropriate services and diagnostic accuracy. If the SLP does not share the culture and language of the patient, misunderstandings may arise [13]. Nevertheless, the high number of patients diagnosed with an ACD in this study needs to be taken with caution. Although SLPs may have had language and cultural familiarity, and the informal assessment approaches used are likely to have been more culturally appropriate, there still may be the risk of over-diagnosis of ACDs, particularly the language or cognitive based disorders such as aphasia or cognitive communication disorders [54,56]. Over-diagnosis of ACDs may be due to cultural and language difference between the SLPs and the Aboriginal and Torres Strait Islander patients [42,50]. This may result in patients being diagnosed with an ACD when in fact, the perceived communication difficulties may be related to cultural and communication difference, not disorder. Additionally as outlined previously, SLPs may lack the appropriate knowledge, skills and resources when working with TBI populations as a whole, leading to diagnostic inaccuracies.

Access to and provision of culturally secure SLP intervention services for ACDs is also essential. Of those patients who were diagnosed with at least one ACD, only approximately one third received inpatient rehabilitation at the study site that focused on the ACD/s. These low numbers are consistent with previous literature where Aboriginal and Torres Strait Islander adults are underrepresented in neurological rehabilitation services, both inpatient and community-based, for ACDs following stroke and TBI [7,17,63]. In the current study, there may be several reasons for this relatively low number of Aboriginal and Torres Strait Islander adults diagnosed with ACDs receiving inpatient rehabilitation focused on their communication difficulties. Firstly, the research site had an extensive catchment area where patients are transferred from regional or community hospitals to the tertiary centre, to receive health care. Frequently, patients from these areas are transferred back to these centres for ongoing care and rehabilitation *via* inter-hospital transfer, when their acute medical needs have stabilised. In this study, it is likely that many of the Aboriginal and Torres Strait Islander patients who were from these locations, were transferred to their home health service prior to having the opportunity to engage in inpatient rehabilitation at the study site. Secondly, patients may have experienced dislocation from family and country, fear, institutional racism, cultural or language misunderstandings, or they may have been faced with other competing priorities such as caring roles or other health challenges [13,16,17,52,64,65]. These factors may have also contributed to patients' reduced engagement in inpatient ACD rehabilitation services.

ACD rehabilitation approaches were varied; however, there was limited documented evidence of SLPs' cultural or linguistic adaptations to therapy for the Aboriginal and Torres Strait Islander stroke and TBI patients. Additionally, there was little documented evidence of engagement with an IHLO in the ACD rehabilitation process. Australian Aboriginal patients have identified that IHLOs made them feel more culturally safe in hospital as they shared common history, culture and backgrounds [18,52,66]. Therefore, it is essential that SLPs engage with IHLOs to ensure rehabilitation approaches meet the cultural and holistic needs of their Aboriginal and Torres Strait Islander patients. A culturally secure SLP service may include ensuring SLPs' behaviours and attitudes reflect their awareness of Aboriginal and Torres Strait Islander culture and language, and the patient's cultural values are incorporated into rehabilitation approaches [18,67]. An enhanced culturally secure model of SLP rehabilitation service delivery for Aboriginal stroke clients with ACDs has been recently reported [18]. In this model, the non-Aboriginal SLP collaborated with an Aboriginal co-worker during ACD rehabilitation sessions with the Aboriginal stroke client [18]. The principles of yarning [9,53] were also adopted and provided beneficial outcomes,

particularly in the development of the therapeutic relationship between all parties [18]. The yarning, or conversational, approaches to ACD therapy were documented infrequently by SLPs in the current study. The aphasia therapy approaches documented by SLPs in the current study, commonly cognitive-neuropsychological (e.g., semantic feature analysis, word-picture matching), functional (e.g., reading newspaper articles) and social (e.g., communication groups), are similar to those previously reported by Australian SLPs [46,68]. Whilst the general approaches to ACD rehabilitation adopted by the SLPs appeared appropriate for the specific ACDs, these approaches may not have been culturally safe for the Aboriginal and Torres Strait Islander patients. Aboriginal Australians who have experienced stroke or TBI have identified that the lack of access to a cultural broker or an Aboriginal support person (e.g., IHLO) during their hospital stay negatively impacted their wellbeing and resulted in instances of miscommunication [16,17]. Collaborating with an IHLO or Indigenous Australian co-worker during rehabilitation, adopting a yarning approach, and ensuring ACD rehabilitation tasks and stimuli are communicatively relevant and salient to the patient (including being available in the patient's language), are essential components of the rehabilitation model for Aboriginal and Torres Strait Islander peoples [7,16,17,53].

Limitations

There are several limitations to this study that require consideration. All data was extracted from patients' medical charts at one study site; therefore, it is not clear whether the SLP practices at the study site are similar to those in other hospital settings. A comparative study at other hospitals would be beneficial to compare practices. Secondly, no comparisons of SLPs' ACD assessment and intervention approaches for non-Indigenous Australian adults with stroke of TBI were undertaken, therefore we cannot determine the extent to which these services may differ. Ideally, a larger data set that included non-Indigenous Australian patients with matching controls on specific variables would have enabled comprehensive comparisons of service delivery across different populations. Thirdly, whilst the intention of this paper was to describe documented SLP ACD practices for Aboriginal and Torres Strait Islander adults post stroke or TBI and reflect on the cultural responsiveness of these practices, we acknowledge that other factors may have influenced SLPs' informal approaches. The informal assessment approaches employed by SLPs are likely to be more culturally responsive; however, we acknowledge that other factors, such as patients' background education level [69], or severity of neurological injury [41], may have influenced the adoption of informal assessment approaches. Finally, documented chart notes only provide part of the SLP service story. Chart notes typically contain factual information and may not include SLPs' reasoning or decision-making processes, nor details of collaborations and communications that may occur (e.g., collaborations with IHLOs). Further exploration of SLPs' reasoning and decision-making processes when providing ACD assessment and intervention services to Aboriginal and Torres Strait Islander adults neurological injury, for example *via* interviews or other exploratory avenues, would be valuable.

Conclusion

To our knowledge, this is the first study that has explored SLPs' documented ACD services provided in hospital to Aboriginal and Torres Strait Islander adults with stroke or TBI. The commonly used informal approaches to ACD assessment in this study are akin to those approaches reported in previous research about SLPs ACD assessment practices for other Australian Aboriginal stroke and TBI populations. Additionally, informal assessment approaches are frequently used by SLPs for TBI populations, regardless of the patient's culture or language background. The tendency to use informal approaches used in the current study may also be due to the absence of culturally and linguistically appropriate communication assessment tools for Aboriginal and Torres Strait Islander populations which remains an ongoing challenge for SLPs. Informal approaches are likely to be more culturally appropriate than using formal or standardised English-language assessment tools, and are likely to align more closely to yarning approaches. ACD diagnosis was relatively high in this study yet only approximately one third of those diagnosed with an ACD received inpatient rehabilitation at the study site focused on the ACD. There may be multiple reasons for this disparity including dislocation from home and family, and healthcare service delivery models that are not culturally secure that may negatively impact patients' engagement in health services. Additionally, it is likely inter-hospital transfer back to a hospital closer to the patient's home occurred before they were able to engage in ACD rehabilitation. While assessment timing for patients with stroke appeared to be in line with national guidelines, and SLPs appeared to be modifying assessment practices to be more culturally appropriate, there still appears to be much work to be done in terms of facilitating culturally secure practices in SLP. These include recommendations made in previous research regarding cultural safety and cultural security, and relate to attention to communication issues including language use (both Aboriginal English and Aboriginal languages generally), working with interpreters as appropriate, collaboration between non-Indigenous SLPs and IHLOs, and the utilisation of an holistic model of health.

Acknowledgements

The authors sincerely acknowledge the traditional custodians of the land upon which this research was conducted and we pay our respects to their Elders, past and present. The authors also acknowledge the Aboriginal and Torres Strait Islander patients whose data contributed to this study. The authors also thank the Aboriginal and Torres Strait Islander Health Leadership Advisory Council for their collaborations and support of this research.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The author(s) reported there is no funding associated with the work featured in this article.

ORCID

Frances Cochrane http://orcid.org/0000-0001-6021-2126
Samantha Siyambalapitiya http://orcid.org/0000-0001-9310-0809
Petrea Cornwell http://orcid.org/0000-0003-2621-8713

References

[1] Engelter S, Gostynski M, Papa S, et al. Epidemiology of aphasia attributable to first ischemic stroke: incidence, severity, fluency, etiology, and thrombolysis. Stroke. 2006; 37(6):1379–1384.

[2] Ponsford J, Sloan S, Snow P. Traumatic brain injury: rehabilitation for everyday adaptive living. 2nd ed. Hove: Psychology Press; 2013.

[3] Jamieson L, Harrison J, Berry J. Hospitalisation for head injury due to assault among Indigenous and non-Indigenous Australians, July 1999-June 2005. Med J Aust. 2008;188(10):576–579.

[4] Katzenellenbogen J, Atkins E, Thompson S, et al. Missing voices: profile and extent of acquired communication disorders in aboriginal and non-Aboriginal adult stroke survivors in Western Australia using linked administrative records. Int J Stroke. 2016;11(1):103–116.

[5] Katzenellenbogen J, Atkins E, Thompson S, et al. Missing voices: profile, extent, and 12-month outcomes of nonfatal traumatic brain injury in aboriginal and non-Aboriginal adults in Western Australia using linked administrative records. J Head Trauma Rehabil. 2018;33(6):412–423.

[6] Armstrong E, Hersh D, Hayward C, et al. Living with aphasia: Three indigenous australian stories. Int J Speech Lang Pathol. 2012;14(3):271–280.

[7] Armstrong E, Hersh D, Hayward C, et al. Communication disorders after stroke in aboriginal australians. Disabil Rehabil. 2015;37(16):1462–1469.

[8] Armstrong E, Coffin J, Hersh D, et al. You felt like a prisoner in your own self, trapped": the experiences of aboriginal people with acquired communication disorders. Disabil Rehabil. 2019;43(13):1903–1916.

[9] Geia LK, Hayes B, Usher K. Yarning/aboriginal storytelling: towards an understanding of an indigenous perspective and its implications for research practice. Contemp Nurse. 2013;46(1):13–17.

[10] Armstrong E, Coffin J, McAllister M, et al. I've got to row the boat on my own, more or less": aboriginal australian experiences of traumatic brain injury. Brain Impair. 2019; 20(2):120–136.

[11] Cochrane F, Siyambalapitiya S, Brown L, et al. " … Trial and error … ": speech-language pathologists' perspectives of working with Indigenous Australian adults with acquired communication disorders … ": . Int J Speech Lang Pathol. 2016;18(5):420–431.

[12] Hersh D, Armstrong E, Panak V, et al. Speech-language pathology practices with indigenous Australians with acquired communication disorders. Int J Speech Lang Pathol. 2015;17(1):74–85.

[13] Taylor K, Guerin P. Health care and indigenous Australians: cultural safety in practice. 2nd ed. South Yarra (VIC): Palgrave Macmillan; 2014.

[14] Australian Institute of Aboriginal and Torres Strait Islander Languages [AIATSIS] and Federation of Aboriginal and Torres Strait Islander Languages [FATSIL]. National Indigenous languages survey report 2005. 2005. Available from: https://aiatsis.gov.au/sites/default/files/research_pub/nils-report-2005.pdf

[15] MacDonald S. Introducing the model of cognitive-communication competence: a model to guide evidence-based communication interventions after brain injury. Brain INJ. 2017;31(13-14):1760–1780.

[16] Armstrong E, Coffin J, Hersh D, et al. You felt like a prisoner in your own self, trapped": the experiences of aboriginal people with acquired communication disorders. Disabil Rehabil. 2021;43(13):1903–1916.

[17] Keightley M, Kendall V, Jang S, et al. From health care to home community: an aboriginal community-based ABI transition strategy. Brain Inj. 2011;25(2):142–152.

[18] Ciccone N, Armstrong E, Hersh D, et al. The Wangi (talking) project: a feasibility study of a rehabilitation model for aboriginal people with acquired communication disorders after stroke. Int J Speech Lang Pathol. 2019;21(3):305–316.

[19] Cochrane F, Siyambalapitiya S, Cornwell P. Clinical profile of aboriginal and Torres strait islander adults with stroke and traumatic brain injury at a regional Australian hospital: a retrospective chart audit. Brain Impair. 2021;22:1–13.

[20] National Health and Medical Research Council. Ethical conduct in research with Aboriginal and Torres Strait Islander peoples and communities: guidelines for researchers and stakeholders. 2018. Available from: https://www.nhmrc.gov.au/about-us/resources/ethical-conduct-research-aboriginal-and-torres-strait-islander-peoples-and-communities

[21] Laycock A, Walker D, Harrison N, et al. Researching Indigenous health: a practical guide for researchers. 2011. Available from: https://www.lowitja.org.au/content/Document/Lowitja-Publishing/Researchers-Guide_0.pdf

[22] Von Elm E, Altman D, Egger M, et al.; STROBE Initiative. The strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. Epidemiology. 2007;18(6):800–804.

[23] Gearing R, Mian I, Barber J, et al. A methodology for conducting retrospective chart review research in child and adolescent psychiatry. J Can Acad Child Adolesc Psychiatry. 2006;15(3):126–134.

[24] Vassar M, Holzmann M. The retrospective chart review: important methodological considerations. J Educ Eval Health Prof. 2013;10:12–17.

[25] Papathanasiou I, Coppens P. Aphasia and related neurogenic communication disorders. 2nd ed. Burlington (MA): Jones & Bartlett Learning; 2017.

[26] Stroke Foundation. Clinical Guidelines for Stroke Management. 2019. Available from: https://informme.org.au/en/Guidelines/Clinical-Guidelines-for-Stroke-Management

[27] Vogel A, Maruff P, Morgan A. Evaluation of communication assessment practices during the acute stages post stroke. J Eval Clin Pract. 2010;16(6):1183–1188.

[28] Stroke Foundation. National stroke audit: acute services report 2017. Available from: https://informme.org.au/-/media/7D1480925 C2046BA914F3F66D392B83A.ashx?la=en

[29] Stroke Unit Trialists' Collaboration. Organised inpatient (stroke unit) care for stroke. Cochr Database Syst Rev. 2013; (9):CD000197.

[30] Barker-Collo S, Jones K, Theadom A, BIONIC Research Group, et al. Neuropsychological outcome and its correlates in the first year after adult mild traumatic brain injury: a population-based New Zealand study. Brain INJ. 2015; 29(13-14):1604–1616.

[31] Knollman-Porter K, Brown J, Wallace T, et al. First-line health care Providers' Reported Knowledge of and Referrals to Speech-Language Pathologists for Clients With Mild Traumatic Brain Injury. Am J Speech Lang Pathol. 2021; 30(5):2214–2227.

[32] Theadom A, Starkey N, Barker-Collo S, on behalf of the BIONIC4you Research Group, et al. Population-based cohort study of the impacts of mild traumatic brain injury in adults four years post-injury. PLoS One. 2018;13(1): e0191655.
[33] McMahon P, Hricik A, Yue J, TRACK-TBI Investigators, et al. Symptomatology and functional outcome in mild traumatic brain injury: results from the prospective TRACK-TBI study. J Neurotrauma. 2014;31(1):26–33.
[34] New South Wales Ministry of Health. Adult trauma clinical practice guidelines: initial management of closed health injury in adults. 2nd ed. North Sydney (NSW): Agency for Clinical Innovation; 2011. Available from: https://aci.health.nsw.gov.au/__data/assets/pdf_file/0003/195150/Closed_Head_Injury_CPG_2nd_Ed_Full_document.pdf
[35] Steel J, Togher L. Social communication assessment after traumatic brain injury: a narrative review of innovations in pragmatic and discourse assessment methods. Brain Inj. 2019;33(1):48–61.
[36] New Zealand Guidelines Group. Traumatic brain injury: diagnosis, acute management and rehabilitation. 2006. Available from: https://www.moh.govt.nz/notebook/nbbooks.nsf/0/B8738C 3605889A6ACC257A6D00809243/$file/traumatic-brain-injury-acc.pdf
[37] Fitts M, Bird K, Gilroy J, et al. A qualitative study on the transition support needs of indigenous australians following traumatic brain injury. Brain Impair. 2019;20(2):137–159.
[38] Katzenellenbogen J, Sanfilippo F, Hobbs M, et al. Voting with their feet-predictors of discharge against medical advice in Aboriginal and non-Aboriginal ischaemic heart disease inpatients in Western Australia: an analytic study using data linkage. BMC Health Serv Res. 2013;13(330): 330–310.
[39] Choi M, Kim H, Qian H, et al. Readmission rates of patients discharged against medical advice: a matched cohort study. PLoS One. 2011;6(9):e24459.
[40] Alfandre D. I'm going home": discharges against medical advice. Mayo Clin Proc. 2009;84(3):255–260.
[41] Coelho C, Ylvisaker M, Turkstra L. Nonstandardized assessment approaches for individuals with traumatic brain injuries. Semin Speech Lang. 2005;26(4):223–241.
[42] Armstrong E, McAllister M, Hersh D, et al. A screening tool for acquired communication disorders in aboriginal australians after brain injury: lessons learned from the pilot phase. Aphasiology. 2020;34(11):1388–1412.
[43] Cochrane F, Siyambalapitiya S, Cornwell P. Speech-language pathology services for indigenous australian adults with acquired communication disorders: a systematic quantitative literature review. Speech Lang Hear. 2020;23(2): 79–90.
[44] Frith M, Togher L, Ferguson A, et al. Assessment practices of speech-language pathologists for cognitive communication disorders following traumatic brain injury in adults: an international survey. Brain Inj. 2014;28(13-14):1657–1666.
[45] Rohde A, Worral L, Godecke E, et al. Diagnosis of aphasia in stroke populations: a systematic review of language tests. PLoS One. 2018;13(3):e0194143–17.
[46] Verna A, Davidson B, Rose M. Speech-language pathology services for people with aphasia: a survey of current practice in Australia. Int J Speech-Lang. 2009;11(3):191–205.
[47] Lorenzen B, Murray L. Bilingual aphasia: a theoretical and clinical review. Am J Speech Lang Pathol. 2008;17(3): 299–317.
[48] Huang A, Siyambalapitiya S, Cornwell P. Speech pathologists and professional interpreters managing culturally and linguistically diverse adults with communication disorders: a systematic review. Int J Lang Commun Disord. 2019;54(5): 689–704.
[49] Morgan D, Harris T, Gidgup R, et al. Identifying the cultural heritage of patients during clinical handover and in hospital medical records. Med J Aust. 2019;210(5):220–226.
[50] Dingwall K, Lindeman MA, Cairney S. You've got to make it relevant": barriers and ways forward for assessing cognition in aboriginal clients. BMC Psychol. 2014;2(1):1–11.
[51] Ralph A, Lowell A, Murphy J, et al. Low uptake of aboriginal interpreters in healthcare: exploration of current use in Australia's Northern Territory. BMC Health Serv Res. 2017; 17(1):733–712.
[52] Wotherspoon C, Williams C. Exploring the experiences of aboriginal and torres strait islander patients admitted to a metropolitan health service. Aust Health Rev. 2019;43(2): 217–223.
[53] Lin I, Green C, Bessarab D. 'Yarn with me': applying clinical yarning to improve clinician-patient communication in Aboriginal health care". Aust J Prim Health. 2016;22(5): 377–382.
[54] Bohanna I, Stephens A, Wargent R, et al. Assessment of acquired brain injury in Aboriginal and Torres Strait Islander Australians: guidance for disability care Australia. 2013. Available from: https://www.braininjuryaustralia.org.au/wp-content/uploads/PDF_Project_Report_9Jul13_FINALx.pdf
[55] Bessarab D, Ng'andu B. Yarning about yarning as a legitimate method in indigenous research. IJCIS. 2010;3(1):37–50.
[56] Armstrong E, Ciccone N, Hersh D, et al. Development of the aboriginal communication assessment after brain injury (ACAABI): a screening tool for identifying acquired communication disorders in aboriginal Australians. Int J Speech Lang Pathol. 2017;19(3):297–308.
[57] Lewis T, Hill A, Bond C. Yarning: assessing proppa ways. JCPSLP. 2017;19(1):14–18.
[58] Gibson C, Crockett J, Dudgeon P, et al. Sharing and valuing older aboriginal people's voices about social and emotional wellbeing services: a strength-based approach for service providers. Aging Ment Health. 2020;24(3):481–488.
[59] Steel J, Ferguson A, Spencer E, et al. Language and cognitive communication disorder during post-traumatic amnesia: profiles of recovery after TBI from three cases. Brain Inj. 2017;31(13-14):1889–1902.
[60] Riedeman S, Turkstra L. Knowledge, confidence, and practice patterns of speech-language pathologists working with adults with traumatic brain injury. Am J Speech Lang Pathol. 2018;27(1):181–191.
[61] Australian Bureau of Statistics [ABS]. Estimates of Aboriginal and Torres Strait Islander Australians. 2018. Available from: https://www.abs.gov.au/ausstats/abs@.nsf/mf/3238.0.55.001
[62] Queensland Government. Aboriginal and Torres Strait Islander peoples in Queensland, Census 2016. 2017. Available from: www.qgso.qld.gov.au/products/reports/atsi-pop-qld-c16/atsi-pop-qld-c16.pdf
[63] Hersh D, Armstrong E, McAllister M, et al. General practitioners' perceptions of their communication with Australian Aboriginal patients with acquired neurogenic communication disorders. Patient Educ Couns. 2019; 102(12):2310–2317.

[64] Shahid S, Finn L, Bessarab D, et al. 'Nowhere to room … nobody told them': logistical and cultural impediments to Aboriginal peoples' participation in cancer treatment". Aust Health Rev. 2011;35(2):235–241.

[65] Kelly J, Dwyer J, Willis E, et al. Travelling to the city for hospital care: access factors in country aboriginal patient journeys. Aust J Rural Health. 2014;22(3):109–113.

[66] Worrall-Carter L, Daws K, Rahman M, et al. Exploring aboriginal patients' experiences of cardiac care at a major metropolitan hospital in Melbourne. Aust Health Rev. 2016; 40(6):696–704.

[67] Coffin J. Rising to the challenge in aboriginal health by creating cultural security. AIHWJ. 2007;31:22–24.

[68] Rose M, Ferguson A, Power E, et al. Aphasia rehabilitation in Australia: current practices, challenges and future directions. Int J Speech Lang Pathol. 2014;16(2):169–180.

[69] Kelly M, McDonald S, Frith M. Assessment and rehabilitation of social cognition impairment after brain injury: surveying practices of clinicians. Brain Imp. 2017;18(1):11–35.