

Capacity building for providers of cognitive rehabilitation in Queensland: a needs analysis survey

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ABSTRACT

Background. Cognitive rehabilitation of people with traumatic brain injury is a complex and challenging area of practice. Practitioners working in cognitive rehabilitation require ongoing training to stay abreast of new research and best practice interventions. A needs analysis was conducted to inform the development of a capacity building program for cognitive rehabilitation providers. **Methods.** A cross-sectional online survey of providers of cognitive rehabilitation services in Queensland collected data on demographic information, perceptions of knowledge, skills and confidence in cognitive rehabilitation, previously completed training, desired training opportunities and delivery methods, and barriers and facilitators to engaging in training. **Results.** The 103 respondents included 67 occupational therapists, 17 speech pathologists, 12 psychologists and seven social workers with a broad range of practice experience. Participants perceived a need for further training, with executive function and functional cognition the most desired topics. The number of topics previously trained on was significantly correlated with levels of knowledge, skills and confidence ($P < 0.01$). Barriers to training were time and affordability, and facilitators included flexibility, workplace support, positive practitioner mindset and targeted content. **Conclusion.** Cognitive rehabilitation providers in Queensland reported a need for further training, delivered flexibly, with a focus on managing complex cognitive impairments.

Keywords: acquired brain injury, cognitive rehabilitation, occupational therapy, practitioners, professional education, speech pathology, training, traumatic brain injury.

Introduction

Acquired brain injury (ABI) refers to any injury to the brain that occurs after birth and encompasses traumatic brain injury (TBI), stroke and other neurological conditions that affect the brain. In Queensland, TBI is estimated to impact 11 000 people a year, with a further 37 000 impacted by stroke ([Queensland Government 2021](#)). Worldwide, the prevalence of brain injury is more difficult to estimate, although [Dewan *et al.* \(2019\)](#) calculated the yearly incidence of TBI to be approximately 69 million people, and [Feigin *et al.* \(2022\)](#) estimated approximately 12 million incidences of stroke worldwide each year.

Cognitive impairment is common after ABI and can affect attention (including working memory and information processing speed), memory, communication and executive functioning ([Wong *et al.* 2014](#); [Downing *et al.* 2019](#)). Depending on the extent of the injury, the severity of cognitive impairment can vary from mild to severe, with the impact ranging from subtle changes in daily function to serious activity limitations ([van Baalen *et al.* 2003](#)). Impairments in cognitive function often impact more significantly on functional performance, relationships and participation in activities than those in physical function ([Khan *et al.* 2003](#)). Cognitive rehabilitation is designed to limit these functional impacts and minimise ongoing challenges in daily life ([Cicerone *et al.* 2000](#); [Jeffares *et al.* 2023](#)). Several different professions are involved in the provision of cognitive rehabilitation, including occupational therapists, neuropsychologists and

speech pathologists (Wong et al. 2014; Pagan et al. 2016; Downing et al. 2019; Jeffares et al. 2023). The focus of this study is to examine the characteristics and specific training needs of cognitive rehabilitation providers in Queensland, Australia, with the aim of informing the development of a capacity building program.

Current practice in cognitive rehabilitation for people with brain injury is supported by evidence-based recommendations for interventions, such as the International Cognitive (INCOG) guidelines (Bayley et al. 2023), the Evidence-Based Review of Acquired Brain Injury (ERABI) Clinical Tool (Evidence-Based Review of Acquired Brain Injury 2022), Cicerone's Cochrane review (Cicerone et al. 2019) and the associated *Cognitive Rehabilitation Manual and Textbook* published by the American Congress of Rehabilitation Medicine (Cicerone et al. 2022). Given the range of cognitive impairments that can arise with brain injury, many different cognitive rehabilitation interventions exist, including those adopting a restorative approach such as cognitive re-training, and those using a compensatory approach such as internal or metacognitive strategy training and external strategy training (Cicerone et al. 2000; Downing et al. 2019). Regardless of approach, cognitive rehabilitation should be focused on improving participation in activities of daily life and relationships (Cicerone et al. 2000; Downing et al. 2019). Due to the heterogeneous nature of impairment following ABI, a 'one-size fits all' approach is inadequate, with differences in access to resources and funding, and rehabilitation duration, settings and needs across the continuum of recovery further influencing that variability (Jeffares et al. 2023). Consequently, cognitive rehabilitation can be a challenging area of practice that requires complex clinical reasoning and specialised skills to plan and deliver best-practice individualised cognitive rehabilitation programs. Therefore, practitioners require ongoing, specific training to keep abreast of the latest evidence and provide effective interventions.

Previous studies have identified that practitioners may be unaware of evidence-based cognitive rehabilitation practices (Nott et al. 2020) and found limited implementation of evidence-based interventions (Poulin et al. 2021), especially in the community setting (Korner-Bitensky et al. 2011). Barriers to the uptake of evidence-based practices include insufficient descriptions of interventions and implementation strategies in the reporting of research, as well as a lack of training and education in understanding and implementing evidence-based recommendations (Bayley et al. 2012; Small et al. 2022). Instead, practitioners have relied on other sources such as textbooks or colleagues to assist with their clinical decision making (Koh et al. 2009; Riedeman and Turkstra 2018; Downing et al. 2019; Jeffares et al. 2023). Additionally, studies have found that few practitioners reported engaging in training to enhance their skills in cognitive rehabilitation (Riedeman and Turkstra 2018; Downing et al. 2019). Given that

practitioners who lack confidence in providing cognitive rehabilitation interventions have been less likely to use them (Wong et al. 2014; Pagan et al. 2016; Riedeman and Turkstra 2018), it is not surprising that studies have explicitly identified low confidence as a barrier to practising cognitive rehabilitation (Pagan et al. 2016; Downing et al. 2019; Jeffares et al. 2023). For example, a qualitative study of stroke rehabilitation practitioners from a variety of disciplines found that lack of confidence in their cognitive rehabilitation skills, particularly in community settings, was a major barrier to effective service delivery, with potentially negative implications for client outcomes (Jeffares et al. 2023).

The goal of training is to provide learning that helps practitioners acquire skills and develop competence in their practice (Luconi et al. 2020), and many studies have identified the benefits of training (Curran et al. 2006; Ammentorp et al. 2007; Pagan et al. 2016; Luconi et al. 2020). Training reduces professional isolation and supports practitioners, particularly those working in rural or remote areas, to acquire new skills and strengthen existing ones (Curran et al. 2006). Engagement in training also assists practitioners to use sound clinical judgement when deciding upon and implementing interventions (Jeffares et al. 2023), and can help address the gap between research knowledge and clinical practice (Luconi et al. 2020). Additionally, having practitioners with increased skills and confidence in providing interventions leads to better outcomes for clients (Ammentorp et al. 2007; Downing et al. 2019). Given that training has many established benefits, it is important to determine how practitioners are currently accessing it, and what aspects of training related to cognitive rehabilitation they feel would be most beneficial to their practice.

Previous well-designed surveys of practitioners in TBI rehabilitation about training needs have concluded that lack of time, inaccessibility and inadequate funding are barriers to accessing training (Pagan et al. 2016; Riedeman and Turkstra 2018). A US survey of speech-language pathologists ($n = 146$) identified that restricted access to journals limited practitioners' ability to stay up to date with current research and best practice (Riedeman and Turkstra 2018). For rural practitioners, a survey in Canada ($n = 237$) found these barriers were compounded by geographic isolation, cost and poor technological infrastructure (Curran et al. 2006). According to an Australia-wide survey ($n = 305$), practitioners working in brain injury are particularly concerned about workplace barriers, such as a lack of paid leave to attend training (Pagan et al. 2016). This suggests practitioners are less likely to pursue training experiences for themselves if they are not explicitly offered by their workplace.

In Australia, there have traditionally been differences between states and territories in the way rehabilitation services are funded, which has impacted on the development of services offering cognitive rehabilitation. With the introduction of the National Injury Insurance Scheme

Queensland (NIISQ) in 2016, rehabilitation funding for catastrophic injury from motor vehicle accidents in Queensland shifted from a fault-based, compulsory third-party scheme to a no-fault scheme that provides necessary and reasonable treatment, care and support for all people with eligible injuries, including TBI (National Injury Insurance Scheme Queensland 2022). The focus on supporting lifetime treatment, care and support needs means increased demand for effective cognitive rehabilitation across the continuum of care from hospital to the community. Along with the introduction of the National Disability Insurance Scheme (NDIS), the greater availability of funding has led to the expansion of services undertaking brain injury rehabilitation, especially in the community sector, and greater demand for cognitive rehabilitation in Queensland. Due to rapidly expanding demand, a workforce of providers equipped with appropriate, specialised skills in cognitive rehabilitation is now needed. While greater clinical practice experience and higher frequency of practice with people with brain injury has been associated with greater confidence (Wong *et al.* 2014; Pagan *et al.* 2016), many new providers in Queensland are yet to gain this experience. The need for building capacity in cognitive rehabilitation was specifically identified by the National Injury Insurance Agency, Queensland (NIISQ Agency), who sought a partnership with the researchers to examine the training needs of practitioners in Queensland to improve the treatment and rehabilitation of people seriously injured in motor vehicle accidents. Given the geographical spread and recent expansion in services in Queensland, a needs analysis was considered necessary to better understand the current landscape of the cognitive rehabilitation provider workforce and to inform development of a capacity building program to prepare practitioners to meet the growing demand for services in the community to improve current practice.

Therefore, a needs analysis of the clinician training requirements of multidisciplinary practitioners who provide cognitive rehabilitation services across Queensland was conducted. In particular, we were interested in determining the training needs of practitioners who provide services to people with TBI, who form a large proportion of NIISQ participants. This study aimed to: (1) understand the demographic profile of cognitive rehabilitation practitioners working with people with TBI in Queensland and their level of knowledge, skills and confidence in cognitive rehabilitation; (2) describe practitioners' current training opportunities related to cognitive rehabilitation; (3) investigate the relationships between demographic factors, completion of cognitive rehabilitation training, and practitioners' knowledge, skills and confidence in cognitive rehabilitation practice; (4) identify the barriers and facilitators to participating in ongoing training in cognitive rehabilitation; and (5) identify preferences for future cognitive rehabilitation training programs, and how these could best be implemented to facilitate participation.

Methods

Design

This study consisted of a customised cross-sectional survey of practitioners undertaking cognitive rehabilitation with clients in Queensland. The study is reported following the consensus-based checklist for reporting of survey studies (CROSS; Sharma *et al.* 2021). Ethical clearance for this study was obtained through The University of Queensland's Human Research Ethics Committee, clearance number HE001067. The study was informed by a reference group consisting of 14 members, including two consumer representatives with lived experience of cognitive rehabilitation, two NIISQ Agency representatives and 10 clinicians from across public and private rehabilitation services, representing different disciplines. The clinicians included two medical directors (metropolitan and regional) and two clinical leads in occupational therapy and speech pathology from inpatient rehabilitation units, a speech pathologist and a neuropsychologist from a community-based rehabilitation team, an occupational therapist and speech pathologist in private practice, a director of occupational therapy from a regional hospital, and the manager of a state-wide community-based brain injury service. The research team consisted of female academics with doctoral qualifications in occupational therapy, speech pathology and psychology, with experience in brain injury rehabilitation research and practice, and one final-year occupational therapy honours student.

Participants

Eligible participants were practitioners from occupational therapy, speech pathology and psychology or other relevant disciplines who provided cognitive rehabilitation to people with TBI in Queensland. Recruitment occurred through relevant organisations and networks, the Australasian Society for the Study of Brain Impairment BRAINSPaN network, professional associations including OT Australia and Speech Pathology Australia, and discipline-specific platforms hosted on websites such as Facebook. Snowball sampling was used by encouraging participants to share the survey with other colleagues.

Measures

The online survey was developed in conjunction with the reference group, who provided feedback on an initial draft. See Supplementary File S1 for a list of changes made in response to reference group feedback. The survey was hosted on Qualtrics (Provo, UT, USA, <https://www.qualtrics.com>) and consisted of 32 questions with a range of answer options, including multiple choice check boxes, 5-point Likert scales and open-ended text boxes (see Supplementary File S2). A brief description of the survey explained that its purpose was to conduct a needs analysis to inform the development of

a capacity building program for cognitive rehabilitation providers. Questions pertained to the following four areas:

1. Demographics: six questions regarding professional background and discipline, years of experience, including years working with clients with TBI, service setting and service location.
2. Current cognitive rehabilitation practice: seven questions regarding the participant's service context, frequency of cognitive rehabilitation practice and practice with individuals with TBI, and current knowledge, skills and confidence in cognitive rehabilitation.
3. Details of previously completed training: participants were asked to indicate topics in cognitive rehabilitation in which they had undergone previous training. Options were broadly grouped into impairment-focused training (14 options), participation-focused training (9 options) and general training (9 options), and participants could select multiple responses. They were also asked to indicate how this training was undertaken, and how effective they felt the training was in enhancing their practice. An open-ended question asked participants to identify, in a free text box, the barriers and facilitators that influenced their engagement in training.
4. Preferences for cognitive rehabilitation training opportunities: 12 questions gathered information on what future training topics participants were interested in and how they would like this training delivered, by asking participants to rate the options from most beneficial to least beneficial. Other questions related to preferences for the timing, frequency and cost of training, and the level of information provided, with participants required to select one option from a list.

Data collection

The project advertisement contained a link to the survey, which was available for 4 weeks between 8 September and 8 October 2021. A brief description of the study was provided to participants, and consent was confirmed through the selection of a check box before the survey began. Participants were informed that they could withdraw from the study at any time. The survey was anonymous, but participants were asked to generate a unique code to allow identification of multiple responses. Participants could provide their name and contact details at the end of the survey if they were interested in participating in a future pilot of a cognitive rehabilitation capacity building program, or alternatively they could email the research team and remain anonymous. Potential participants were reminded by email of the closure of the survey 1 week before its end date.

Data analysis

The quantitative data were downloaded from Qualtrics (Provo, UT, USA, <https://www.qualtrics.com>) and loaded

into the IBM Statistical Package for Social Sciences (ver. 27, IBM Corp., Armonk, NY, USA) for analysis. Descriptive statistics were used to summarise participant demographics and survey responses, including the training opportunities that practitioners had previously undertaken, desired topics for additional training and their preferences for the delivery of future training. Spearman's correlations were undertaken to determine if relationships were present between clinical experience, completion of cognitive rehabilitation training, and practitioners' knowledge, skills and confidence in cognitive rehabilitation practice. The variable, Queensland Health Service District, was dichotomised into two groups (Brisbane and other locations) and an independent groups *t*-test used to compare the groups on number of topics in which training had been received. Similarly, the type of service that participants worked in was dichotomised (Queensland Health services and other services), and the amount of training was compared between groups using an independent groups *t*-test.

A content analytic framework was used to organise the responses to the open-ended questions of the survey. Responses to the open-ended questions were electronically uploaded to Excel to organise the data. The data were analysed using inductive content analysis (Graneheim and Lundman 2004) and the results of previous survey studies investigating clinician's perspectives of cognitive rehabilitation practice and training were not reviewed by the coders until after the analysis was completed to ensure an inductive process was used. The responses were independently line-by-line coded by two members of the research team (L. C. and S. P.) who then met to compare codes. Lines of coding were classified as agreement or disagreement between the two independent coders, with approximately 90% agreement found. Agreement was achieved when the codes assigned by the independent raters captured the same meaning of the text, whereas disagreement was determined when the identified codes did not represent similar meaning. In the cases of disagreement, a consensus discussion with a third member of the research team (J. F.) led to a final list of codes. A list of codes was then developed, and themes were extrapolated from these codes via an iterative process of reviewing the data and engaging in a series of discussions with three members of the research team (L. C., S. P. and J. F.) to refine and name themes.

Results

A total of 108 surveys were completed. Three were excluded as the respondents lived outside Queensland, and two were excluded as only the initial questions on demographic information were completed. Therefore, 103 surveys were included in the data analysis.

Table 1 outlines the demographic characteristics of respondents. Respondents were predominantly occupational

Table 1. Demographics of participants ($N = 103$).

	<i>n</i> (%)
Profession	
Occupational therapy	67 (65.0)
Speech pathology	17 (16.5)
Neuropsychology	8 (7.8)
Clinical psychology	4 (3.9)
Other	7 (6.8)
Health district	
Metro North/Metro South	58 (56.3)
Gold Coast	10 (9.7)
Townsville	10 (9.7)
Sunshine Coast	9 (8.7)
Central Queensland	5 (4.9)
West Moreton	5 (4.9)
Mackay	3 (2.9)
Wide Bay	1 (1.0)
Type of practice	
Qld Health hospital	43 (41.7)
Private practice	32 (31.1)
Qld Health community service	13 (12.6)
Sole provider	12 (11.7)
Private hospital	2 (1.9)
Non-governmental community organisation	1 (1.0)
TBI-specific practice	
No	62 (60.2)
Yes	22 (21.4)
Mostly	19 (18.4)
Frequency of working with TBI clients	
Regularly	43 (41.7)
Often	35 (34.0)
Occasionally	23 (22.3)
Very rarely	2 (1.9)
Frequency of providing cognitive rehabilitation	
Regularly	45 (43.7)
Often	32 (31.1)
Occasionally	15 (14.6)
Very Rarely	10 (9.7)

therapists (65%) working in the Brisbane region (56%) and employed at Queensland Health (43%). Respondents had an average of 13.47 years (s.d. = 9.46) of experience, with a mean of 9.07 years (s.d. = 7.87) worked specifically in the

Table 2. Current knowledge, skills and confidence of practitioners ($n = 100$).

	High <i>n</i> (%)	Moderate <i>n</i> (%)	Some <i>n</i> (%)	Limited <i>n</i> (%)
Knowledge	14 (13.6)	42 (40.8)	32 (31.1)	12 (11.7)
Skills	10 (9.7)	42 (40.8)	34 (33.0)	14 (13.6)
Confidence	11 (10.7)	33 (32.0)	31 (30.1)	25 (24.2)

field of TBI rehabilitation. Forty-two percent of respondents worked regularly with individuals with TBI, and a similar percentage (44%) provided cognitive rehabilitation regularly.

Table 2 shows respondents' current reported levels of knowledge, skills and confidence in undertaking cognitive rehabilitation. The majority indicated they currently had moderate levels of knowledge, skills and confidence. Visual inspection suggests that level of confidence was lower compared to level of skills and knowledge, with 54% of respondents indicating they had only some or limited confidence.

Table 3 outlines the topics of previous training that respondents had undertaken, ranked from most to least frequently completed training. The most frequently completed training topics were goal setting (74%), cognitive assessment (73%) and memory (70%) interventions. Three respondents (3%) had completed a second degree related to cognitive rehabilitation.

The total number of training topics completed ranged from 0 to 29 topics, with a mean of 12 topics (s.d. = 7).

As shown in Table 4, greater perceived knowledge, skills and confidence in cognitive rehabilitation were significantly associated with more years of experience, higher frequency of working with people with TBI and providing cognitive rehabilitation (all $P < 0.01$). The strongest correlations with knowledge, skills and confidence were with the total number of training topics completed ($r_s = 0.62-0.65$, $P < 0.001$), with greater number of training topics associated with better knowledge, skills and confidence.

An independent groups *t*-test comparing the number of training topics for participants in Brisbane ($n = 58$, $M = 12.26$, s.d. = 6.78) versus other locations ($n = 43$, $M = 10.77$, s.d. = 6.92) was not significant, $t(99) = 1.08$, $P = 0.28$. Participants who worked in Queensland Health services received training on a significantly greater number of topics ($n = 56$, $M = 13.13$, s.d. = 7.24) than those who worked for other services ($n = 47$, $M = 9.96$, s.d. = 6.38), $t(101) = 2.33$, $P = 0.02$.

The most frequently desired topics for training were executive function (74.7%), functional cognition (69.9%), self-awareness (65.1%), impulsivity (63.1%), memory (62.2%), mild TBI (62.1%), social cognition (61.2%) and attention (61.1%) (Fig. 1). Respondents indicated their preferred delivery mode for training was mostly online with

Table 3. Topics of previously completed training ($n = 100$).

Training topic	n (%)
Goal setting	76 (73.8)
Cognitive assessment	75 (72.8)
Memory	72 (69.9)
Executive function	65 (63.1)
Attention	57 (55.3)
Mild traumatic brain injury	54 (52.4)
Fatigue	53 (51.5)
Outcome measurement	53 (51.5)
Functional cognition	50 (48.5)
Working with families/carers	46 (44.7)
Behaviour management	45 (43.7)
Basic ADL training	45 (43.7)
Instrumental ADL training	40 (38.8)
Impulsivity	38 (36.9)
Group therapy	38 (36.9)
Self-awareness	36 (35.0)
Disinhibition	31 (30.1)
Providing feedback and education	31 (30.1)
Learning routines and habits	30 (29.1)
Cognitive communication disorders	29 (28.2)
Disorders of consciousness	25 (24.3)
Communication partner training	24 (23.3)
Community living skills training	24 (23.3)
Telerehabilitation	24 (23.3)
Social cognition	23 (22.3)
Vocational rehabilitation	21 (20.4)
Self-identity	20 (19.4)
Driving	19 (18.4)
High-level language skills	18 (17.5)
Appraising cognitive rehabilitation evidence	16 (15.5)
Apathy	13 (12.6)
Paediatric cognitive rehabilitation	5 (4.9)
None of the above	4 (3.9)

some face-to-face components (55%), followed by mostly face-to-face with some online (25%), and entirely online (9%). Most respondents (86%) indicated that expert masterclasses would be the most useful approach to training, followed by workshops (65%) (Table 5). Respondents were also asked to indicate how much they were willing to pay for training courses delivered by experts. Of 99 responses to this

question, 34 (34%) were willing to pay A\$50 an hour, and 29 (29%) A\$75 an hour, 23 (23%) A\$100 or more per hour, and 13 (13%) people indicated they wanted to spend less than A\$50 per hour.

Content analysis determined the common themes related to the barriers and facilitators of completing training (Table 6). The barriers to completing training included (1) time and (2) affordability. First, respondents highlighted that competing and fluctuating demands between professional caseloads and personal commitments made it difficult to commit time to training and described the challenge of having to decide what to prioritise. For example, '[not enough] time either a) to make up for clinical time missed when participating in PD [professional development] or b) ability to attend on non-work days due to personal life commitments.' Attending training during work hours could interfere with core duties, for example 'amount of time I have available to invest into a course whilst still meeting my KPIs as an employee.' Second, affordability of training was a barrier, and some respondents indicated they would like low or no cost training options.

Themes identified as facilitators to completing training included: (1) flexibility, (2) workplace support, (3) positive practitioner mindset, and (4) targeted content. Flexibility was defined in two broad aspects of 'delivery' and 'access'. The first aspect of delivery related to a preference for training to be provided flexibly, including options for face-to-face and online attendance, as well as manageable session length. For example: 'primary facilitators would be accommodating courses/resources (e.g. combination of online (at your own pace) work and scheduled face to face work).'

The second aspect of access referred to having access to materials such as recordings and resources outside of scheduled session times to allow practitioners to review content and reinforce learning by applying new knowledge in everyday practice. Flexible access also included having technology to facilitate their performance and engagement in training. For example: 'providing options for online learning and information to be recorded so that I can learn in my own time as well as work time would be appreciated.' Flexibility also included easier access to training for regional and rural practitioners.

The second theme, workplace support, was identified by many participants as a factor that facilitated their participation in training. In particular, the provision of dedicated, paid time to attend training was desirable to many. For example: 'my Director is very supportive for PD promoting improved patient intervention during work time'. Having the support of supervisors and directors to complete training, including in areas of interest that may be outside their immediate work scope, and having a flexible team who could cover the caseload was considered an important aspect of support. Access to workplace leave and funding for training was also highlighted as a facilitator, while some

Table 4. Spearman Rho correlations between knowledge, skills, confidence and experience and training variables.

	1	2	3	4	5	6	7	8
1. Years worked	1	0.825*	0.257*	0.056	0.027	0.380*	0.331*	0.306*
2. Years worked in TBI		1	0.335*	0.032	-0.013	0.519*	0.476*	0.434*
3. Number of training topics completed			1	0.268*	0.421*	0.626*	0.625*	0.646*
4. Frequency of working with TBI				1	0.567*	0.313*	0.294*	0.316*
5. Frequency of providing cognitive rehabilitation					1	0.411*	0.461*	0.508*
6. Knowledge						1	0.874*	0.837*
7. Skills							1	0.902*
8. Confidence								1

* $P < 0.05$.

respondents indicated that employer funding thresholds limited how much training they completed.

The third theme of positive practitioner mindset described attitudes towards training that were evident on a spectrum across the respondents. At one end were practitioners who engaged in training only as a professional registration requirement and viewed training as an obligation. More common, however, were practitioners who were intrinsically motivated to learn and improve their practice for the benefit of their clients. This type of practitioner also displayed enthusiasm and interest in the subject area: 'it's important to me and I would make myself available. It's the one area I really want to improve.'

The fourth theme related to targeted content which could be translated into practical clinical skills. Many responses outlined the need for the content of training sessions to be targeted to their needs at the right level and relevant to their caseload with opportunities for translation of knowledge into practice between sessions. One participant commented 'a huge barrier is being able to apply it to practice and converting the skills learnt into new and regular practice with consumers.' Participants valued the inclusion of evidence-based information and high-quality research and indicated that having courses delivered by experts, with time for in depth case discussions, made them more likely to attend a particular course.

Discussion

This study broadly investigated the training needs of providers of cognitive rehabilitation to people with TBI in Queensland. The aims were to determine their profile and training preferences, including topics of perceived training need, preferred methods of delivery, and barriers and facilitators to completing training. In total, 103 responses were received. Although this is

not as high as previous national studies of a similar workforce (Pagan *et al.* 2016; Downing *et al.* 2019), the number of responses is reasonable because our study represents practitioners in only one Australian state.

The demographic profile of respondents suggests that the typical provider of cognitive rehabilitation to people with TBI in Queensland is an occupational therapist with more than 10 years' clinical experience. They are most commonly working in a metropolitan Queensland Health facility which is not a brain injury-specific service, but one where they regularly see clients with TBI and provide cognitive rehabilitation. The higher prevalence of responses from occupational therapists is potentially due to the method of dissemination of surveys, as the researchers had strong connections with occupational therapy groups and networks. However, this demographic is similar to a study of cognitive rehabilitation providers working with individuals with TBI completed by Downing *et al.* (2019), indicating that there may be a larger proportion of occupational therapists practicing in cognitive rehabilitation compared to other professions. However, in a study by Pagan *et al.* (2016), occupational therapists were the second-most represented profession after psychologists. While most participants in our study worked with clients with TBI, the majority also worked with other patient groups and only provided cognitive rehabilitation approximately once a week. This reflects our finding that the majority of respondents did not work in TBI-specific practices, suggesting that it is possible to extrapolate our findings beyond TBI practice to cognitive rehabilitation more broadly with other health conditions.

The majority of participants indicated that they had 'moderate' or 'some' level of knowledge (72%), skills (78%) and confidence (60%) in cognitive rehabilitation generally. Levels of knowledge, skills and confidence were significantly moderately correlated with the frequency with which practitioners conducted cognitive rehabilitation.

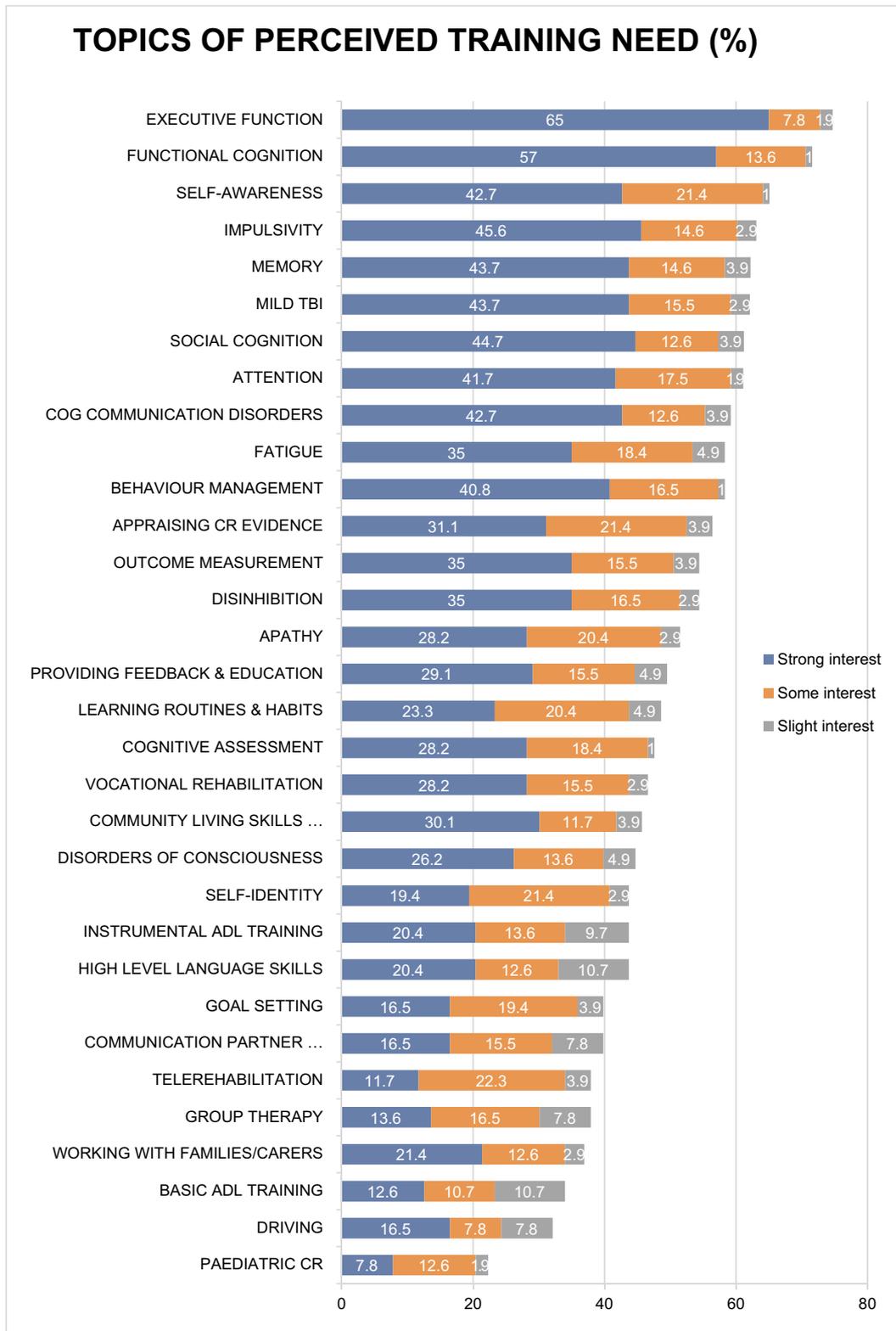


Fig. 1. Topics of perceived training need (% of respondents).

Table 5. Desired form of training (N = 99).

Form of training	Extremely useful n (%)	Very useful n (%)	Moderately useful n (%)	Slightly useful n (%)	Not at all useful n (%)
Expert masterclass	89 (86.4)	9 (8.7)	1 (1.0)	0 (0.0)	0 (0.0)
Workshops	67 (65.0)	25 (24.3)	5 (4.9)	1 (1.0)	1 (1.0)
Sharing resources	55 (53.4)	30 (29.1)	12 (11.7)	2 (1.9)	0 (0.0)
Update on recent research advances	48 (46.6)	39 (37.9)	11 (10.7)	1 (1.0)	0 (0.0)
Webinars	45 (43.7)	40 (38.8)	12 (11.7)	1 (1.0)	1 (1.0)
Web-based community of practice	43 (41.7)	32 (31.1)	16 (15.5)	7 (6.8)	1 (1.0)
Small group discussion	37 (35.9)	35 (34.0)	22 (21.4)	3 (2.9)	2 (1.9)

Table 6. Barriers and facilitators of completing training.

Barriers/Facilitators	Definition
Barriers	
Time	Competing demand of caseload and personal commitments
Affordability	Training too expensive
Facilitators	
Flexibility	Delivery of training in a flexible way and independent access to resources
Workplace support	Workplace providing dedicated, paid time to attend training
Positive practitioner mindset	Individual practitioner attitude towards training
Targeted content	Training content which responds to practitioner need with relevance to practitioner caseload

More participants rated their confidence as lower than their knowledge or skills, which suggests that feeling competent in delivering cognitive rehabilitation does not always directly translate into increased confidence. However, these self-ratings, while helpful in understanding practitioners' attitudes to their practice, can be problematic as individuals may vary in their ability to subjectively assess their own proficiency. The number of topics that practitioners had undertaken training on was highly correlated with levels of knowledge, skills and confidence, suggesting that training may have a direct impact on practitioners' self-efficacy for engaging in cognitive rehabilitation.

Results indicate that participants had most frequently received training in goal setting (74%) since qualification. Given that Pagan *et al.* (2016) identified goal setting as the most frequently completed activity in TBI rehabilitation, it may be that practitioners are seeking training in this area to ensure their preparedness for this task. Additionally, Cameron *et al.* (2018) found that some practitioners did not use collaborative goal setting appropriately in practice. This may explain the emphasis on goal setting as a training topic. Similarly, 73% of participants in our study reported having completed previous training regarding cognitive assessment. Pagan *et al.* (2016) identified this as the third most frequently performed skill in TBI rehabilitation, again

suggesting that practitioners seek training in frequently used skill areas. Additionally, many training programs are likely to include goal setting and assessment in relation to the cognitive domain they are targeting, and this may explain the high rates of participation in training on these two topics. Only 3% of respondents in our study indicated they had completed a second degree related to cognitive rehabilitation, possibly due to the high cost involved and the limited number of courses available.

Significant relationships were identified between knowledge, skills and confidence and the number of years worked. This is similar to the findings of Pagan *et al.* (2016), who identified that practitioners with less than 2 years' experience had significantly lower confidence to overcome intervention barriers compared with those with greater experience. However, in contrast to Pagan *et al.* (2016), who found that the amount of client contact was not associated with confidence, our results showed a significant relationship between knowledge, skills and confidence and both time spent working with clients as well as frequency of completing cognitive rehabilitation. This suggests that more inexperienced practitioners in particular may require support to build their competency in cognitive rehabilitation.

There were no significant differences in the number of topics on which training was completed based on location

in Queensland. Given that training is a requirement for registration and continued practice in all professions represented in this study (Speech Pathology Australia 2016; Psychology Board of Australia 2019; Australian Association of Social Workers 2020; Occupational Therapy Board of Australia 2020), this may explain the participation in training by rural practitioners despite the barriers previously identified in research on this group (Curran *et al.* 2006; Berndt *et al.* 2017; Ramsden *et al.* 2022). However, there was a significantly greater number of training topics completed by practitioners who worked for Queensland Health compared to those who worked for private practice or non-governmental organisations. This finding may suggest that identified barriers (e.g. less time, flexibility, funding or the need to self-fund) may have a greater impact on non-Queensland Health practitioners when making decisions to participate in training. It also indicates that there is a particular need for training for practitioners working outside Queensland Health facilities, especially given that these practitioners are often delivering services to NISQ and NDIS participants in the community setting where reduced uptake of evidence-based interventions has been identified (Korner-Bitensky *et al.* 2011).

The topic that practitioners most commonly perceived they needed training on in this study was executive function, with almost three-quarters of participants indicating some interest in this topic. This aligns with findings from an international study surveying practitioners from multiple professions (neuropsychologists, occupational therapists, speech pathologists and rehabilitation physicians) (Nowell *et al.* 2020), as well as a study which explored occupational therapy practice in Sweden (Holmqvist *et al.* 2014). This is not a surprising finding as executive functioning is a complex area of intervention which is frequently targeted during cognitive rehabilitation (Holmqvist *et al.* 2014; Nowell *et al.* 2020). In the present study, respondents appeared to desire training on general impairment-based topics more than specialised topics such as telerehabilitation, driving and paediatric cognitive rehabilitation, which were topics of lower perceived need. Other topics of perceived need, such as self-awareness and impulsivity, were topics that fewer respondents had sought training in, hence suggesting their motivation to expand their skills. Poulin *et al.* (2021) also found that cognitive rehabilitation interventions targeting executive functions and self-awareness were identified as the highest priorities for implementation by clinicians in Canada.

With respect to preferred delivery format, most respondents preferred training to be available mostly online, with some face-to-face components. This supports the preference for flexible programs, with flexibility described as a facilitator to participation in training. Expert masterclasses (i.e. a workshop facilitated by an expert on a specific topic) were the most desirable form of training, which aligns with comments that targeted training from experts was a facilitator to engaging in training.

Barriers and facilitators to completing training included time constraints, affordability, flexibility, workplace support, positive practitioner mindset and targeted content. Themes identified in this study are similar to barriers and challenges to engaging in training highlighted by Curran *et al.* (2006), which included cost, limited workplace support and lack of flexibility. This suggests that barriers to participating in training have remained similar over the years.

This was the first study to examine the cognitive rehabilitation training needs of practitioners working in Queensland. While the survey targeted practitioners working with clients with TBI, the findings may have broader applicability for other populations who experience cognitive impairment and require rehabilitation such as stroke or brain tumour. The results of the needs analysis could be used to guide the development of training on cognitive rehabilitation, which may help close the gap between research evidence and clinical practice. However, some limitations of the study need to be acknowledged. First, owing to the dissemination of the survey through networks, the total number of practitioners reached, as well as the actual number who work this area, it was not possible to calculate response rate. It therefore remains unclear whether the participants sampled are representative of the population of practitioners working in cognitive rehabilitation in Queensland. Furthermore, the respondents to this study were practising solely in Queensland, Australia; therefore, the findings may not be transferable to practitioners working in other areas of Australia or overseas, where funding and delivery of services could be different. Although there was no difference between the amount of training that regional and rural practitioners accessed compared to those based in metropolitan areas, further research into the experiences of remote practitioners is recommended to determine their training needs. A limitation of the survey structure was the division of training topics into impairment-based and participation-focused, which implies that rehabilitation of specific impairments (e.g. memory) cannot be done with a participation focus. This structure may have influenced the training needs identified.

Future research should focus on developing a capacity building program in line with the recommendations of practitioners involved in this needs analysis. Future capacity building should focus on providing training on topics of perceived need, aligning with preferences for flexible access, and be facilitated by experts in the field. Further qualitative research, such as using focus groups, would be a useful adjunct to the current study to understand barriers and facilitators to participating in training. This needs analysis will be used to guide the development of a capacity building program for cognitive rehabilitation providers. Future research is required to evaluate how effective the program is at improving the knowledge, skills and confidence of practitioners, and ultimately the impact on outcomes for their clients with TBI.

Conclusion

This study was completed to understand the perceived training needs of cognitive rehabilitation providers in Queensland, Australia. Given the prevalence of TBI and the changing landscape of cognitive rehabilitation service provision in Queensland, an increasing number of practitioners are required to regularly engage in cognitive rehabilitation. Gaining an understanding of areas of perceived need for professional development and how this training can be most effectively delivered is essential. This knowledge will ensure that training can be designed and delivered in a manner that allows practitioners to implement appropriate interventions that lead to optimal outcomes for their clients. Indeed, a key finding to emerge in this study was that completion of training was strongly correlated with knowledge, skills and confidence, suggesting that training helps practitioners feel better prepared to deliver cognitive rehabilitation. The results of this needs analysis will inform the development of future training to build capacity in the cognitive rehabilitation workforce to better meet the needs of clients with brain injury.

Supplementary material

Supplementary material is available [online](#).

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Data availability. The data that support this study will be shared upon reasonable request to the corresponding author.

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Ethics standard. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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