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Research Gaps in Intensive Comprehensive Aphasia Programs: A Qualitative Study

By

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Committee Approval

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List of Abbreviations

ADL	Activity of daily living
ALA	Assessment of Living with Aphasia
Aphasia LIFT	Aphasia Language Impairment and Functional Therapy
BNT	Boston Naming Test
CCRSA	Communication Confidence Rating Scale for Aphasia
CETI	Communicative Effectiveness Index
COVID-19	Coronavirus disease of 2019
ICAP	Intensive Comprehensive Aphasia Program
mICAP	Modified Intensive Comprehensive Aphasia Program
MIT	Melodic Intonation Therapy
SFA	Semantic Feature Analysis
TBI	Traumatic brain injury
TDF	Theoretical Domains Framework
TIR	Therapeutic Intensity Ratio
OT	Occupational Therapist
PI	Principle Investigator
PT	Physical Therapist
PWA	People with aphasia
SLP	Speech-Language Pathologist
VNeST	Verb Network Strengthening Treatment
WAB-R LQ	Western Aphasia Battery—Revised Language Quotient
WHO-ICF	World Health Organization's International Classification of Functioning, Disability and Health

Research Gaps in Intensive Comprehensive Aphasia Programs: A Qualitative Study

Thesis Abstract–Idaho State University (2023)

Intensive Comprehensive Aphasia Programs (ICAPs) have been found to be effective for treating individuals with aphasia. ICAPs vary in different administrative areas (e.g., intensity, caregiver education, etc.) leading to a need to explore the efficacy of the model components. The purpose of this research is to investigate gaps that exist in current ICAP literature according to ICAP leadership. Current gaps in ICAP research were identified through the collection of semi-structured interviews completed with eight ICAP professionals. The constant comparative analysis method was used to determine themes and subthemes. Findings included two main themes with subthemes. The first main theme was program access with subthemes of participant and cohort characteristics, scalability, telehealth, and stakeholders. The second main theme was structure and process with subthemes of intensity and duration, outcome measures, defining ICAP components and participant customization, delivery model applications, and sustainability. These main themes and subthemes are then defined and discussed.

Keywords: Aphasia; Intensive Comprehensive Aphasia Program (ICAP); Limitations

Introduction

Aphasia

Aphasia is estimated to be experienced by one-third of stroke survivors which means that about one million people in the United States are currently living with aphasia (Monnelly et al., 2021). Aphasia is an acquired language disorder that results from brain injury, often a stroke or traumatic brain injury (TBI). Rose et al. (2021) reported that about 50% of stroke survivors who develop aphasia continue to experience aphasia 12 months after their stroke, and even longer for some individuals. Despite aphasia's life-changing nature, this acquired language disorder does not affect one's intelligence, memory, speech, or sensory abilities. (Hallowell, 2017). It is critical that when one is diagnosed with aphasia, they receive intervention to minimize the impact and maximize the recovery of impacted communication skills. However, even when people do not have immediate access to care, therapy can still be given years after the initiating event (i.e., stroke, TBI) to treat the enduring impacts of aphasia on their lives.

There are two broad classifications of aphasia; fluent and nonfluent, referring to whether the person's speech is fluid or halted. These types of aphasia occur due to damage in different parts of the brain. In fluent aphasias, the person can speak fluidly, but the content of their speech is often incoherent and confusing. This most often occurs when a part of the brain called Wernicke's area, located near the back of the left temporal lobe, is damaged. People with fluent aphasias are often unaware of their deficits. In nonfluent aphasias, the person's speaking ability is halted, telegraphic, and often ungrammatical. However, the content of their speech is consistent with the conversation. This most often occurs when a part of the brain called Broca's area, located in the left side on the frontal lobe near the Sylvian fissure, is damaged. People with nonfluent aphasias are often aware of their deficits. It is key to note, however, that this

classification of fluent and nonfluent aphasias is oversimplified as there are many subtypes of aphasia and the presentation in each person is unique (Hallowell, 2017). Also, the classifications of fluent versus nonfluent do not indicate the person's intelligibility or the impact of their communication on their quality of life or daily social and environmental interactions (Hallowell, 2017).

Aphasia often occurs with accompanying difficulties. Other comorbidities and the severity of the aphasia diagnosis play an important role in the communication profile of an individual (Hallowell, 2017). Studies have shown that approximately 60% of people with aphasia have developed depression one year after their stroke (Døli, Helland, & Helland, 2017). Other impacts include increased anxiety, social exclusion, life limitations (i.e., inability to work, or to engage in certain hobbies), and difficulties with family member/caregiver feelings and life changes (Hallowell, 2017).

Aphasia Treatment

Receiving speech-language pathology services can be effective for people with aphasia (PWA) very early after a stroke. In fact, even though early on PWA are going through spontaneous recovery, treatment can improve recovery times and produce valuable gains for those who have chronic aphasia (Fridriksson & Hillis, 2021; Breitenstein et al., 2017; Dignam et al., 2015; Stahl et al., 2016). Results across studies have shown improvements in a variety of areas of functional communication such as reading, writing, and expressive language. High dose, intensive treatment was also found to increase the benefits of aphasia treatment (Rose et al., 2013). As these findings became known, more programs began to be developed that implemented these characteristics. Over time, a definition was created for a specific delivery model called Intensive Comprehensive Aphasia Programs (ICAPs) by Rose et al. in 2013.

Intensive Comprehensive Aphasia Programs

      Within the last ten years, ICAPs have been established to provide treatment to PWA that aligns with evidence-based recommendations (Rose et al., 2013, Rose et al., 2021, Monnelly et al., 2021). ICAPs are comprehensive in the domains that are treated, including family/caregiver education, language impairment, and life participation. The program model draws on the principles of neuroplasticity, or the brain's ability to change and adapt, by providing therapy at a greater intensity than traditional treatments (Mohr, 2017). In a review conducted by Rose et al. (2013), specific parameters were given in order to qualify for the title of ICAP. These parameters are that the program (1) provides a minimum of three hours of treatment per day for at least two weeks, (2) uses various treatment approaches and formats, including individual and group therapy, (3) targets the impairment and the participation levels of language and communication, (4) includes patient and/or caregiver information, and (5) has a cohort of participants who start and end the program at the same time (Rose et al., 2013). The next few paragraphs outline the primary elements of the definition in further detail, demonstrate the complexity of measuring the components of ICAPs, describe the challenge of comparing outcomes across ICAPs, and depict the potential future directions for the key elements within the original definition.

      Intensity. While high intensity therapy has been shown to produce better outcomes for PWA (Brady et al., 2016; Teasell et al., 2012), it is an element that has been highly variable across ICAP programs (Rose et al., 2013). Intensity is an important element to define in research so that all practitioners may use evidence-based practices in their treatment. As Babbitt et al. (2015) suggested, it may be beneficial to use an intensity metric that would act as a reference to the level of intensity each program employs. Currently, programs will include the number of hours and the number of weeks they provide treatment, however there is not a formalized way of

calculating and comparing the intensity of one program to another (Rose et al., 2021). Additionally, there is currently no research on what level of intensity is best for ICAPs and PWA using an intensity comparison metric. It is also possible that multiple levels of intensity are needed for certain PWA who may not benefit from an ICAP.

Various treatment approaches, including individual and group therapy. Including various treatment approaches ensures that the aphasia is being treated in different contexts (Rose et al., 2021). However, the variability of PWA has created inconsistent treatment approaches. The ICAP model allows for the use of different treatment approaches, such as Melodic Intonation Therapy (MIT), Semantic Feature Analysis (SFA), and Verb Network Strengthening Treatment (VNeST) (Rose et al., 2021). This is a strength of the ICAP model as it can individualize its treatment to meet the needs of people with various difficulties, while still meeting ICAP criteria. This variability, however, makes comparison between ICAPs and creation of new ICAPs difficult, as it is hard to ascertain whether the benefits are coming from specific treatment approaches or the ICAP model itself (Rose et al., 2021). Additional research could help ICAP administrators utilize the best treatment approaches, conventional and unconventional, for their patients.

Targets impairment and activity/participation levels. While it is important to specifically target the impairment of a PWA, it is also valuable to target different activities and opportunities for participation. This allows the PWA to not only work on their language skills, but connect with other people (Rose et al., 2021). These connections can help with concomitant difficulties such as depression (Døli, Helland, & Helland, 2017). These activities, however, are not standardized within the definition of an ICAP and can vary, making it difficult to measure

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and compare improvement across programs. Further studies could look at what types of activities best help PWA improve their language skills, while addressing concomitant difficulties.

Includes patient and/or caregiver information. While aphasia can be devastating to those who experience it, it also impacts those who are in close relationships with PWA (Monnelly et al., 2021). Educating and involving families and caregivers is key as they can function as extensions to formal services given within the ICAP (Off et al., 2019). This is why family/caregiver information is a crucial part of the ICAP model. While involvement from family members or care partners can be extremely helpful, it can also create difficulties for many PWA. There are many questions to consider when requiring this kind of involvement, including what happens if PWA does not have a family or care partner, PWA do not want their family involved or the family does not want to or cannot be involved. Additionally, it is essential to determine what kind of education is given to the families and caretakers. These issues must be taken into account when such a stipulation on participation in a program is given. Research on what caregiver education is best, and when to give it could help improve the quality of education ICAPs give to caregivers. While caregivers can be a valuable extension to aphasia services, they may also be experiencing difficulty. This should be taken into consideration when giving education about aphasia. Caregivers should be made aware of counseling services and support groups for caregivers of PWA (Rose et al., 2019). Research on how and when to give this information could improve caregiver well-being and ability to be involved in aphasia therapy.

Includes cohorts. Another unique characteristic of ICAPs is their use of cohorts. These cohorts are made up of stroke and/or brain injury survivors that enter and exit the program at the same time (Stahl et al., 2016). As opposed to drilling or massed practice treatments alone, intensive therapy involving language in social interactions (i.e., group therapy) is more effective

for individuals with aphasia (Stahl et al., 2016). The ICAP cohort design facilitates social

interaction and relationship building (Griffin-Musick et al., 2020). While the cohort design has

been shown to improve social interaction and language skills, the optimal characteristics of the

cohort are not clearly defined. This makes it difficult to measure improvement that can be

attributed to the specific cohort construction and it makes comparison between cohorts and

ICAPs difficult. Further research into cohort construction would help ensure that the best

implementation of cohort construction is being used within ICAPs.

Studies have found ICAPs to be an effective way to treat people with aphasia (Babbitt et

al., 2016). Results from ICAPs can vary, yet it has been reported that ICAPs can result in

positive and significant outcomes for PWA in areas such as reading, writing, comprehension,

speaking, social interaction, and mental health (Babbitt et al., 2016). However, while there is a

definition of ICAPs, there is currently a lack of general guidelines on best practices for how an

ICAP should be administered. The purpose of this research is to investigate the gaps in ICAP

research that currently exist from the perspective of ICAP leadership that would help propel the

evidence base forward for ICAPs.

<div align="center">Review of the Literature</div>

Emergence of ICAPs

Before the first published research on ICAPs in 2013, a study was conducted to

determine what PWA wanted from their treatment. After reviewing the interviews with 50

individuals with aphasia, the researchers found that their responses aligned with the World

Health Organization's International Classification of Functioning, Disability and Health (WHO-

ICF) (Worrall et al., 2011). The interviews revealed that PWA wanted their treatment to align

with their personal goals. Some of these goals included desires to improve their impaired

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communication, gain more information about aphasia, increase independence, receive treatment relevant to their personal lives, and increase participation in different aspects of life, such as social, leisure, and work (Worrall et al., 2011). According to a separate study by Howe et al. (2012) that sought to understand the needs of family and caregivers regarding aphasia therapy, they discovered an expressed desire by caregivers to be involved in therapies, to learn more about aphasia, and to receive guidance on how to better support their family member with aphasia. The ICAP design promotes the idea of incorporating both the goals of individuals with aphasia and their loved ones.

As research on aphasia therapy continued, gaps in evidence-based research for treatment applications for PWA became evident. Specifically, there arose gaps in the education for the individual with aphasia as a lot of the education is given only in written format (Rose et al., 2009). Many PWA have deficits in reading, so this mode of education is less effective for them. Also, the readability of those written materials is often too high for the majority of people. Often, the materials given, while full of good information, are replete with jargon and difficult concepts. Materials should be clear and concise, while giving appropriate information. Gaps were also found in the intensity or the dose of treatment as the intensity of most aphasia treatments falls below what research has shown is most effective (Code & Petheram, 2011; Gunning et al., 2017). Traditional or usual care aphasia treatment dosage and intensity standards for chronic patients include meeting once or twice a week for an hour with the SLP over the course of several months. ICAP treatment dosage and intensity standards are to meet four or five days a week for three or more hours for two to four weeks. While it has been shown that higher intensity treatment is beneficial for PWA, the best method and intensity level has not been determined. Finally, gaps were also identified in the training and education of communication

partners (Chang et al., 2018; Rose et al., 2019). Many communication partners reported not receiving enough information early on in the treatment process. Others reported that they only received information about what aphasia is and what causes it. Other topics, such as how best to communicate with PWA, communication progress, care partner support, and aphasia therapy were not addressed (Rose et al., 2019). A study that sought to understand the factors influencing aphasia management practices found that much of the treatment given did not align with evidence-based guidelines (Shrubsole et al., 2019). There were various reasons for this, including environmental barriers, personal beliefs, and social influences. ICAPs were designed to specifically address these evidence-based gaps in aphasia rehabilitation. The ICAP model includes patient education in formats that the patient will be able to receive and understand, such as verbal and pictorial representations, aligns with evidence-based research on the range of intensity that is best for PWA, and it includes caregiver information and training. These elements help enable the patients with aphasia to progress and apply learned skills in more functional aspects in their lives.

To fill the gaps in aphasia treatment, ICAPs are designed to follow the WHO-ICF model (Rose et al., 2021). The WHO-ICF model considers the holistic needs of the individual by looking at their impairments, health conditions, body structure and functioning, activities and life participation, and environmental and personal factors. Aphasia treatment must target multiple domains and include partner or caregiver education in order to align with this model (Simmons-Mackie & Kagan, 2007). To summarize, ICAPs were specifically designed to provide comprehensive treatment to individuals with aphasia, include partner and caregiver education, bridge the evidence to practice gap, infuse technology practices, and target both linguistic and life participation impairments through evidence-based treatment.

In 2013, Rose et al. published an operational definition for ICAPs. The researchers had set out to discover the current practices and core features of ICAPs around the globe. They found that this still rare service delivery model was present in multiple countries, but that further research was required to understand their efficacy and cost-effectiveness. The definition that the researchers created has persisted since that report. The authors defined an ICAP as (1) providing a minimum of three hours of treatment per day for at least two weeks, (2) using various treatment approaches and formats, including individual and group therapy, (3) targeting the impairment and the participation levels of language and communication, (4) including patient and/or caregiver information, and (5) having a cohort of participants who start and end the program at the same time (Rose et al., 2013).

More recently, the first scoping review of ICAPs sought to better understand what constitutes an ICAP (Monnelly et al., 2021). This review identified many gaps in the research and called for stronger justification of the ICAP design. Some of the gaps identified included a rationale for the components listed by the definition given by Rose et al. 2013, which was outlined previously. The review found that the strongest rationale for the ICAP model was the intensity parameter; however, dosage was often left unspecified (Monnelly et al., 2021). For example, when reporting the total number of hours of treatment, the dosage or intensity must also be reported along with whether interprofessional activities counted towards the intensity. The researchers also determined that elements of ICAPs should be systematically added or subtracted so that the essential components might be made clear (Monnelly et al., 2021). The studies on ICAPs need better documentation when it comes to the program's procedures in order to allow for replication. This documentation includes the materials used, the specific interprofessional activities, and a more standardized dosage description. It is also important to

note that the publications on ICAPs seldom report on modifications or updates made to the ICAP model, nor do they explain why the modifications were made (Monnelly et al., 2021). These modifications are not deviations from what is acceptable for an ICAP, rather they are differences that operate within the ICAP definition.

In 2013, an outline was created by Hula et al. to guide future research on ICAPs. This outline was separated into four phases. Phase I is for the proof-of-concept, feasibility, and acceptability of ICAPs. This phase is where researchers examine whether a specific treatment has had the desired effect. This phase also contains the secondary aims of exploring the optimal dosage, feasibility, acceptability, and effect size of ICAPs. Research designs that are most commonly used in this phase include case studies, small pre-post experiments, single subject and group designs, and retrospective investigations. Investigations into the safety of ICAP administration also fall into this phase, however the risks involved with participation of an ICAP, such as fatigue, are negligible (Hula et al., 2013) and are consistent with routine clinical practices. Currently, most of the published research on ICAPs are Phase I investigations.

Phase II is the efficacy of ICAPs. Efficacy is defined as treatment that is well-defined on a focused population under optimal conditions with trained clinicians, deliberately chosen participants, and the most effective outcome measures. Research designs that are most common in this phase include parallel group design or a randomized control group design.

Phase III is the effectiveness of ICAPs. Effectiveness differs from efficacy as it is defined as inferences that are made under typical clinical conditions. Effectiveness studies how well research can be generalized. The research design preferred in this phase is a randomized control design. To reiterate, efficacy is defined as treatment under optimal conditions while efficiency is treatment under typical conditions.

Lastly, Phase IV is for health services research. This phase aims to determine what changes are needed in health service delivery or policy. This investigation of the current research gaps of ICAPs falls within Phase IV because this research aims to determine the gaps in current research according to ICAP administrators that is needed to propel the evidence base forward.

Research on ICAPs has grown considerably since the publication of the Rose et al. international study (2013) and Hula et al. research agenda (2013). Below is a categorization of the current research under each phase of the research agenda created by Hula et al. (2013).

Phase I-a: ICAP Proof-of-Concept

In 2013, Babbitt et al. initiated an investigation into ICAPs. The researchers conducted a qualitative study to describe the experience of working in an ICAP for clinicians (n = 7). The researchers sought to understand the commonalities and differences of the experiences of these clinicians and compare those experiences to working in a traditional clinical setting. The seven participants were clinicians from three separate ICAPs. The researchers found themes from the semi-structured interviews given. The clinicians said that they enjoyed the ICAP structure as it allowed them to go more in-depth with the clients and gave them a different view of aphasia and aphasia therapy. The clinicians also experienced different rewards in the ICAP experience than in traditional therapy, such as deeper relationships with the clients and families, seeing the clients make progress, learning more about the diagnoses, and supporting other staff members. The clinicians also stated that participating in an ICAP has its challenges, such as the time required to give intensive treatment, the challenge of treating groups of clients with various diagnoses and severities, and the difficulty of returning to the traditional therapy setting. Ultimately, the clinicians enjoyed their experience working in an ICAP and found it both rewarding and challenging.

Also in 2013, Rodriguez et al. created an ICAP in Australia called Aphasia Language Impairment and Functional Therapy (LIFT). Aphasia LIFT was established to explore the basic outcomes of an ICAP. Their participants (n = 11) provided evidence that ICAPs can improve functional communication and communication-related quality of life of PWA. The researchers completed a follow-up examination 6-8 weeks after the ICAP and the results showed that the improvements made during the ICAP were not maintained. Research continued on ICAPs despite this finding due to its small cohort size. In direct contrast, a United Kingdom-based ICAP conducted a study to determine the outcomes of an ICAP and found that meaningful improvements were made to the participants' (n = 46) language abilities. These improvements were measured immediately after the program and again at a follow-up three months after the program (Leff et al., 2021).

A retrospective analysis comparing two ICAPs, one in Canada (n = 71) and one in Michigan (n = 44) found that ICAPs are effective for most participants (Persad et al., 2013). These findings were consistent regardless of age, gender, or time post onset (Persad et al., 2013). Additionally, a study describing the integration of iPads into a Boston, Massachusetts ICAP (n = 20) showed that this integration generated positive results for PWA (Hoover & Carney, 2014).

A later study by an ICAP in Boston, Massachusetts (n = 27) investigated the outcomes of integrating interprofessional services (Hoover et al., 2017). The researchers concluded that integrating interprofessional services, including physical therapy, occupational therapy, speech therapy, and nutrition services, resulted in positive outcomes for PWA in their linguistic abilities and quality of life (Hoover et al., 2017). Likewise, another five-year retrospective study found that interprofessional services (i.e., music therapy, occupational therapy, speech-language pathology, adaptive sports, etc.) are effective for individuals with moderate to severe aphasia

(Nicholas et al., 2021). A further study investigated the effectiveness of incorporating occupational therapy in an ICAP (n = 19) (Escher et al., 2018). The researchers found that incorporating occupational therapy aided in an increase of achievement of functional gains to increase life participation (Escher et al., 2018). These findings support the previous findings by Nicholas et al. (2021) and Hoover et al. (2017).

In 2014, an investigation was conducted to describe the outcomes of a residentially-based ICAP set in Pittsburgh, Pennsylvania. In this ICAP, the participants lived together for the duration of the program. The participants received five hours of 1:1 treatment every day and activities were provided outside of treatment to allow the participants to interact. The researchers found that the majority of the participants (n = 23) experienced significant improvements (Winans-Mitrik et al., 2014). In accordance with these findings, another study was completed in 2015 at an ICAP in Chicago that demonstrated that intensive treatment does yield positive improvements for the participants (n =74) with language impairments and participation measures reported by the patient and the family (Babbitt et al., 2015).

With time, research on the proof-of-concept of ICAPs became more focused. In 2018, a study sought to understand the properties of neural networking that lead to improvements after participation (n =8) in an ICAP (Baliki et al., 2018). The researchers found significant improvements in most language and attentional domains following the ICAP (Baliki et al., 2018). An ICAP set in Montana undertook a study to review the impact of aphasia on family members and caregivers. The researchers found that, through interprofessional services, ICAPs can help the caregivers of PWA as well as the individuals with aphasia (Off et al., 2019). This program went on to study the impact of ICAPs that are university-based on the psychosocial well-being of PWA. The researchers found significant improvements in the participants'

psychosocial well-being. They also found that a university-based ICAP can be effective in improving language skills and it has advantages to other settings because of the decreased cost by incorporating student clinicians (Griffin-Musick et al., 2020 Griffin-Musick et al., 2021). This program also initiated a telehealth interprofessional program to understand the program perspectives of graduate student clinicians and participants with aphasia. The researchers discovered that the graduate student clinicians reported positively on the interprofessional design and that the participants with aphasia reported a desire for increased opportunities to connect with their fellow participants and for added communication practice (Kincheloe et al., 2022).

To summarize, this ever-growing body of research shows that ICAPs can be effective in improving outcomes for PWA in both language impairments and quality of life. While some studies showed mixed results, the majority of studies demonstrated positive results. The mixed nature of some of the results could be due to specific cohorts, differences in types or severity of aphasia, and the usage of different treatments or base ICAP components. This body of research also demonstrates that while ICAPs are administered within specific guidelines (i.e., intensity, cohorts), there is room for flexibility such as the implementation of iPads, the inclusion of interprofessional programs, the option of residential programs, the research of properties of brain networking, and the use of graduate student clinicians in a university-based setting.

Phase I-b: ICAP Feasibility and Acceptability

Knowing whether ICAPs are feasible and if they will be accepted by PWA is imperative to study and understand, as it determines the likelihood of success and growth of a program. For the purposes of this article, feasibility is defined as the variability of the ICAP program's model. While research has shown the feasibility of ICAPs (Babbitt et al., 2015; Babbitt et al., 2016;

Babbitt et al., 2021), there remain gaps in the research world covering which types of aphasia, severities, ages, and genders respond best to treatment in this model.

At an ICAP in Chicago, Illinois, Babbitt et al. sought to identify specific characteristics of their clients that contributed to significant outcomes, including the type of aphasia, severity, age, and gender (n = 74) (Babbitt et al., 2015; Babbitt et al., 2016). The researchers found that age was the only predictive factor to treatment responsiveness. The younger group (age mean of 52.2 years) experienced greater outcomes in expressive language, quality of life, and naming than the older group (age mean of 59.8 years). While the age difference between the two groups was not statistically different, it showed that younger people showed more progress, perhaps due to higher levels of motivation and neuroplasticity. The researchers also found that 11% of individuals in their program did not respond to treatment at all (Babbitt et al., 2016). They also concluded that ICAPs can benefit a wide range of aphasia types and severities as there was progress with 89% of their participants. In other words, the ICAP model is feasible for most PWA. However, more research needs to be conducted to gain a better understanding of which types and severities of aphasia gain the most benefit from participating in an ICAP.

In 2021, Babbitt et al. examined the perspectives of ICAP stakeholders. In the study, they assessed the ICAP experiences of PWA and their family members or caregivers through qualitative interviews (Babbitt et al., 2021). A theme was found as the participants often mentioned the exceptional training and experience of the ICAP speech-language pathologists (SLPs) in contrast to the SLPs in other treatments. They also found that participants valued the ability to form relationships within their cohort, as this added to their ICAP experiences (Babbitt et al., 2021). The study also revealed that participants improved greatly in their communication

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and their activities of daily living (ADLs). Finally, this study shows that ICAPs are a feasible option for PWA, arguably the most important of stakeholders.

Phase II: ICAP Efficacy

Efficacy is defined as treatment that is well-defined on a focused population under optimal conditions with trained clinicians, deliberately chosen participants, and the most appropriate outcome measures.

In 2015, the first Phase II study on ICAP efficacy, treatment under optimal conditions, was conducted (Dignam et al., 2015). The study was a nonrandomized, parallel group pre-post test design (n = 34) that compared intensive treatment and distributed treatment within the context of an Australian ICAP. The researchers found that distributed treatment yielded better impairment-based results on word retrieval measures. Functional outcomes, however, were comparable for both intensive and distributed treatments. In summary, this study found that distributed treatment yields better results for improving impaired language as measured by the study's primary outcome measure, the Boston Naming Test (BNT) (Kaplan et al., 2001). The BNT is a single-domain confrontational naming assessment that does not assess the areas of written language, receptive language, or repetition abilities. The results showed significant differences between the two groups immediately posttest ($p = 0.04$) and at the follow-up ($p = 0.002$). These results, however, should be treated with caution as the BNT has been found to have flawed psychometric properties and only targets the single domain of expressive language (Harry & Crow, 2014).

Critically, for the functional communication measures, including the Communication Confidence Rating Scale for Aphasia (CCRSA) (Cherney et al., 2011), Communicative Effectiveness Index (CETI) (Lomas et al., 1989), and Assessment of Living with Aphasia (ALA)

(Kagan et al., 2011), the treatments were equally beneficial in improving the quality of life for PWA.

In 2021, a study investigated the outcomes of an ICAP using consensus aphasia research outcome measures (Wallace et al., 2018) and the effect of intensive naming treatment. The authors found that there were no observable changes for quality of life (i.e., difficulties with physical tasks, feelings, or executive functions) and functional communication (i.e., using the phone, ordering food), even though there were significant improvements for some language measures (i.e., naming) at the group level. While some participants made measurable communication improvements, the finding was inconsistent across the group. The study also yielded no significant differences in improvements between the intensive and distributed naming treatment schedules (Auclair-Ouellet et al., 2021). It is unclear if the lack of differences between the treatments continued over time as there was no maintenance data collected due to resource constraints. The difficulty of gathering maintenance data is another gap that exists for aphasia researchers and is an area that could contain valuable information for those running ICAPs. Auclair-Ouelet and colleagues explained that factors of ICAPs need to be studied further, including intensity, dosage, number of items targeted per session, and optimal time to increase treatment lists. Additionally, they stated that larger scale studies need to be conducted in order to better understand what participant profiles are most likely to benefit from the ICAP service delivery model (2021).

Phase III: ICAP Effectiveness

Effectiveness is defined as inferences made under typical clinical conditions and studies how well research can be generalized. To reiterate, effectiveness is treatment given under typical conditions. A study that is currently underway by Cherney et al. (2022) is investigating the cost

effectiveness and efficacy of the ICAP service delivery model. The study is a randomized controlled trial (n = 56) with two groups. The first group was given 60 hours of intensive and comprehensive treatment over three weeks, while the second group was given 60 hours of distributed treatment over 15 weeks. The authors hypothesize that while both groups will have significant improvements in communication skills, life participation, and health-related quality of life, there will be greater improvements in the intensive treatment group than in the distributed treatment group. The measures used in this study (WAB-R LQ, ALA, CCRSA, CETI) were given pre-treatment, post-treatment, and a three-month follow-up. They also hypothesize that this will potentially demonstrate that intensive treatment is more cost effective (Cherney, 2022).

Phase IV: ICAP Health Services Research

As research on ICAPs has increased and has been shown to be an effective service delivery model, it has become apparent that there are still some gaps in the evidence-based research available. Early in the research on ICAPs, Hula (2013) cited the need for increased studies on implementation to determine best practices. They cited that research on feasibility, sustainability, cost-effectiveness, and comprehensive non-intensive treatment versus comprehensive intensive treatment is needed (Hula et al., 2013). Recently, Monnelly et al. (2021) identified other gaps in the research in their scoping review. They found that additional research is needed to define intensity and dosage, explore delivery formats such as virtual versus face-to-face, explore computer-based therapy, delineate group therapy, determine how to target multiple levels of the ICF, outline education for family/caretakers and PWA, determine adherence and fidelity, and discover how to tailor treatment.

Research into the feasibility of ICAPs started to grow with a qualitative investigation that sought to understand what clinicians across six countries who do *not* participate in ICAPs feel

they would need in order to implement an ICAP. From the conducted interviews, the researchers found four themes from the Theoretical Domains Framework (TDF) which help identify factors that influence the implementation of interventions. Those domains were collaboration, advocacy, culture, and innovation. The clinicians also referred to the importance of a strong evidence base that emphasizes the benefits and feasibility of intensive comprehensive programs (Trebilcock et al., 2019).

In 2021, a survey was conducted as a follow-up to the original survey by Rose et al. in 2013 with the aim to understand the growth of the ICAP model internationally (Rose et al., 2021). This updated survey showed that the ICAP treatment model still aligns with the WHO-ICF recommendation by containing impairment-based and functional life participation approaches to therapy. The researchers also found that the number of ICAPs found internationally has grown considerably over the past decade. The number of respondents to the 2013 survey was 13, which increased to 29 in 2021 (Rose et al., 2021). Additionally, this study identified and modified ICAPs (mICAPs). To qualify as a mICAP, it must modify one single component of the stringent ICAP definition. For example, a mICAP might change the treatment to only have individual therapy and not include group therapy. Early in ICAP research, the need for mICAPs became apparent because of the intensive time, energy, and resource demands necessary for intensive program implementation. In the international survey on ICAPs in 2021, mICAPS were found to be rather commonplace. The survey found that 7 of the 29 respondents fell under the mICAP classification. Additionally, 14 of the respondents met the criteria for an ICAP and the remaining eight programs had two or more modifications and so did not fall under either classification. Further research on mICAPs is needed to understand the extent to which a

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single component of an ICAP can be modified and still result in significant outcomes for PWA (Rose et al., 2021).

Rose et al. (2021) also cited the need for further research on the sustainability of the ICAP delivery model. The sustainability of an ICAP is dependent on a program's ability to adhere to the key elements described in the original Rose et al. 2013 study. These core elements have been thoroughly and deliberately specified by highly trained and experienced aphasiologists. Those core elements are that an ICAP must be sufficiently intensive, be comprehensive in its treatment, and have a cohort. For the purpose of this study, and because of the importance of the ICAP and mICAP definitions, sustainability is defined as the maintenance of a program's adherence to the core elements of the Rose et al. 2013 definition of ICAPs (Shelton et al., 2018).

In 2021, an online platform for SLPs was created which sought to improve the intensiveness and comprehensiveness of their services (Trebilcock et al., 2021). This site, AphasiaNexus, will likely help the sustainability and ease of implementing ICAPs into various clinical settings. This site will become available after additional testing is completed. AphasiaNexus includes resources for SLPs, such as a checklist for ICAP start-ups, training opportunities, therapy materials, success stories, and more. This web-based resource will help support international collaboration among SLPs interested in creating and running ICAPs as ICAPs are implemented worldwide (Trebilcock et al., 2021).

Rose et al. 2021 survey revealed that 25% of the original 2013 respondents were no longer in operation in 2021. Two main reasons for the termination of these programs were financial stability and the inability for current committed program leaders to continue their critical role to support implementation. Three further studies investigated the difficulties of

financial stability. In 2020, a study assessed a cost analysis of ICAPs. The researchers found that, to initiate an ICAP, the cost is about $1,530 per participant in a cohort of 10 or $3,283 per participant in a cohort of six in the United States (Boyer et al., 2020). A United Kingdom-based study found that an ICAP reported its cost to be about $6,500 per participant (Leff et al., 2021). The most significant cost of ICAPs is the cost of trained personnel, such as speech-language pathologists who are integral to program implementation. It is crucial to both the implementation and sustainability of the ICAP delivery service model to understand the affordability and distribution of costs (Jordan & Deutsch, 2021). Without this knowledge, this service delivery model cannot continue and more ICAPs will have to close, despite the research which shows its effectiveness. Understanding the affordability and distribution of ICAP costs could lead to better financing which would improve the sustainability of the ICAP service delivery model.

The aim of this qualitative study is to identify elements of ICAPs that need more research to propel the evidence base forward, according to ICAP leadership. Semi-structured interviews with current ICAP administrators and a content analysis of the interviews were completed. Specifically, this study investigates the answer to the following question: What research gaps need to be addressed according to ICAP leadership to propel the ICAP literature base forward?

Methodology

This research used data that were collected in 2021 by a graduate student at Idaho State University. The data collected for this study were originally collected for a prior study that was examining barriers and supports of ICAPs. The data were examined and coded for this study from the vantage point of characterizing research gaps from the perspective of ICAP leaders versus sustainability parameters for the prior study. One of the questions from the interviews

collected directly asked the ICAP leaders about areas that, in their opinion, need further research. That question became the genesis of this study.

Participants and Sampling

The participants of this qualitative study consisted of international ICAP program leaders that participated in the 2021 survey study (Rose et al.). All but two of the total 21 participants of the 2021 study of ICAPs and mICAPS consented to be contacted for follow-up information. Purposive sampling was used to contact consented participants individually by email in the summer of 2021 (Oppong, 2013). Purposive sampling was used to target individuals who were or are ICAP leadership as the researchers wanted insight into what ICAP leadership thought about different aspects of the ICAP model. The emails requested participation in this study and provided information on the format (e.g., videoconferencing) and time expectations for the interviews. After subsequent follow-up emails, eight participants from seven ICAP programs agreed to participate in an interview. The interviews were carried out during the summer and fall of 2021. To preserve anonymity, the programs were given a code name with an assigned number and letter combination based upon regional location, North America (NA) or Europe (E). One program (N3) had two different interviewees as its program's primary leader had recently changed, and some questions needed to specifically capture the insight of the individual who was involved in the program in its early days.

Participant and ICAP demographics are shown in Table 1 (collected from Rose et al., 2021 survey data) as well as the Therapeutic Intensity Ratio (TIR) for each program to compare intensiveness across ICAPs/mICAPs (Babbitt et al., 2015). TIR is found by multiplying the number of hours of treatment per day by the number of treatment days per week. That number is then multiplied by the number of weeks the program ran. This result is then divided by the

number of weeks the program ran times 40 (e.g., the number of hours in a standard work week) and converted to a percent.

$$\frac{\text{Hours of treatment per day} * \text{Number of treatments per week} * \text{Number of weeks in the program}}{\text{Number of weeks in the program} * 40 \text{ (hours of a standard work week)}}$$

For example, E2 ran for eight hours per day for five days per week for three weeks (8*5*3 =120) and three weeks times 40 hours (3*40 =120), which produces a TIR of 100% (120/120 =1*100 =100%).

Table 1

ICAP Demographics

Program	General Location	Total Years Running	Number of Cohorts per year	Cohort Size	Therapeutic Intensity Ratio (TIR)	Utilization of Graduate Students?
E1	Europe	35	29	3	93.8%	yes
E2	Europe	10	5	6	100%	sometimes
E3	Europe	2	2	8	62.5%	sometimes
N1	North America	10	3	3	23.4%	sometimes
N2	North America	2	1	9	37.5%	yes
N3	North America	5	3	5	60%	yes
N4	North America	3	12	2	37.5%	no

Note. Used with permission from Roberts, (2022). Some data was collected from 2021 quantitative study (Rose et al., 2021)

Instrumentation

Two researchers from the Rose et al. 2021 study designed the interview questions used in this study. The interview questions were designed to gather information in three areas: "1) motivation for implementing the program, 2) logistics of the program, and 3) plans for future modifications or past modifications" (Roberts, 2022, pg. 26). These questions were created to understand what characteristics allowed the ICAP to be implemented successfully and how it was sustained over time. Supplementary follow-up questions were added as needed to obtain further information. See Appendix A for the full interview script for each participant. This semi-structured interview design helped maintain consistency across interviews while allowing for unrestricted responses from the participants.

Procedures

Data collection for this study took place in individual semi-structured interviews carried out in English through the Zoom video conferencing platform (Zoom Video Communications, 2020). The automatic transcription features from Zoom were utilized to collect both video and audio recordings, in addition to whole word transcriptions from each interview. It is reported that online interviews are identical in quality to face-to-face interviews (Gray et al., 2020; Hanna, 2012). The interview recordings ranged from 25 to 58 minutes in length (mean = 39 minutes). The sessions were carried out by a trained female second-year speech-language pathology graduate student with a trained aphasia PhD researcher present in all the interview meetings, apart from two due to scheduling conflicts. There was no correspondence between the primary interview and the interviewees prior to the recruitment emails.

The automatic interview transcripts were titled according to the location of the program and uploaded to a secure storage platform. The transcripts were analyzed side-by-side with the

recording to correct words that had been incorrectly transcribed by the automatic software

(Zoom Video Communications, 2020). Distracting fillers (i.e., "um", "uh", "like") were removed

from the transcript and punctuation was added to increase readability. Each transcript was

corrected and checked for interrater reliability by one researcher and additionally 50% of the

transcripts were checked with interrater reliability by a four-person student team from the

University of Montana. A skilled aphasiologist trained this four-person student team. Some

transcripts were prioritized for interrater reliability checks due to the international-residing

participants who presented with a different dialect, which resulted in increased errors of Zoom's

transcriptions. The percentage of agreement between the independent transcriber and the four-

person team was 98%. The transcripts were then organized by question to facilitate assigning

thematic codes during the data analysis. Some questions were not asked to every interviewee

because of the nature of their program (i.e., a program that did not have difficulties with client

recruitment was not asked to describe recruitment strategies). This resulted in some questions

having more responses than others. The transcripts were checked a final time against the

recording to ensure no content was lost due to the readability changes. Each transcript was then

uploaded to Dedoose, a qualitative data management and analysis software system, for coding

and analysis (SocioCultural Research Consultants, 2018).

Data Analysis

Qualitative content analysis was used to identify gaps in ICAP research that need further

investigation. This approach allowed the researchers to organize the data, extract meaning from

it, and draw realistic conclusions about the research question (Bengtsson, 2016). Content

analysis has been commonly used in aphasia research (Palmer et al., 2017; Wallace et al., 2017;

Rose et al., 2018; Rose et al., 2019; Bright et al., 2020). This content analysis approach allowed

for a structured and systematic method of summarizing contextual results from qualitative data. The research team included the second-year graduate student who conducted the interviews, another second-year graduate student specifically looking into the research question for this study, the Principal Investigator (PI) from Idaho State University, and the PI from the University of Montana. Both PIs had previous clinical and research experience with the ICAP model. A bottom-up approach allowed the participant responses to drive the extraction process of common themes, and analysis for this study included recontextualization, categorization, and compilation (Bengtsson, 2016).

In the first stage, the **recontextualization stage**, the coded data (see Appendix B for the list of codes and quotes from the data) was reviewed from the original transcripts to ensure all content relating to future research needed for ICAPs had been appropriately coded (or not coded). In short, this stage ensured that all pertinent data pertaining to this study was correctly coded, and all unnecessary information, or "dross" (Burnard, 1991), had been appropriately omitted from coding. This process was heavily aided by Dedoose as all applied codes were easily read within its original context (SocioCultural Research Consultants, 2018). Information deemed unimportant or unrelated to the research question was excluded from further analysis.

In the second stage, the **categorization stage**, meaningful units, or excerpts, were consolidated. First, each code that was applied within the research question of "further research" (see Appendix A for interview questions) was compiled. Second, all other excerpts and applied codes were compiled as long as they contributed to the research question. All of these excerpts were gathered into a single document and then analyzed by the team to determine emerging themes and subthemes. This process was iterative and dynamic as the team progressed through the transcripts and themes were refined. The categorization process also included ensuring that

all codes that were similar or homogenous appeared under the same theme or subtheme (Bengtsson, 2016).

In the third and final stage, the **compilation stage**, the data was interpreted from a neutral perspective, in alignment with the qualitative content analysis approach. Three of the researchers met and discussed the emerging themes and subthemes until they reached a consensus (see Appendix C for a list of codes that became themes and subthemes along with quotes from the data). This process was iterative in nature, meaning that the researchers repeatedly met, examined themes, and determined which themes to group together and which to exclude. Themes that were only coded three times or fewer were not included in the analysis if they did not also add novel content that enhanced the understanding and perspective of the research question (see Appendix D for the frequency of codes). Additionally, manifest analysis, which is the process of staying "close" to the original participants' wording, was used to present the results so that the results would remain as close as possible to the original meaning and context of the speaker (Bengtsson, 2016). Words within the excerpts that contained a program's location were marked with an [X] to maintain anonymity.

Interrater Reliability for Coding

To calculate the interrater reliability for the complete dataset gathered from the semi-structured interview, three of the transcripts were randomly selected: E2, E3, and N2 (about 38% of the total transcripts). These transcripts were checked before the meeting of the researchers to make a collective decision on the code application agreement. For example, under the question of "future research", if all three researchers used the code "outcomes" then the agreement was 100%. If only two of the three used the same code, this was still considered sufficient agreement. For the three transcripts, an excerpt was given the same code by at least two of the three

researchers for 51% of the total applied codes. When only one researcher had applied a code, it was discussed by the team until consensus was reached. While agreement appears relatively low initially, the research team met to discuss 100% of the codes concluding in 100% consensus on all applied codes. Therefore the final interrater reliability agreement was 100%. This process was repeated for the smaller dataset that specifically applied to this research which concentrated on the evidence gaps.

Results

This analysis looked at the responses to one of the questions given in the interviews: "What research do you wish you had on ICAPs that you do not have now?" References to further research needed embedded across the responses to other questions were also analyzed. Analysis of the data revealed two overall themes: program access and structure and process. Table 2 shows the division of themes and subthemes.

Table 2

Overview of themes and subthemes

Themes	Subthemes
Program Access	Participant and Cohort Characteristics
	Scalability
	Telehealth
	Stakeholders
Structure and Process	Intensity and Duration
	Outcome Measures
	Defining ICAP Components and Participant Customization

	Delivery Model Applications
	Sustainability

Each theme and subtheme is defined and described below with examples of quotations taken from the interview transcripts.

Theme 1: Program Access

ICAPs are a unique service delivery model and are not very common. In fact, only 14 ICAPs and seven mICAPs were identified in a recent worldwide study (Rose et al., 2021). Program access is the ability to provide this service delivery model to the people who need it and the factors that contribute to the difficulty of accessing this model due to expenses, proximity, and diagnoses. While there has been research that has shown the effectiveness of this model (Babbitt et al., 2013; Rodriguez et al., 2013; Leff et al., 2021; Cherney, 2022), more research, programs, and understanding is needed to help this model become available for more people. As was said in one of the interviews conducted for this study, "...in order to get this into a broader application, I think ICAPs are all fine and good, but you can only serve so many people with an ICAP, but there are thousands of patients with aphasia each year." There are many people who might benefit from participation in an ICAP, but because of the small number of programs in the world, most people with aphasia will not have the ability to participate and therefore cannot benefit from the ICAP model. This leads to further gaps within program access. From the data, four subthemes emerged and are discussed below.

Subtheme 1a: Participant and Cohort Characteristics

This subtheme relates to what attributes should be considered when selecting participants and when forming cohorts. Many participants talked specifically about the clinical characteristics of the people included in their ICAPs. The characteristics of the cohort were also discussed.

Questions were posed about who would most benefit from participation in an ICAP. The participants wanted "...maybe some more research on the severity levels and how an ICAP can work for somebody with different levels of deficit." Currently, there are no guidelines on how the cohort of an ICAP should be organized. Open questions remain about forming a group of people with the same type of aphasia, or whether the severity levels should be more similar to try to ensure therapy is equally beneficial for all participants. Other open questions remain about the consideration of other concomitant impairments and how those should be considered in the ICAP model. Some participants even talked about people with other diagnoses, such as TBI and dementia, who had participated in an ICAP and were receiving benefits from this service delivery model. One ICAP in particular that participated in the study accepts participants who had a TBI. One participant said, "I think there are probably people who fit into this model really nicely that aren't the traditional aphasia classifications." This touches on the cohort aspect of ICAPs as well. Research on how cohorts are composed would be beneficial. Questions were posed about whether a cohort needed to have similar diagnoses, severities, ages, and life experiences as all of these factors could impact how well a cohort gets along with each other. Overall, additional research on who would most benefit from the ICAP model is needed. Research about aphasia types, severity levels, concomitant impairments, and other diagnoses will help ICAP leadership provide better services to the people who will benefit from this model.

Subtheme 1b: Scalability

Scalability is the ability to create and grow a program to the point that it will produce improvements for the clients and care partners, offer consistency for clinicians, and demonstrate to insurers why they should invest in this model. ICAP leadership wants evidence that can help determine how scalable the ICAP model is or could be. One participant said, "...I feel like we

always talked about what would make our program scalable and I have always thought that if we made it somehow remote or if we linked it to a university clinic model then it would always be possible, probably. But that's not enough." Research on factors that would help the ICAP model to be maintained for all current programs would help ICAP leadership to consider if those factors that are critical to other established programs could also help their programs survive and thrive in the future. Establishing evidence-based scalability parameters could also help future ICAPs to be created, as it would be clearer what an ICAP program needs in order to grow.

Subtheme 1c: Telehealth

In conjunction with the scalability, participants talked about the potential benefits of offering remote options for their programs. This subtheme relates to the ability to provide this model remotely, whether that is fully remote, or a hybrid approach. A lot of the comments were as a result of the COVID-19 pandemic and the immediate need for remote programs to continue to offer treatment and for PWA to receive treatment. Others, however, were about programs that had a hybrid approach or would like to shift to a telehealth modality for post-ICAP group sessions. One participant stated, "I'd love to look more into that and see if you had an in-group first then that later on you maybe could continue that group in an online setting." Research about the effects and potential benefits of this modality and home programming extensions to the ICAP model could help the scalability of these programs and increase access to ICAPs.

Subtheme 1d: Stakeholders

This subtheme refers to what information the different stakeholders need to have in order to support the ICAP model so that this model can continue to grow. There are many stakeholders to the ICAP model: clients, caregivers, insurers, doctors, graduate students, occupational therapists, physical therapists, psychologists, and SLPs. Each of these stakeholders needs

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different information to help them understand the efficacy of ICAPs and improve different

aspects of ICAPs that could promote program access. In order for the ICAP model to be an

option for more people, ICAP leadership needs the stakeholders to understand and have buy-in

with the model. Insurers especially have a role in a program's ability to thrive. One participant

said, "I believe in order to convince the insurers that this is worthwhile it really needs to be

shown that the effects we're seeing are above chance." Another participant said, "Sometimes I

am struck by how much information even neurologists lack on what is really necessary to treat

aphasia." Efficacy and cost effectiveness studies geared toward stakeholders can help increase

buy-in and therefore increase program access for a greater number of people.

Theme 2: Structure and Process

The structure and process of running an ICAP was the second prominent theme that

emerged throughout the interviews. Structure and process is the manner in which the ICAP

model is set up, organized, and streamlined. As this program is not widespread, additional

research on how to organize ICAPs will help ICAP leadership improve and optimize the

functionality of the ICAP model. One participant said, "I just wish there was some more solid

research out there about the effectiveness of the ICAP intensity and tools and protocols—all of

it." Within this theme, five subthemes emerged and are discussed below.

Subtheme 2a: Intensity and Duration

One of the main characteristics of an ICAP is the intensity and duration of treatment.

Intensity is how much treatment a client receives and duration is how long that treatment lasts.

This subtheme refers to finding the optimal ratio of intensity and duration to get the best results

for participants. For example, if a client receives ten hours of treatment a week for five weeks

then the ten hours per week is the intensity and the five weeks is the duration. However, in the

current evidence base, it is not specified how intense the treatment should be or how long the treatment should last. This is true for all aphasia research. However, since intensity is such a large component of ICAPs, it is striking that this has not yet been specified. As such, different programs have opted for different intensity and duration ratios. Additional research on the optimal intensity and duration for clients would help ICAPs be more effective. "I wish there were something that would give us a little bit more information about intensity and timing—how much." Another participant said, "...we need to know what would be the ideal treatment time because I know many of the ICAP definitions say about six weeks, four weeks, three weeks. And I think we need more research on that timeline." This sentiment was shared by multiple ICAP leaders. Some participants also talked about the possibility of the intensity and duration ratio changing based on aphasia type and severity. Research into this area will help ICAP leadership optimize the dosage recommendation for ICAPs.

Subtheme 2b: Outcome Measures

This subtheme deals with defining which measures the ICAP model uses so that programs can learn from each other and more easily compare results. Selecting outcome measures creates the pathway for evaluating efficacy in any program. Outcome measures are the tools with which ICAP leadership can quantify the progress that clients make during treatment. ICAP leadership expressed a desire to standardize what outcome measures are used in the ICAP model to improve effectiveness and be able to learn from other ICAPs. One person said, "I wish there were some standard set of outcome measures that we could use and share so that we could all have this data that says to the paying agencies and government and insurers, 'this is effective, please fund it.'" As this participant said, having an established set of standardized measures could help insurers and agencies see the effectiveness of the ICAP model, as well as help

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increase the ability for ICAPs to learn from each other and increase their quality of benefits for clients. Having a standardized set of outcome measures would also provide a foundation for what impairment-based and psychosocial outcomes an ICAP is setting out to provide for their clients.

Subtheme 2c: Defining ICAP Components and Participant Customization

One of the strengths of ICAPs is the high level of individualization that is possible during treatment. However, this potential for individualization makes it difficult to compare ICAPs, learn from one ICAP to another, and create new programs that comply with the structural parameters of how any given program applies their mix of therapeutic components. This subtheme refers to that ability to customize its treatment to its clients and documenting those customizations. Some programs customize their treatment to the person during individual treatment and during group treatment. Other programs use the same treatment approach for all their clients. For example, a program may use the Semantic Feature Analysis (SFA) approach for all clients–clients with severe Wernicke's aphasia and clients with mild Broca's aphasia. In some programs, they receive one hour of individual therapy a day and in others they receive three. Still other programs have small group therapy while others have large group therapy. In some programs, clients receive occupational therapy or music therapy while in others they receive no therapy other than from the SLPs (Rose et al., 2021; Monnelly et al., 2021). Creating operational definitions for this individualization process for the ICAP components could help ICAPs to learn from each other and grow in understanding what is best for the clients and care partners. This operationalization would also improve the fidelity of the ICAP model to its definition and between programs. One participant said, "Certainly, there's a definition of an ICAP and what it means, but then there's a lot that can be operationally defined within that and especially when thinking about why it works. So is it some level of individualization that's happening that isn't

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being documented? Or is it that it's really this combination of group and individual intervention that's pretty specified—you do it very similarly every time for all individuals so you should get a similar effect. I think that's really important is to kind of have some operational definitions around this is what an ICAP is, but getting some specifics in there." Creating these operational definitions will help ICAP leadership to create more effective programs, improve fidelity to the ICAP definition, improve fidelity between programs, and produce improved outcomes for their clients as they will more readily be able to learn from other ICAPs. Having a clearer definition of the ICAP components will help ICAP leadership concentrate more on the components or active ingredients that can produce desired results for the clients and care partners.

Subtheme 2d: Delivery Model Applications

While there are certain stipulations for running a program that qualifies as an ICAP, there are additional factors that are not clearly defined and are applied in a variety of ways across programs. As there are some aspects of the ICAP definition that are left up to interpretation, different programs apply the definition in their own unique ways. This subtheme refers to how the ICAP definition is applied in various ways and finding a way to document those changes. Participants talked about how to integrate individual needs into the cohort model of an ICAP, using telehealth or a hybrid model of in-person and telehealth to help those who have difficulty coming in person (distance, mobility issues, etc.), identifying an optimal treatment length for those who tire quickly due to concomitant issues or severe diagnoses, and deciding what to do about clients who want to participate in the program multiple times. One participant said, "...the population is fairly diverse, so catering the program and the treatment to the needs of a variety of clients—some who have you know moderate to severe aphasia and others who are fluent with no language deficits and have severe deficits in memory or executive functioning. Finding a way to

basically integrate all of those needs into one treatment can be difficult because it's such a specialized group." Further research in delivery model applications will help ICAP leadership clarify those other points of running an ICAP, which can increase effectiveness for the clients.

Subtheme 2e: Sustainability

Sustainability is the ability of the program to grow, extend, progress, and improve over time. If a program is not sustainable, it will not survive change. The ICAP model is intense for the clients as well as for the staff, clinicians, and leadership. While they are intense, research has also shown the effectiveness of ICAPs (Babbitt et al., 2013; Rodriguez et al., 2013; Cherney, 2022). However, a program needs to also be sustainable in order for it to continue and grow. Research on the sustainability of ICAPs is essential for this model to continue into the future. One participant said, "In addition, I would really benefit from, at this point, seeing research on financial sustainability and how that affects funding, budgeting for ICAPs, where the money is going and how they deal with changes in the economy even, in the economics of healthcare." Further research into financial sustainability will help ICAP leadership create appropriate programs to effectively treat clients while also supporting staff and clinicians involved. There are other aspects of sustainability, however, that also need to be more fully researched. A thesis done by a student at Idaho State University explored the supports and barriers of sustainability in the ICAP model (Roberts, 2022). This qualitative study highlights further areas of sustainability research that would be beneficial to ICAP leadership to enable further growth of their programs.

Discussion

The ICAP model was defined in 2013 (Rose et al., 2013) and more recent studies have highlighted that this relatively new service delivery model needs further research in various areas to solidify the definition for this model. This study characterizes what research ICAP leaders feel

is missing from the current overall published literature on ICAPs. The ICAP leaders that were interviewed for this study talked about a variety of topics that could be addressed to help the evidence base grow for this service delivery model (see Appendix D to see the frequency with which different codes were discussed). Ultimately, their responses fell into two main themes: program access and structure and process which will be discussed more fully here along with their connections to the current evidence base and their clinical implications.

Most of the interviewed ICAP leaders mentioned a gap in the current literature base in regards to program access or lack thereof. There are very few programs and so PWA have a difficult time getting to and participating in ICAPs. This could be because they do not know these programs exist or because the program is too far away or too expensive. Another factor that influences this difficulty in gaining access is the limited number of people a program can take at any given time; "You can only serve so many people with an ICAP, but there are thousands of patients with aphasia each year." Coupled with the limited number of people an ICAP can accommodate are the lack of standard clinical qualifications for participation in an ICAP. These qualifications or clinical inclusion criteria are rather vague in the current literature base (Rose et al., 2021). It is currently unclear if only people with aphasia should participate, or if other diagnoses could also benefit from this model. Also, within an ICAP is a cohort model, and when accepting clients, ICAP leaders must take into account the different diagnoses, severities, ages, and life experiences. Having a group that has some similarities leads to a more cohesive group which can lead to better outcomes in group therapy. The characteristics that can interplay in this cohort model are also unclear (Rose et al., 2021). These findings of participant and cohort characteristics mirror gaps that have been identified elsewhere in the aphasia literature (Babbitt et al., 2015; Babbitt et al., 2016; Babbitt et al., 2021; Monnelly et al., 2021). Understanding the

characteristics that best lead to the potential for positive outcomes from the ICAP model are important to ensuring this model is being utilized to its fullest potential and helping its clients to achieve their best outcomes.

Another gap related to program access is the ICAP model's ability to be scalable. Research on factors that influence this model's ability to grow and for existing programs to enhance their reach and access could help ICAP leadership improve their programs. Another way of increasing access would be to provide remote or telehealth options. Whether this were a completely remote program, a hybrid model, or an in-person program with telehealth supports for maintenance would be an area that needs further research and development. This is a gap that was highlighted in a recent study by Monnelly et al., (2021) as the authors contemplated different areas that could increase access to this service delivery model. One participant also mused about the benefit of ICAPs that have connections to university clinics, including the ability to use graduate student clinicians and the potential to support recruitment practices due to connections with clients that attend the university clinic.

Lastly, another factor of program access was the range of information that various stakeholders need regarding the ICAP model. Different information is needed for the clients and care partners than is needed for SLPs and other professionals such as OTs, PTs, and psychologists who are involved in the program. Additionally, insurers need research evidence before they would be willing to cover the costs of ICAP participation. This is an area that the current literature base has been trying to fill (Monnelly et al., 2021), however more research needs to be done with these stakeholders in mind in order to provide the information needed so that they will, in turn, help increase the access to this program for all PWA.

The second theme that was found from the data was about structure and process, or how ICAPs are organized, set up, and streamlined. ICAP leadership talked about the gaps that exist within the structure of an ICAP such as intensity and duration. While intensity is an essential component of ICAPs—it is even in the name—there is not a clear definition of the ratio of intensity and duration that will provide the best outcomes for clients. Some of the research participants spoke about clients with different diagnoses and levels of severity and that different people can withstand a higher number of treatment hours than others. This corresponds with many of the currently published studies that mentioned this need for a better definition of intensity and duration (Code & Petheram, 2011; Gunning et al., 2017; Monnelly et al., 2021; Auclair-Ouellet et al., 2021). Research on how to determine the best intensity and duration levels when there are so many confounding variables can greatly affect how ICAP leadership runs their programs. This could help guide them to organize their programs to be more effective for their clients.

Another gap that the research participants addressed was about using a standard set of outcome measures. Research on which outcome measures are the most effective for ICAPs can help ICAP leadership to format their interventions to not only help their clients but learn from other programs and grow from that comparison. While this was not mentioned as a gap in the literature, using a standard set of outcome measures could improve ICAP interventions as they could know what areas are most effective to treat.

One of the strengths of the ICAP model is its ability to individualize treatment. However, this was also found as a gap in the current research. The ICAP leadership who participated in this study cited the difficulty of this individualization process. While it is greatly beneficial, it can be difficult to compare one ICAP to another because of the highly individualized nature of this

model. While this model allows for individualization, it does not require the ICAP to define the individualization process or lack thereof. There are some ICAPs that give the same treatment to everyone and others where each client gets highly individualized treatment. There are programs where a client receives one hour of individual therapy a day and in others, they receive three. There are also some programs that offer occupational therapy while the others do not include an interprofessional component (Rose et al., 2021; Monnelly et al., 2021). This gap was also identified in some of the current published literature (Monnelly et al., 2021). Research on defining the ICAP components and participant customization can help ICAP leadership create programs that are most effective, provide the best treatment, and learn from other ICAPs in order to enhance their own programs.

An additional way to improve the structure and process of the ICAP model ~~is~~ to better understand the delivery model applications taken by ICAP leadership. Currently, the ICAP components are still rather loosely defined. This allows ICAP leadership to interpret the definition in various ways leading to vastly different programs (Rose et al., 2021). While the ICAP model wants to allow for individualization, having such different programs can lead to confusion and problematic communications and comparisons between programs. This gap was also identified by a recent study by Monnelly and colleagues (2021). The researchers from that study talked about the differences that occur between ICAPs and the difficulties that can arise from those differences. For example, while all programs in their study had a combination of individual and group therapy, some used computer-based interventions while others did not. Research on how to best apply the ICAP delivery model can help ICAP leadership organize their programs in a direction that can be more effective for its clients.

Lastly, sustainability is an important factor in a program's structure and process. The ICAP leadership who participated in this study mentioned the need for more information that could ensure this service delivery model could be sustainable over time. There is a lot to consider related to sustainability such as funding and budgeting. While the current published literature does not talk about this gap, a recent thesis done by a student at Idaho State University explored the supports and barriers of sustainability in the ICAP model (Roberts, 2022). Understanding what makes an ICAP sustainable will help ICAP leadership organize their programs so that they will be able to grow and thrive, thus being able to help more people.

The current evidence base contains several articles that fall under Phase I, or proof-of-concept, feasibility, and acceptability of ICAPs, according to the Hula et al. (2013) classification of articles. This phase deals with determining whether a specific treatment has the effect desired along with ascertaining optimal dosage, feasibility, acceptability, and effect size. According to the results found in the current study, further research in this phase is needed to optimize recommendations for dosage, intensity, and participant and cohort characteristics. There are very few Phase II or efficacy studies which look at treatment under optimal conditions. According to the current study, further research is needed within this phase to look at scalability, sustainability, and stakeholder information. There are even fewer studies in Phase III, or effectiveness studies. This stage looks at treatment under typical conditions. This is very important as clinicians very rarely work under optimal conditions (Phase II) and have to make necessary adjustments (Phase III). According to the current study, further research is needed in the same areas as in Phase II to determine if there are substantive changes from optimal to typical conditions. Lastly, there are also not many studies that fall within Phase IV, or health services research. In this phase, it is the goal to ascertain what changes are needed in the health

service delivery or policy. Further research is needed in this area, according to the current study, to define the ICAP components and participant customization in order for insurers to consider reimbursing for ICAP participation.

While this study found multiple areas that need further research, the next logical step would be to conduct randomized controlled trials to show the efficacy and effectiveness of this service delivery model. This could help doctors, insurers, and future participants understand that this model works and increase buy-in thus increasing the number of people who could have access to this model. These randomized controlled trials would focus on Phases II and III of the phases of research by Hula and colleagues (2013).

Limitations

All the participants recruited for this study were taken from the participant base from Rose and colleagues (2021) quantitative survey respondents. Therefore, the purposive sampling used in this study may not represent the full spectrum of perspectives on what research gaps need to be addressed according to ICAP leadership to propel the evidence underlying this model forward. Also, not all the potential participants from the Rose and colleagues (2021) survey responded to the survey sent to them for this study. Likewise, this study has few participants, and a small sample size may limit the generalizability of the results (Oppong, 2013). Further, a potential limitation of any study is the risk of bias. The research team have all had prior experience leading clinical ICAPs and researching the ICAP model and are all active members in the ICAP community. This introduces the possibility of bias in the analysis and interpretation of the findings. The team, however, took measures to prevent such bias, such as explicitly tracking the decision-making process throughout the analysis process (Noble & Smith, 2015). Lastly, all of the interviews were conducted in English, which was the native language of the interviewers.

While all the participants spoke English, it was not the native language of three of the participants, leaving a possibility of linguistic and cultural misinterpretation (Welch & Piekkari, 2006). This was not considered to be the case, however, and the plans for a member check will help mitigate any limitation to the study this may have caused.

Future Directions

Member checks were not able to be completed for this project due to time constraints. Therefore, it is recommended that member checks be completed at a later date to affirm the findings of this study (Bengtsson, 2016). This was mitigated by using three researchers during the coding and analysis stages. Coding was completed independently and then the researchers met to review their findings. Member checks would be an additional step to ensure fidelity to the participant's meaning. Member checks involve presenting the findings to the original eight participants to ensure the participants and researchers agree that the participant's responses were interpreted correctly (Bengtsson, 2016).

While this study is full of paths for future research, the next immediate recommended steps for assessing the ICAP model to promote patient access are to start a series of investigations. These investigations would have the aim of providing concrete information to different stakeholders regarding financial sustainability with efficacy results from randomized control trials in order to promote buy-in to the ICAP model. This could increase the number of people who can participate in this model. This especially applies to stakeholders such as insurers and doctors who may refer their patients to SLPs.

Lastly, for next steps regarding the structure and process of the ICAP model, it is recommended that a series of studies be conducted to more clearly define the active ingredients in the ICAP model. The results of this study showed that while the ability to individualize is a

strength of this model, it can create difficulties when it comes to creating, running, and comparing outcomes from across ICAP models.

Conclusion

ICAPs filled a needed gap in aphasia treatment and have served the needs of many individuals with aphasia (Rose et al., 2021). The ICAP model does not provide treatment for an individual in isolation, but in cohorts of people, which allows for the formation of relationships within this model of people who can support each other. This structure can also provide a context for more language practice in naturalistic settings (i.e., during group therapy). ICAPs have been shown to benefit individuals with aphasia (e.g., Babbitt et al., 2016), however this is a relatively new service delivery model, with a definition only becoming available in 2013 (Rose et al., 2013). This qualitative investigation identified research gaps that need to be addressed according to ICAP leadership to propel intensive aphasia research forward. The first theme was program access and contained subthemes: participant and cohort characteristics, and stakeholders. The second theme relates to the structure and process of the ICAP model and contained subthemes: intensity and duration, and defining ICAP components and participant customization. These themes and subthemes provide insight into the main gaps that ICAP leadership identified as areas that need further research.

In conclusion, a quote from one of the interviewees shows the importance of improving the evidence-base for this delivery model, "I think everyone treating aphasia knows that it works, but in terms of evidence-based medicine and cost savings I believe there's still a lack of randomized controlled trials." In addition to the randomized controlled trials that are needed, another interviewee stated that more research is needed for, "...understanding who needs it. When do they need it? Is there like too much eventually?" While ICAPs and mICAPs are an

exciting new mode for aphasia treatment, this study identifies the gaps that remain to be filled

with sufficient research to ensure this service delivery model can provide intensive services to a

multitude of people with aphasia.

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Appendix A
Script for the Qualitative Interviews on ICAP Sustainability

Introduction
Hello, thank you for joining the meeting. My name is _____. I am a graduate student/professor at Idaho State University/Montana State University.

Consent Form and Recording
I am going to start recording now and then we will begin.
~Start recording~
You already signed and we received your consent form, but before we begin do you have any questions or concerns?
If they ask about their classification from the 2020 Survey article, respond; We are not able to provide detailed feedback on where your program data was assigned/classified for each element - This was part of the IRB - human subject restrictions.

Ask follow up questions if you feel appropriate based on responses or need more information than was provided

First I want to begin with some questions on the **motivation** for your program and its **implementation.**
- What gap or need prompted your ICAP or mICAP implementation?
- What specifically led you to adopt the ICAP model?
  - *Potential follow up question:*
    - When were you first introduced to ICAPs?
    - What made you excited about the ICAP and ultimately decide to do it?
    - How do you feel about ICAPs in general, in comparison to other treatment models?
- What **barriers** to implementation have you or your program experienced?
  - *Potential follow up questions:*
    - What pushback did you get when introducing the idea of creating the ICAP?
    - What was the most difficult part of implementing your program?
- What critical/essential **supports** exist that your ICAP could not run without?
  - *Potential follow up questions:*
    - What infrastructure did you already have in place that made it easier to form the ICAP?
    - Did you collaborate with other individuals involved in an ICAP before or while establishing your own ICAP?
    - Who and/or what were the most significant factors in creating the ICAP?
      - Do you feel the ICAP would continue to exist if you were to leave? If not, what would need to happen so it would?
- Looking back, what advice would you give to new/emerging ICAPs or what is something you wish you had done differently?
  - *Potential follow up question:*

- Tell me about why you didn't do that/follow that advice originally and why would you recommend it now?

Thank you. Now I have some questions about the **logistics** of your program.
- Was it difficult to recruit at first?
  - How about now?
  - *Potential follow up questions:*
    - How did you address recruitment issues then and/or now?
    - Do you have high return rates each year?
    - How many are new recruits?
    - How many are local?
- Can you tell us about the staffing for your program?
  - Do you use grad students for implementation?
    - If so, to what extent? How are graduate students utilized?
- Can you describe the training for the clinicians, supervisors, or grad students?
- Are there areas for development or activities you would like to include in your ICAP but have not added and if so what are they?
  - *Potential follow up question:*
    - Why have you not yet included them and why do you want to include them?
- What types of interprofessional activities do you include and how are they executed?
  - Do you practice collaboratively or separately?
  - *Potential follow up question:*
    - How do you feel interprofessional care contributes to your program?
- Please describe any caregiver supports or activities for your ICAP, if any.

Thank you. We have just one last series of questions about your **plans or modifications** to your program**.**
- What changes have you made throughout the implementation process? i.e. logistical changes? patient needs? clinician needs? administrative support? funding? resources?
  - What spurred these changes?
  - Please describe what barriers, if any, you faced implementing these changes.
- Moving forward, what elements would you like to either add or takeaway, or any adaptations you would like to make to your ICAP?
  - *Potential follow up question:*
    - What plans do you have for your ICAP in the future?
- What research do you wish you had on ICAPs that you do not have now?
- *Other potential questions:*
  - What mission statements guide your decisions for the ICAP?
  - What core principles do you base your program on?
  - Have you ever thought about discontinuing the ICAP? If so, why?
- *If time:* How have you adapted to COVID? Will you continue any of those changes?

Thank you for your thoughtful answers. Is there anything else you would like to share with us about your program? Any questions?

Thank you for joining, and have a good rest of your day.
~End recording~
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Code	Definition	Example
Advocacy	ACTIVE positive explanation or engagement of the ICAP model or aphasia rehabilitation Anytime the benefits/advantages of the ICAP model or aphasia rehabilitation is promoted	"People who don't care for patients with aphasia don't really get it. And the patients can't speak for themselves, obviously, so they don't have a lobby and we need to be their Lobby. So get the word out that the aphasia therapy is working" "I think that's an important thing to do, just to introduce the form to SLPs so they know. Because I can also feel that sometimes when I talk about it, when the SLPs haven't been doing it in real life, they don't really understand what it's all about. So they really need to do it before they can feel how it is to do that kind of treatment."
Brainstorming	Individual or group think to determine an alternative/solution to an observed issue or limitation or ways to improve/modify the program, or creating a plan of action moving forward (either to develop the program or while the program is already established) Can be in response to a specific issues, and an ongoing dynamic process as the program develops Scaling-up & scaling-down Also include therapeutic motivation—motivation for administering therapy in an ICAP format	"There are a few that are more about the outdoors and community feel and kind of recreational. So then we started brainstorming 'gosh well, maybe we could do something like this'. Then we had to really piecemeal our ideas and also streamline them because they started with very vast ideas that were just thrown out there, like a drum circle or maybe we could have art class. So our students were really thinking outside the box." "So our students were really thinking outside the box. And then we had to decide 'okay, are we going more of a recreational route and what is our motivation there versus more of a therapeutic route?'"
Buy-in	belief (and support) in the	"But he [boss] was convinced pretty fast

	ICAP model and aphasia rehabilitation from patients, other clinicians, other stakeholders, etc.	that this is something special. People come from all over Germany to us so this is unique. That's when he also started engaging himself in this ward and defending it against attacks from basically everywhere."
	Active or passive	
Participant Candidacy/Cohort Characteristics	Participant characteristics for eligibility (inclusionary and exclusionary traits) to participate as a member of the cohort in the ICAP model

Any characteristics/traits that apply to the cohort as a whole (i.e. "alive", "vibrant", or willing to be challenged, etc.) | "The other thing is, also in Aachen we mainly concentrate on patients aged 50 or a mean age is 50 years. But with the demographic changes we are seeing, I'm not entirely sure if an ICAP is also something that an 80-year-old person would like to have or would benefit from. So that's something we need to find out more. And finally, we need to find out, is an ICAP also applicable for patients suffering from progressive aphasias."

"And starting to ask yourself the question of 'is this just one person who's doing this' and or 'is it regularly happening with certain people or certain profiles' and trying to get to the bottom of that. We didn't really have that. But I'm just thinking ahead that those would be things that we could do in the future to help with candidacy."

"I know that many people were really afraid that they were too brain fatigued that they wouldn't tolerate that kind of treatment. But we actually saw the opposite. When they came down and they started to get going they became much more alive and vibrant so they were all gaining from the intensive treatments." |
| Caregivers/Care Partners | Unpaid/untrainted family/friends/etc. who provide care to the PWA outside of the ICAP

May be in a position to support/care (emotional/physical/etc.) for the individual with aphasia | "We spend lots of time educating the patients, but they are only half of the communication chain. So it's so valuable to also educate the receivers of aphasic communication, then to educate senders for aphasic recipients."

"At the beginning of every semester of our treatment program we have a family and |

	in improving their communication; family and friends of the PWA who could be included in the ICAP model to support communication May include; (Caregiver) Feedback (Caregiver) Resource	student orientation." "We also do a caregiver feedback survey at the end of every semester where they get to actually share their perception of how the semester went for their loved one."
COVID	Any reference to COVID or pandemic May include changes, adjustment, etc. May be negative or positive	"Well, sadly, the first year they almost had to stop the groups because, like many of the hospitals, they had to reduce rehabilitation activity in order to have hospital staff for the acute COVID patients available."
Data & Documentation	Information during the ICAP that was collected and recorded, either for clinical guidance and/or for research May be logistical, or processes/systems of documentation Documentation at any point in the process—before program, during implementation, after program	"I think that's beneficial before designing a larger study where you're going to really demonstrate the effect or try to measure the effect and use that for stakeholders…so data, and then I think the other thing being the documentation piece. We had a lot of schedules. We use a lot of Excel. We use Google Sheets and Google Drive. I think schedules were really helpful because we have schedules for the participants, schedules for the clinicians, for the masters clinicians...A huge part of the success is having a plan very clearly and where is this stuff happening."
Delivery models	Any information related to both the format and the delivery of the program. Telehealth, in-person, etc. Telehealth Use of telehealth to administer the ICAP or to educate others about the ICAP	"or those who couldn't relocate for financial or logistical reasons, they just simply couldn't get the treatment. Now that has actually changed with COVID because we have changed to a telehealth model and it's really been wonderful actually for us because we have been able to reach many more patients, in fact, the majority are actually out of State." "Hence, at the moment, we are actually discussing changing the model to maybe

		add a two plus two weeks program with a break in between, because that will generate more money for the hospital."
		"With our telepractice version of it this year I don't believe there is anyone else that required collaboration."
		"However, on the other hand, as I said, sometimes I have talked about what aphasia is, and how it affects your brain. We've done it on tele repetition. So the group has been at the hospital sitting in one video and I have been on the outside of the university."
		"So we have quite a few participants from Pennsylvania, but some of which were 1 to 3 hours away, so it was nice that it was via telepractice so that they could still participate."
Duration/Intensity	Any details on the total hours/time/weeks/days of the program

Any mention of dosage/dose | "And the third thing is, after a lot of feedback with our clients, we have reduced the time per day, the amount of hours per day because we were finding that the last couple of hours were not really prime hours for people."

"The biggest change was that this year we added a week and we added more individual sessions and the dedicated teams."

"But the insurance always kept telling us, 'why are you doing six weeks? Three weeks seems to be pretty fine'. We had to find a compromise with them. So we went from seven to six weeks." |
| Evidence-base | An evidence base/research agenda to establish the program, run the program and/or continue the program

Or evidence/research | "In addition, I would really benefit from, at this point, seeing research on financial sustainability and how that affects funding, budgeting for ICAPs, where the money is going and how they deal with changes in the economy even, in the economics of |

	desired or needed, or used to convince others of the ICAP model usefulness *Efficacy/effectiveness/efficiency* of ICAP model and/or aphasia rehabilitation	healthcare." "So it is very helpful to have those outside questions come in, because those are the questions that, eventually, if we're trying to bill for a service like this or have a code for a service, that's what insurance companies want to know. So it just makes you think what could happen years from now if we had really good evidence for this."
Expense	The cost (time, money, resource allocations, space, etc.) of running the program, related to staffing, infrastructure, etc.	"I could supervise clinical fellows to run the program, that's a lot less expensive than a research SLP with CCCs." "We see a lot of counseling needs that folks are not being served because either the counselor or the psychologist doesn't really know about aphasia so they can't serve them, or it's very expensive or not covered by insurance."
Funding	Sources of funding for the program to run properly Expense, sustainable funding, profitability, etc.	"One of the biggest barriers for continuing a program like this and making it have some longevity is funding." "We also reduced the number of students we would take again to reduce the cost." "I could supervise clinical fellows to run the program, that's a lot less expensive than a research SLP with CCCs."
Future directions	Information or elements that the program is desires or cites as a need in the future Will likely include bulk of research question	"I think we need more research on that timeline." "I would really benefit from, at this point, seeing research on financial sustainability and how that affects funding, budgeting for ICAPs, where the money is going and how they deal with changes in the economy even, in the economics of healthcare."
Graduate students	Content describing graduate students (or undergraduate) involvement (or lack of) in	"mentoring the students through the process there's so much time involved that it actually made the program more expensive

	any component or stage of the ICAP Graduate student role play; research, student training	than if we just did it ourselves one-to-one without students." "We had started a journal club review with a group of graduate students who had clients with aphasia."
Group treatment	Any time or manner the cohort is treated as a whole or interacts together in structured and/or facilitated activities Formal or informal	"Yes. It depends a bit, but usually we have something which we call an exchange experience, which is a talking group. They would talk about how it is living there for aphasia and their experience from it."
Interprofessional	The inclusion and/or exclusion of professionals other than SLP/ST in assessment/ treatment and the program overall Interprofessional [Counseling] [mental health] May include mention of mental health services Information regarding participants and their families/caretakers emotional and mental health	"So actually that was in Sweden. Usually we have, in the rehab team, the neurologists, the SLP, the physiotherapist and also what you call an occupational therapist. But it didn't work that well with the Swedish occupational therapists." "Every patient also receives physical therapy, because most of our patients also suffer from spasticity. 98% or 90% of our patients suffer from a stroke. So that's what everyone gets. Unfortunately we don't have resources for occupational therapy very much."
Leadership	Roles described in the ICAP or institution (university, hospital, etc) setting on leading or doing the overarching organization and running of the program	"That took a heck of a lot of discussion and if Elisa and I hadn't been having that discussion I'm not sure who would have, weighing all the factors brainstorming." "So I think that just speaks to the complexity of the program and how you would really need to train a therapist sufficiently, and really it's almost like intensive treatment yourself. It's very intense trying to really get a handle on the program to take it over." "So it depends on the staff and it also

		depends on the leadership of the hospital, because if they want to stop the program they can just do it."
Location	Physical location of the program May include specific drawbacks or advantages of that location	"so, people want to come to Boston, so I think that was probably also a drawl. People who are retiring, we have some families who are like 'oh yeah like we'd love to, we're retiring soon, maybe we'll go to Boston for a semester.'"
Networking	Prior, existing or developing relationships or connections (with other individuals, organization, etc.)	"So this year, Christine Cook, she actually posted on the SIG website. We have a local community of folks who work with clients with aphasia in the Pennsylvania, New Jersey, Delaware region, and we meet kind of quarterly."
Outcomes	Any changes/results of the program for participants/care partner/cohort/graduate students/other clinicians May be positive or negative outcomes	"We had another case in the past of somebody who is apraxic and referred to our program and he shared that he felt he got the same level of satisfaction out of the program that our other folks with aphasia. So it might be interesting to see if other ICAPs end up letting other diagnoses into their program that benefit from an intensive model."
Patient-directed content	Activities or content or therapies/interventions that is initiated (or prompted or organized or directed) by the participant's own initiative and guided by their own interests and preferences	"Some of our participants themselves have interesting interests they would like to share or talk about or professions and something that they would like to share, so then sometimes some of them take the data and organize and music evening exchange, they show each other than music on the iPads and iPhones and stuff like that and talk about music, or they do a little photo course because someone could on the iPhone or things like that yeah."
Program access	Participant's ability to access a program, or barriers from the perspective of the participant to enrolling in program May include expenses,	"I don't want it to become a country club for rich people with aphasia, but in some respects there's a certain socioeconomic class that can access our program where others can't."

	regional proximity, participant characteristics, etc. *Likely to be double or triple coded*	
Program Feedback	Information and opinions and perspectives provided from those involved in the ICAP (caregivers, PWAs, and involved clinicians) Either at the end or during/throughout the program Expectations of the program	"So with my personal clients I kept those li nes of communication open via email, via phone calls and then some of their care partners would join in on the last day to give feedback as well." "We also do a caregiver feedback survey at the end of every semester where they get to actually share their perception of how the semester went for their loved one."
Program /Facility/Instituti on/Person reputation	Regard or notoriety of a program that either supports or hinders program implementation or continuation	"She has connections with neuropsychologists, neurologists, and rehabilitation clinics. We're a known brand of aphasia lab research. So I think that we had some leg up there in terms of when we were trying to recruit."
Recruitment	Identification and methods of how the program found and enrolled participants May include elements of demand: The demand for the program—either early in the program or ongoing demand May include mentions of an established pool or need for services	"But beyond that I was also trying to tell them about our program so that they would send us people. So it was a recruitment, but I think it was a respectful recruitment." "So I think that we had some leg up there in terms of when we were trying to recruit. So I think that was useful and also just established ways of recruiting. How do you recruit in general?"
Regional proximity	The distance of participants from the program from their permanent residence May include how and how long far they need to travel	"The second change, or the most profound change that we've done now is to implement it in Sweden so they don't have to go to Spain." "We usually would get a lot of patients

	to a program; may be where they live, adjust to the move	from outside the Oslo area where the clinic is. So I would say 75% are outside a day trip away coming to the clinic."
Space	Physical space/infrastructure that the ICAP takes place in	"Also having the building already, so we have a lab that has a space, and then we were able to...Because we were providing an academically focused intervention, it was really useful that we were in a rehab sciences building where we had classrooms."
Staffing	General statements about the staff running the ICAP	"In order also to reduce workload on the administrative staff, we employ a full-time staff split into two persons who are dealing only with doing the logistics all year round."
Stakeholders	Any mention of those who have a stake in ICAPs—i.e. insurance companies, etc.	"I think that's beneficial before designing a larger study where you're going to really demonstrate the effect or try to measure the effect and use that for stakeholders."
Structure & processes	Any process related to the ICAP that was organized and set up to be swifter and easier May be procedural in nature; streamline; etc.	"We spent a lot of energy on streamlining the application process and the onboarding process." "Why is this necessary and why does it have to be at the hospital? So we created templates and streamlined this."
Sustainability	Any mention of the ability for ICAPs to continue or maintain operational, expanding the populations treated, monetary effects, methodologies, its longevity etc.	"Is 300 hours too many hours, do we really need all 300? I think maybe we do, but we don't know. So I think understanding that and then what are the things that we actually need. What gives us the most bang for our buck in the intensive program? Because at some point we need to find a way to make this… We're all believers here, me and you and everybody in the study I'm sure. So this is probably an answer you're getting from everyone, but like I feel like we always talked about what would make our program scalable and I have always thought that if we made it somehow remote or if we linked it to a university clinic model then it would always be possible,

		probably."
Technology	The use of technology during the ICAP	"One other thing, as I told you, apps and tablets and devices were a blind spot, and we managed to create a position for an SLT who had experience in natural language processing. She had a position with Apple for a few years and we got her on board."
Training	Training and/or education given to graduate students, clinicians, allied professionals, family/caregivers, etc. May also include education - teaching others about the ICAP, including specific elements such as the cohort, intensity, etc. Teaching can include exposure or formal teaching seminars/tutorials	"I just see that as a huge missing piece to serve the family. We're doing communication training and things like that to give them some techniques and things like that."

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Themes	Subthemes	Quotes
Program Access	Participant and Cohort Characteristics	"...maybe some more research on the severity levels and how an ICAP can work for somebody with different levels of deficit." "I think there are probably people who fit into this model really nicely that aren't the traditional aphasia classifications."
	Scalability	"...I feel like we always talked about what would make our program scalable and I have always thought that if we made it somehow remote or if we linked it to a university clinic model then it would always be possible, probably. But that's not enough."
	Telehealth	"I'd love to look more into that and see if you had an in-group first then that later on you maybe could continue that group in an online setting."
	Stakeholders	"I believe in order to convince the insurers that this is worthwhile it really needs to be shown that the effects we're seeing are above chance." "Sometimes I am struck by how much information even neurologists lack on what is really necessary to treat aphasia."

Structure and Process	Intensity and Duration	"I wish there were something that would give us a little bit more information about intensity and timing—how much." "...we need to know what would be the ideal treatment time because I know many of the ICAP definitions say about six weeks, four weeks, three weeks. And I think we need more research on that timeline."
	Outcome Measures	"I wish there were some standard set of outcome measures that we could use and share so that we could all have this data that says to the paying agencies and government and insurers, 'this is effective, please fund it.'"
	Defining ICAP Components and Participant Customization	"Certainly, there's a definition of an ICAP and what it means, but then there's a lot that can be operationally defined within that and especially when thinking about why it works. So is it some level of individualization that's happening that isn't being documented. Or is it that it's really this combination of group and individual intervention that's pretty specified—you do it very similarly every time for all individuals so you should get a similar effect. I think that's really important is to kind of have some operational definitions around this is what an ICAP is, but getting some specifics in there."

	Delivery Model Applications	"Finding a way to basically integrate all of those needs into one treatment can be difficult because it's such a specialized group."
	Sustainability	"In addition, I would really benefit from, at this point, seeing research on financial sustainability and how that affects funding, budgeting for ICAPs, where the money is going and how they deal with changes in the economy even, in the economics of healthcare."

Code	Frequency
Participant Candidacy/ Cohort Characteristics	11
Delivery Model	9
Structure & Process	7
Stakeholders	6
Outcomes	6
Program Access	5
Funding	5
Sustainability	4
Duration/Intensity	4
Future Directions	3
Buy-in	2
Training	2
COVID	1
Graduate Students	1
Staffing	1
Technology	1
Group	1
Expense	1