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Development of an evidence-based aphasia therapy implementation tool: an international survey of speech pathologists' access to and use of aphasia therapy resources

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ABSTRACT

Background: Speech and language therapy can reduce the level of impairment and disability caused by aphasia (Brady et al., 2016). Selecting a therapy can be challenging for clinicians who may struggle to stay abreast of the best evidence to support therapy selection (Rose et al., 2014). Once a therapy is selected, accessing relevant resources is a significant barrier to implementation (Shrubsole et al., 2019). The Aphasia Therapy Finder (ATF) is proposed to be an online repository of therapy resources designed to aid selection of evidence-based aphasia therapies and to bridge the evidence-practice gap in aphasia rehabilitation.

Aims: In this study, we aimed to explore speech pathologists' selection and use of aphasia therapy approaches, and access to aphasia therapy resources in clinical practice. We further aimed to explore speech pathologists' perspectives on the proposed ATF.

Methods & Procedures: A cross-sectional, mixed-methods, survey design was employed. A 22-item web-based survey was developed and disseminated to speech pathologists via professional networks internationally. Data analyses included descriptive statistics and conventional content analysis.

Outcomes & Results: Eligible responses from 176 speech pathologists across 19 countries were included in the analyses (86.3% completion rate). Speech pathologists reported using a range of therapy approaches (n = 43) in aphasia rehabilitation, consistent

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with previous findings (Rose et al., 2014). Information regarding new therapy approaches was predominantly obtained from academic sources including conferences, research literature, and professional development workshops. Speech pathologists placed high importance on research evidence when selecting therapy approaches. Resource limitations, including time and budget constraints, were identified as key barriers to implementing evidence-based aphasia therapy approaches in clinical practice. There was strong support for development of the ATF; 91.7% of respondents indicated they would use it in clinical practice. Recency of research, equity of access with the inclusion of linguistically and culturally diverse resources, and usability of resources were identified as priorities when developing the ATF.

Conclusions: While speech pathologists report using a range of aphasia therapy approaches in clinical practice and consider research evidence when selecting therapy approaches, resource limitations continue to present a barrier to the implementation of evidence-based practice. The development of the ATF may support the translation of research evidence into clinical practice.

Background

Aphasia is a chronic and debilitating communication disorder that results from damage to the brain and may affect an individual's ability to speak, understand speech, read, write, and gesture. Aphasia affects approximately 30% of stroke survivors (Engelter et al., 2006). People with aphasia experience the poorest health-related quality of life (Lam & Wodchis, 2010), reduced participation in meaningful life activities (Wray & Clarke, 2017), and reduced social networks with increased social isolation (Azios et al., 2022; Northcott et al., 2016; Wray & Clarke, 2017). Such severe impacts on everyday life can lead to mental health challenges, with depression and anxiety being highly prevalent in people living with aphasia (Code et al., 1999; Hilari et al., 2010, 2012; Morris et al., 2017).

Several aphasia therapy approaches have been demonstrated to be effective, and can reduce the level of language impairment and communication disability that an individual experiences (Brady et al., 2016; The REhabilitation and recovery of peopLE with Aphasia after StrokE Collaborators [RELEASE], 2021). However, aphasia is a heterogeneous condition so there is no "one size fits all" therapy approach. A broad range of therapy approaches for the rehabilitation of aphasia exist, spanning the International Classification of Disability, Functioning and Health (ICF) (World Health Organization [WHO], 2001). According to Web of Science (April, 2022), there has been a proliferation in the number of published intervention studies in aphasia rehabilitation, with the number of studies published in peer review journals per decade consecutively doubling from 1990 to 2020 (1990-00 n = 719; 2000-10 n = 1,499; 2010-2020 n = 3,314) (search terms "aphasia" AND ("therapy" OR "treatment"); Language: Any). However, the number of well-designed evidence-based clinical research studies in aphasia rehabilitation is still limited. Consequently, selecting an aphasia therapy approach may be a challenge for speech pathologists who may struggle to stay abreast of developments in the expanding evidence base.

While there is evidence to support the effectiveness of aphasia rehabilitation, the implementation of research evidence into clinical practice may be influenced by

a number of factors (Shrubsole et al., 2019). The Theoretical Domains Framework (TDF) identifies 14 domains influencing behaviour change, which may support understanding of the implementation of evidence-based practice in aphasia rehabilitation and may be used to develop strategies for effective implementation (Cane et al., 2012). In a study exploring factors influencing speech pathologists' uptake of recommended aphasia practices in Australia, Shrubsole et al. (2019) found that the TDF domains "environmental context and resources", "beliefs about consequences", and "social influences" were consistently reported to influence speech pathologists' clinical practice. Furthermore, in a study of aphasia rehabilitation practice in Australia, Rose et al. (2014) found that the majority of speech pathologists identified lack of resources as the major challenge in current aphasia rehabilitation. Additionally, a recent UK survey of 227 speech pathologists found lack of resources was the biggest barrier to provision of intensive aphasia therapy (Monnelly et al., 2023). Consequently, one significant barrier to the implementation of best practice approaches in aphasia rehabilitation is limited access to the required resources.

A greater understanding of speech pathologists' current clinical practice in aphasia rehabilitation, with respect to factors influencing the selection and use of aphasia therapy approaches and resources, will provide a foundation to support the translation of research evidence into clinical practice. It is anticipated that this knowledge could help to inform the development of the Aphasia Therapy Finder (ATF), a therapy implementation tool designed by the authors as part of the Collaboration of Aphasia Trialists (Working group 4: Effectiveness of aphasia interventions). The Collaboration of Aphasia Trialists is an international network of multidisciplinary aphasia investigators in rehabilitation, social science, psychology and linguistics research. The ATF is proposed to be a searchable database of common aphasia therapies with high to moderate level evidence. The ATF will aim to provide accessible summaries of the evidence for therapy approaches and instructions on how to carry out and adapt the therapy approaches in a clinical setting. Furthermore, the ATF will provide access to the resources required for rapid implementation into clinical practice.

Aims

In this study we aimed to gain a greater understanding of speech pathologists' clinical practice in aphasia rehabilitation, including factors influencing their selection and use of therapy approaches and their access to aphasia therapy resources. Furthermore, we aimed to identify potential barriers and facilitators to the implementation of evidence-based aphasia therapy approaches. The knowledge obtained from this international survey will in turn inform the development of the ATF. A full description of the development of the ATF is beyond the scope of this paper.

Methods

Design

An online, cross-sectional, mixed methods survey was developed and disseminated using QualtricsXM survey software (2022) (Supplemental 1). The survey was designed and reported as per the Checklist for Reporting Results of Internet E-Surveys (CHERRIES)

(Eysenbach, 2004) (Supplemental 2). Ethical approval for this study was obtained from The University of Queensland's Low and Negligible Risk ethics sub-committee (2021/HE000252).

Participant Recruitment

Speech pathologists, or individuals holding an equivalent or related professional qualification (e.g., clinical linguist, neurologist), 18 years or older, with clinical experience in providing language and communication therapy for people with aphasia were recruited to participate in the survey. The survey was disseminated in English, therefore, sufficient English to access and participate in the survey without use of an interpreter was required.

The survey was available to participants between 8th July 2021 to 13th December 2021. It was disseminated via international professional networks including the Collaboration of Aphasia Trialists (CATS), the American Speech-Language-Hearing Association Special Interest Group for Neurogenics (ASHA-SIG 2), the Royal College of Speech and Language Therapists (RCSLT), the British Aphasiology Society, the Aphasia Access Organization, the German Society for Aphasia Research and Treatment, the Centre for Research Excellence in Aphasia Rehabilitation and Recovery (Aphasia CRE) community of practice membership, and the Queensland Aphasia Research Centre (QARC). Recruitment also occurred via relevant social media outlets (e.g., Facebook™, Twitter™, LinkedIn ™).

Survey Development

Informal discussion groups were conducted with 24 clinical speech pathologists in Australia (n = 12) and the United States of America (n = 12) from February to March 2021 to identify key themes regarding the use of evidence-based aphasia therapy approaches in clinical practice and to introduce the concept of the ATF. Information obtained from these discussion groups was then used to develop the content of the survey, which addressed three main topics:

(1) Background information: personal demographics (language, age, gender, nationality), professional experience (qualifications, years of clinical aphasia experience, clinical caseload).
(2) Approaches to aphasia rehabilitation and access to resources: use of defined therapy approaches (definitions provided in the survey, see Supplemental 3), frequency of employing new therapy approaches, clinical rationale for selecting a therapy approach.
(3) Views and perspectives on the proposed ATF (recommendations for development of the ATF with respect to access, cost, and features).

A 22 item, web-based survey was developed by the authorship team and piloted with two speech pathology researchers to determine acceptability and technical functionality prior to dissemination. Participants provided informed consent prior to commencing the survey and were able to discontinue the survey at any time. Participants' data were de-identified to preserve anonymity and, once submitted, were unable to be withdrawn from the study. Consistent with best practice in web-based survey construction, a range of

response formats (19 binary and multiple-choice questions, 3 open-ended questions) were used and participants had the option to return to previous pages before submitting their final response. The estimated time for completion of the survey was 20 minutes.

Data Analyses

Data were exported from Qualtrics XM software into a Microsoft Excel© database for analyses. Survey data were initially screened to determine complete and incomplete responses for individual participants. Submissions containing only consent and/or demographic information were removed from the data set and excluded from further analyses. Submissions containing consent and demographic information as well as partial or total survey response were included in analyses. Quantitative survey data were analysed using Microsoft Excel© software to generate descriptive statistics (frequency counts and percentages). Qualitative survey data, obtained through open ended questions, were analysed using conventional content analysis (Hsieh & Shannon, 2005). The first author (J.D.) read through individual participant responses, derived codes that captured the key meaning, and placed related codes into categories and subcategories, which were determined by the researcher (J.D.). Within categories and subcategories, potential barriers and facilitators to the selection and use of evidence-based therapy approaches in aphasia rehabilitation were identified and mapped to the domains of the TDF (Michie et al., 2005). The coding of qualitative survey data and mapping to the TDF were then reviewed by the second author (S.H.) and discrepancies were discussed and resolved in a single peer debriefing session.

Results

A total of 204 participants commenced the survey, however, 28 participants did not provide further information beyond the demographic information. These 28 responses were considered incomplete and were therefore removed from the dataset and excluded from further analyses. Responses from the remaining 176 participants were included in analyses (completion rate = 86.27%).

Participant demographics and predominant caseload

A broad, international representation of participants (95% female, age 18-34 years 39%, 35-44 years 28%, 45-54 years 18%, > 55 years 15%) was achieved with responses received from 19 countries across 6 continents (see Table 1). The majority of participants were from developed countries (94%), according to the United Nations country classifications (United Nations, 2023). The majority of participants (94%) identified as speech pathologists, with the remaining sample consisting of clinical linguists (3%), a neurologist, a cognitive neuroscientist, an English language teacher, and a singing teacher. For the purposes of this manuscript our participant group will be referred to collectively as speech pathologists, however, acknowledging that 6% of respondents reported holding an equivalent or related professional qualification. Participants held a range of professional qualifications (see Table 2) and reported a range of years since obtaining their qualifications and of clinical experience with aphasia (see Table 3). Participants worked in

Table 1. Reported country of respondents (n=176).

Country	%	*n*
Australia	24%	43
Canada	2%	3
Chile	1%	1
Germany	4%	7
Iceland	1%	1
India	1%	1
Ireland	1%	1
Italy	1%	1
Kenya	1%	2
New Zealand	2%	3
Nigeria	1%	1
Norway	11%	19
South Africa	1%	1
Sweden	1%	2
Switzerland	1%	2
Turkey	2%	3
United Kingdom of Great Britain and Northern Ireland	20%	36
United Republic of Tanzania	1%	1
United States of America	26%	45
Not specified	2%	3

Table 2. Highest professional qualification obtained (n=176).

Qualification	%	*n*
Bachelor's degree	11%	19
Bachelor's degree with Honours	13%	23
Clinical Doctorate	1%	2
Graduate certificate/diploma	3%	6
Master of Philosophy (MPhil)	3%	5
Doctor of Philosophy (PhD)	18%	32
Postgraduate Master's degree	50%	88
Not specified	1%	1

Table 3. Reported number of years post qualifications obtained and years of aphasia clinical experience (n=176).

	Years post qualifications		Aphasia clinical experience	
Clinical experience	%	*n*	%	*n*
Less than 1 year	3%	5	2%	4
1-3 years	13%	22	16%	29
4-5 years	10%	17	9%	16
6-10 years	20%	36	20%	36
11-15 years	21%	37	22%	38
16-20 years	7%	13	6%	11
20+ years	25%	44	23%	40
Not specified	1%	2	1%	2

various clinical settings including community-based rehabilitation (27%), inpatient rehabilitation (19%), university clinic (16%), acute hospital service (14%), and private practice (14%) (see Table 4) and practiced across the continuum of care from the acute (1-7 days post onset; 13%), sub-acute (1 week-6 months; 46%), and chronic (more than 6 months; 41%) phases of recovery.

Table 4. Reported primary clinical setting of respondents (n=176).

Primary clinical setting	%	*n*
Hospital - Acute service	14%	24
Hospital - Inpatient rehabilitation service	19%	34
Community rehabilitation - Day hospital, outpatient rehabilitation service, community centre or home-based care	27%	48
University clinic	16%	28
Private practice	14%	24
Residential aged care facility/Skilled nursing facility	1%	2
Aphasia center	1%	1
Community health organisation	1%	2
University research programme	2%	3
Voluntary sector	1%	2
Other	4%	7
Not specified	1%	1

Aphasia therapy approaches used in clinical practice

Participants were asked to describe their current use of aphasia therapy approaches and access to resources. The definitions for aphasia therapy approaches included in the survey were adapted from the theoretical approaches to aphasia rehabilitation identified by the RELEASE Collaboration (2020) (Supplemental 3). Participants reported using a wide variety of aphasia therapy approaches and techniques (Table 5). More than half of the participants reported using semantic (88%), multimodal (71%), functional and pragmatic (69%), phonological (63%), conversation partner training (61%), and verbal therapy approaches (51%). Forty-three specific aphasia therapy techniques were reported (Appendix 1). To learn about new developments in the management of aphasia, participants reported relying heavily on professional development courses, seminars, and conferences (82% of respondents), research literature (74%), and special interest groups (50%) to maintain currency of practice (Table 6). Two-thirds of participants reported using a therapy approach or technique for the first time in the six months prior to completing the survey: 1-2 months prior (25%), about three months prior (22%), about six months prior (17%), about one year prior (28%), and more than five years prior (8%). Participants reported that selection of a therapy approach or technique is most often influenced by the scientific evidence base to support its use (80% of respondents), the ease of administration including preparation time and resources required (64%), access to or availability of the therapy resources in the workplace (58%), and level of knowledge or familiarity with the approach (53%) (Table 7). Participants reported accessing therapy resources online via

Table 5. Speech pathologists' reported use of therapy approaches for aphasia rehabilitation.

Therapy approach	Count	% of respondents
Semantic therapy	154	88%
Multimodal therapy	125	71%
Functional & pragmatic therapy	121	69%
Phonological therapy	110	63%
Conversational partner training	107	61%
Verbal therapy	89	51%
Sentence processing therapy	76	43%
Melodic Intonation Therapy (MIT)	31	18%
Constraint Induced Aphasia Therapy (CIAT)	25	14%

Note: Each respondent could list as many therapy approaches as they wished.

Table 6. Speech pathologists' reported methods for obtaining information regarding new developments in speech pathology for the management of aphasia.

Mode	Count	% of respondents
External professional development courses, seminars or conferences	145	82%
Research literature	130	74%
Special interest groups	88	50%
Through your current workplace/department	82	47%
Search engines (e.g., Google©)	59	34%
From students undertaking clinical placements with you	33	19%
Other		
Social Media (e.g., Twitter, Instagram, Facebook)	12	7%
Aphasia Research Centres & Interest Groups (Aphasia CRE, QARC, British Aphasiology Society, Aphasia Bank Group)	8	5%
Speech pathology professional bodies (e.g., Speech Pathology Australia, RCSLT, ASHA)	5	3%
Podcasts (e.g., Med SLP, speech uncensored)	4	2%
Aphasia Access	3	2%
Websites (e.g., Tactus)	3	2%
Professional colleagues	2	1%
Participation in research	2	1%
Private speech pathology services (e.g., Honeycomb Speech Therapy Activity Studio)	1	1%
SpeechBITE	1	1%
Patients/Clients	1	1%
Collaboration of Aphasia Trialists	1	1%

Key: Aphasia CRE = Centre for Research Excellence in Aphasia Rehabilitation and Recovery, QARC = Queensland Aphasia Research Centre, ASHA = American Speech-Language-Hearing Association, RCSLT = Royal College of Speech and Language Therapists

Note: Each respondent could list as many methods as they wished.

Table 7. Factors influencing speech pathologists' selection of a therapy approach or technique for aphasia rehabilitation.

Answer	Count	% of respondents
Scientific evidence base to support the therapy approach or technique	141	80%
Ease of administration of therapy approach or technique (e.g., amount of preparation time required, specific resources needed)	112	64%
Access and availability within your workplace	102	58%
Level of knowledge and familiarity with the therapy approach or technique	93	53%
Cost of therapy approach or technique	43	24%
Reimbursement for a particular intervention	8	5%
Other		
Fit with patient's clinical presentation (language, cognitive and medical factors) and goals for intervention	7	4%
Patient's personal preference and task engagement	4	2%
Fit with service model (group intervention, volunteer-facilitated, conversation-based, not impairment-level, ability to be delivered online, time availability)	3	2%
Clear description of the treatment in the literature including key components and mechanisms of therapy	1	1%
Gap in SLPs knowledge/skill base	1	1%
Fit or ability to adapt for local population (i.e., CALD)	1	1%
Word of mouth from other clinicians/anecdotal success	1	1%

Note: CALD = Culturally and Linguistically Diverse.

a search engine (73%), from the patient or family (70%), from existing resources within the workplace (70%), from aphasia therapy software (64%), or from commercially available aphasia therapy resources (61%) (Table 8).

Table 8. Speech pathologists' access of resources to support the implementation of aphasia therapy.

Having found an approach to aphasia therapy that you want to implement, what resources do you access and where from?		
Answer	Count	% of respondents
Online resources from search engines (e.g., Google© images)	128	73%
Personally salient stimuli (e.g., from person with aphasia)	124	70%
Existing resources within your workplace or department	124	70%
Aphasia therapy software (e.g., computer programs and apps)	112	64%
Commercial aphasia therapy resources (e.g., workbooks and activity sheets)	108	61%
Other		
Develop my own resources	11	6%
Textbooks and research literature	1	1%
Podcasts or webinars	1	1%
Student created resources	1	1%
International professional colleagues	1	1%

Sub-analysis of participants' responses from developing countries (n = 10), from countries with an official language other than English (n = 42), and from participants holding an equivalent or related professional qualification to speech pathology (n = 10) revealed a similar pattern of results to the broader sample with respect to the selection and use of therapy approaches. All participants holding an equivalent or related professional qualification to speech pathology were from countries with an official language other than English.

Development of the Aphasia Therapy Finder

Qualitative analysis of participants' perspectives and recommendations for the development of the ATF identified four broad categories: potential benefits of the ATF; cost and equity of access; clinical considerations; and usability (Table 9).

There were very high levels of support for the development and use of the ATF, with 92% of respondents indicating that they would use the ATF in their clinical practice (7% maybe; 1% no). Projected use of the ATF differed with years of clinical experience, with less experienced speech pathologists (i.e., 10 years of experience or less) indicating they were more likely to access the resource (96%) than more experienced speech pathologists (> 10 years experience, 87%). Of the participants who indicated that they would use the ATF, 87% reported that they would access it at least once per month, if not more frequently (11% every 6 months; 2% once per year). Qualitative content analysis provided further support for the development of the ATF with one participant responding, *"It sounds ideal and badly needed as there is such a divergence of [therapy] approaches that an evidence-based repository would be hugely helpful"*. Potential benefits of the ATF identified by participants included increased efficiency for speech pathologists, support for the translation of latest research evidence into clinical practice, and use of the ATF as a tool to support teaching and learning for speech pathology students and new-graduate speech pathologists.

Table 9. Conventional content analysis of speech pathologist perspectives on the development of the Aphasia Therapy Finder.

Category	Subcategory	Example	Behaviour Change Domain of the Theoretical Domains Framework[a]
Potential benefits of the ATF	ATF may support the translation of evidence-based practice	*"Sounds ideal and badly needed as there is such divergence of approach that an evidence-based repository would be hugely helpful."*	Beliefs about consequences
	Useful for training students and new graduate speech pathologists	*"Seems like a very practical and useful project. Many new graduates report - they have heard of these techniques - but are unclear of 'how' to perform them."*	Beliefs about consequences
Equity of Access	Cost and payment model	*"Cost is a big limiting factor for any therapy approaches. Indicating what is free or not would be important"*	Environmental context and resources
	Access for clinicians in developing countries	*"It will be good to have access to the Aphasia Therapy Finder however, therapists from developing countries may not be able to afford it just like other treatment packages . . . it will be good to have a waiver for SLPs from developing countries"*	Environmental context and resources
Clinical Considerations	Recency of evidence included in the repository	*"To continue to be useful (and evidence based) the resource would need constant updating."*	Knowledge
	Comprehensive range of therapy approaches included	*"Needs to cover interventions across all aspects of the ICF, feel it is easy for it to be still impairment focused . . . needs to be regularly updated, relevant etc."*	Knowledge
	Access to culturally appropriate information and resources	*"Please also consider the cultural relevance of some therapies as most/ all published materials are white- centric and high-income country biased. For this and other reasons, most materials need to be personalised and this is time consuming for the SLT. Would welcome information on cultural biases for each type of approach."*	Environmental context and resources Beliefs about consequences
Usability	Time efficient	*"I think it would be an amazing resource for very busy clinicians to have this all in one place with the leg work of finding the papers/evidence done for us."*	Environmental context and resources Beliefs about consequences
	Direct access to therapy resources	*"As a clinician recently moved from the hospital system to private practise it is vital to have easy access to evidence-based therapy resources for aphasia to ensure quality care."*	Environmental context and resources Beliefs about consequences Skills
	Incorporation of videos to demonstrate therapy techniques	*"Videos would be amazing, I think confidence and time is a major that is a barrier for many when implementing new approaches. It takes time to read an article and figure out how to implement with trial and error. If PWA and experts were agreeable to share videos of intervention I think it would go a long way to improving the quality of service SPs provide."*	Beliefs about consequences Skills

Note. Categories and subcategories were generated based on researcher interpretation. ATF = Aphasia Therapy Finder.
[a] Michie et al. (2005).

Cost and equity of access

A common barrier to the utilisation of new, evidence-based therapy approaches and resources identified by participants was budget limitations within their workplace. Participants identified a need for the ATF to be a cost-effective and accessible resource. Only 19% of respondents indicated that they would be prepared to pay to access the ATF, with 64% of respondents reporting they were unsure and 16% unwilling to pay. Of those who were prepared to pay, there was a large range of proposed price points (range 2-1000AUD for a one-off payment). The preferred payment model was a one-off payment (69%) compared to a subscription model (31%). Respondents working in developing countries (n = 10) identified free or limited costs to speech pathologists as an important consideration. While 100% of these respondents reported they would use the ATF clinically, only 10% of respondents reported that they would be willing to pay to access it.

Clinical considerations

Key clinical requirements of the ATF included the recency of the literature and resources included in the repository, with participants indicating *"it would need to be reviewed and updated regularly",* and inclusion of a broad range of interventions across the ICF (WHO, 2001). The inclusion of culturally appropriate resources and the translation of information and resources for culturally and linguistically diverse populations was also identified as a priority by study participants, particularly from developing countries with an official language other than English, with several respondents requesting resources be made available in multiple languages.

Usability

Finally, a prominent reported barrier to the implementation of evidence-based therapy approaches into clinical practice was increased caseload demands and time limitations for speech pathologists. As such, several respondents highlighted the importance of the usability and accessibility of the ATF: *"I think above all it needs to be easily accessible . . . think like a clinician rather than an academic as it is put together"*. Participants identified key usability features, including simple explanations, direct access to therapy resources, and video demonstrations as important design considerations in the development of the ATF.

Discussion

This study explored speech pathologists' reported current clinical practice in aphasia rehabilitation with respect to the selection and use of evidence-based aphasia therapy approaches and access to resources to support therapy delivery. The results of this survey portray an international cohort of speech pathologists, delivering a comprehensive and diverse array of aphasia therapy approaches with a high level of attention to the evidence-base and in the context of significant resource limitations. This research has identified numerous design considerations for the ATF as well as barriers and facilitators to the

selection and implementation of evidence-based aphasia therapy. These findings will be taken into consideration in the development of the ATF.

Consistent with previous research (Rose et al., 2014), we found that speech pathologists utilised a broad range of aphasia therapy approaches and techniques, spanning the ICF (WHO, 2001). These findings reflect the heterogeneity of aphasia and the need for a broad range of interventions to address participants' diverse communication rehabilitation goals (Brady et al., 2016; Worrall et al., 2011). Whilst the broad range of therapy approaches utilised in aphasia rehabilitation is reflective of the diverse clinical population, it also poses challenges to speech pathologists, who are required to remain abreast of the latest research evidence and maintain skills and proficiency in the delivery of a wide range of aphasia therapy approaches.

This survey found that speech pathologists pay a high-level of attention to the evidence-base for aphasia therapy approaches in their clinical practice. The strength of the scientific evidence available was identified by 80% of speech pathologists as a primary consideration when selecting aphasia therapy approaches or techniques for use in their clinical practice. It is interesting to note, however, that while respondents identified 43 specific aphasia therapy approaches that they use in their current clinical practice, the evidence base to support these therapy approaches is mixed. For example, the most frequently reported therapy technique employed by speech pathologists (13% respondents) was Verb Network Strengthening Treatment (VNeST), which has Level III evidence to support its clinical efficacy (Edmonds, 2016; Edmonds et al., 2009), according to the National Health and Medical Research Council evidence hierarchy (NHMRC, 2009). In contrast, less than 3% of respondents reported using Constraint Induced Aphasia Therapy in clinical practice, despite there being Level 1 evidence to support its clinical efficacy (Zhang et al., 2017). Given that the number of well-designed, evidence-based clinical research studies in aphasia rehabilitation remains limited, it may be that speech pathologists place emphasis on the availability of *any* research evidence to support an aphasia therapy approach, rather than appraising the level of evidence available. Alternatively, it may be that some aphasia therapies with high level evidence are difficult to implement into clinical practice.

The majority of speech pathologists reported accessing information about aphasia therapy approaches via traditional scientific and clinical forums including conferences, professional development workshops and research literature, including journal articles. These forums provide access to recent research evidence, of verifiable quality and are often presented by experts in the field. However, these traditional means of obtaining information may be time consuming for busy clinicians and may lack the flexibility to provide information regarding therapy approaches on a case-by-case basis. It is interesting to note that a small number of speech pathologists reported accessing research evidence via alternative pathways, for example via social media platforms such as Twitter™. These online platforms have the potential to rapidly disseminate the latest research evidence and may be accessed at a time that is convenient for treating speech pathologists.

A key barrier to the delivery of evidence-based therapy approaches identified by speech pathologists in this study was resource limitations. Although 64% of respondents reported implementing a new therapy approach within 6 months of completing the survey, speech pathologists reported complex clinical caseloads, time pressure,

competing caseload demands, and budget constraints as limiting factors in the selection and implementation of new, evidence-base aphasia therapy approaches. These barriers are consistent with those identified in previous research (Monnelly et al., 2023; Rose et al., 2014; Shrubsole et al., 2019) and in view of the ageing population and increasing clinical demands for speech pathologists, are unlikely to change in the future (Theodoros, 2012).

Aphasia Therapy Finder

The ATF is proposed to be a searchable database of common aphasia therapies with moderate to high-level evidence and aims to include resources and information to support the rapid translation of research evidence into clinical practice. The results of this survey found strong support for the development of the ATF with speech pathologists perceiving potential benefits including improved efficiency in clinical practice, increased translation of research evidence to clinical practice with improved clinical outcomes, and use as a training tool for students and new graduate speech pathologists.

Analysis of the survey responses in the current study has identified several key design considerations of the ATF and these will be used to inform its development. Consistent with current clinical practice, it is proposed that the ATF incorporate a range of aphasia therapy approaches and techniques, across the ICF, including activity, participation and environmental interventions. Speech pathologists reported placing high importance on the evidence base when selecting and implementing a therapy approach, and consequently it is important that the ATF be regularly maintained to include the latest research evidence. By providing concise summaries of the levels of evidence available, the ATF will enable speech pathologists to easily identify not only which aphasia therapy approaches are supported by research evidence, but also to determine the highest level of evidence available for use.

The need to regularly maintain the ATF, in order to incorporate the latest research evidence, has implications for the funding model and the sustainability of the resource. Despite respondents identifying the preferred payment method as being a one-off payment, due to workplace barriers, many survey respondents suggested that a subscription model would support the long-term sustainability of the resource. With regards to cost, only 19% of respondents indicated that they would be willing to pay to access the ATF and of those that were willing to pay, there was a broad range of price points. Consistent with this finding, many respondents identified budget constraints within their workplace as a barrier to accessing resources and implementing new therapy approaches. In addition to cost, equity of access for speech pathologists working in developing countries was identified as an important consideration. Consequently, further investigation into the costs to access the ATF, the payment model and sustainability will be required.

The inclusion of resources for culturally and linguistically diverse populations was identified as an important clinical design consideration for the ATF. It is noted that 24% of respondents were from countries with an official language other than English. While 93% of this group reported that they would use the ATF, consistent with the broader study sample, respondents identified the need for evidence-based resources to be translated into a variety of languages. This may pose a challenge for some therapies

where the intervention is designed around components of a particular language (e.g., phonology or syntax) or has specific cultural considerations (e.g., therapies for mood and wellbeing, pragmatics, conversation) and therefore cannot be directly translated. The Collaboration of Aphasia Trialists has gone someway to address these challenges, supporting the cultural and linguistic adaptation of formal language assessments for aphasia. However, further concerted international efforts are required for the cultural and linguistic translation and evaluation of evidence-based aphasia therapies, in order to disseminate them via the ATF.

All of the participants who reported holding an equivalent or related professional qualification to speech pathology came from countries with an official language other than English. These participants reported having clinical experience providing language and communication rehabilitation to adults with aphasia and reported demographic and clinical experience profiles commensurate with the broader study population. It is possible that for this 6% of respondents, the training and qualification process to work in aphasia rehabilitation in their country is different to countries with an official language of English. These data provide further justification for the need to enable access to culturally and linguistically diverse, evidence-based aphasia therapy resources, given the potential differences in training and qualification pathways for people working in aphasia rehabilitation internationally.

Consideration of the usability of the ATF was identified by respondents as an important step in the design phase. Speech pathologists indicated that short and simple instructions with direct links to clinical resources, including resources for culturally and linguistically diverse populations, was a priority. Furthermore, there was an overwhelming request for video demonstrations for the delivery of therapy approaches. The TDF identifies 14 domains of behaviour change, acknowledging that knowledge exchange alone is often not sufficient to change clinical practice (Cane et al., 2012). The inclusion of video demonstrations directly addresses the skill component of behaviour change, and as such is potentially an important implementation component of the ATF. Furthermore, the inclusion of video demonstrations would further support the utility of the ATF as a valuable training tool for students and clinicians with limited experience in the management of aphasia.

Limitations and Future Directions

This study recruited an international cohort of speech pathologists with participants from across 19 countries. However, the survey was disseminated in English only and it is noted that only 24% of participants were recruited from countries with an official language other than English. Furthermore, only 6% of participants were recruited from developing countries. As such, this study did not explicitly consider the perspectives of individuals from culturally and linguistically diverse populations and/or developing countries. Equity of access for speech pathologists in developing countries and challenges accessing culturally and linguistically appropriate resources were identified as key themes in the present study. An explicit strategy for how to construct and disseminate the ATF to a diverse international population, with consideration of access to evidence-based, culturally and linguistically appropriate resources, is required.

In the current study, conventional content analysis of qualitative survey data was used to explore speech pathologists' perspectives of and recommendations for the development of

the ATF. Recognising the potential for bias, research notes were taken by the first author (J. D.) throughout the survey design, dissemination and analyses to promote reflexivity and transparency. Furthermore, two members of the research team were involved in the coding and factor determinations from the qualitative data. Neither of the authors involved in the coding of the data (J.D., S.H.) reported actual or potential competing interests with regards to the study. While two researchers were involved in the coding and factor determinations, this process was not conducted independently and as such, may be considered a limitation of the study.

The next phase of this research is to develop and pilot a prototype of the ATF, incorporating the design considerations and findings from the present study. Consultation with website designers, technology experts and speech pathologists will form an important part of the design phase. The prototype of the ATF will initially be developed in English, however, will include links to resources and aphasia therapies developed in other languages, providing they have high-level evidence to support their efficacy (e.g., Cognitive Linguistic Treatment, de Jong-Hagelstein et al., 2011). Cultural and linguistic adaptions of aphasia therapies for inclusion in the ATF is planned for future stages.

The primary target audience for the ATF is speech pathologists, however, consumers with aphasia, their family members and support networks and other health professionals may also find the ATF useful in understanding different approaches and their evidence and be able to use this information to advocate for access to rehabilitation. An aphasia-accessible version of the ATF is planned for future development.

Conclusions

This study explored speech pathologists' current clinical practice in aphasia rehabilitation and identified factors influencing the selection and implementation of aphasia therapy approaches and techniques. The resulting picture from this international cohort of speech pathologists highlights the comprehensive and diverse range of aphasia therapy being offered and notably high level of attention to the evidence-base, in the context of significant resource limitations. Potential barriers and facilitators to the implementation of evidence-based aphasia therapy were identified and incorporated into design considerations for the ATF, a proposed evidence-based aphasia therapy implementation tool.

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Appendix

Appendix 1. Specific aphasia therapy types and other forms of aphasia treatment used by speech pathologists in aphasia rehabilitation. In addition to the above therapy approaches, please list any specific therapy types that you commonly use in aphasia rehabilitation.

Therapy technique	Count	% of respondents
Verb Network Strengthening Treatment (VNeST)	22	13%
Semantic Feature Analysis (SFA)	19	11%
Anomia therapy (including repetition, word finding, cueing hierarchies, errorless treatments)	9	5%
Script training	8	5%
Augmentative and Alternative Communication (AAC)	7	4%
Copy and Recall Therapy (CART)	7	4%
Phonological Component Analysis (PCA)	7	4%
Discourse Treatment (including NARNIA, narrative Intervention, Cooperative Narrative Recall Therapy, Integrated discourse therapy)	6	3%
Functional, goal-directed therapy	6	3%
Life Participation Approach to Aphasia (LPPA)	6	3%
Oral Reading for Language in Aphasia (ORLA)	6	3%
Cognitive neuropsychological treatment (word retrieval, auditory processing, reading, spelling, sentence processing)	5	3%
Promoting Aphasic's Communicative Effectiveness (PACE)	5	3%
Supported conversations in aphasia SCA/Better conversations with aphasia	5	3%
Anagram and Copy Treatment (ACT)	4	2%
Articulation approaches: e.g., integral stimulation	4	2%
Multiple Oral Reading (MOR)	4	2%
Psychological support: Advocacy, counselling	4	2%
Response Elaboration Technique (RET)	4	2%
Attentive Reading Constrained Summarisation/ARCS-W	3	2%
Cognitive Linguistic Treatment	2	1%
Computer therapy apps (StepbyStep, Listen-in)	2	1%
Mapping therapy	2	1%
Memory and attention treatments (e.g., Attention Process Training)	2	1%
MODality-Activation (MODAK)	2	1%
Multidisciplinary intervention	2	1%
Metacognitive approaches	2	1%
Treatment of Underlying Forms (TUF)	2	1%
Sentence Production Program for Aphasia (SPPA)	2	1%
Abstract Semantic Associative Network Training (AbSANT)	1	1%
Aphasia Education	1	1%
Asset-based Community Development (ABCD) for aphasia	1	1%
Biographic Narrative Intervention	1	1%
Combined Aphasia and Apraxia of Speech Treatment (CAAST)	1	1%
Communication partner training	1	1%
Constraint Induced Language Therapy (CILT)	1	1%
Gesture-based therapy	1	1%
Group therapy	1	1%
Melodic Intonation Therapy (MIT)	1	1%
Self-management approaches	1	1%
Speech Entrainment Therapy (SET)	1	1%
Strategy-based reading comprehension approaches	1	1%
Tactile kinaesthetic treatment - pure alexia	1	1%

Note: Additional responses were received from 173 of 176 respondents. Respondents were able to provide free text responses to this prompt. Not all responses are considered a specific therapy type (e.g., group therapy), but remain listed here for completeness.