A qualitative exploration of speech-language pathologists' intervention and intensity provision for children with phonological impairment

ABSTRACT

Purpose: To explore the reasons behind speech-language pathologists' (SLPs') current clinical practices (intervention and intensity provision) for children (0-18 years) with phonological impairment.

Method: Three focus groups each with five SLPs and six 1:1 interviews with SLP managers from one region of the UK (*n*=21) were carried out. A thematic analysis was undertaken.

Results: SLPs often used an eclectic mix of familiar approaches with easily-accessible therapy materials. SLPs only reported deviating from their core approach if the child did not progress in therapy. Mixed responses were gathered on the perceived feasibility of transferring evidence based intervention intensities into clinical practice. The importance of parents to increase intensity provision at home was noted. Barriers to SLPs' evidence-based decision-making included: time; confidence levels; service-related restrictions and; difficulty replicating research in practice. Having peer support and access to decision-making pathways and manualised intervention protocols were considered ways to overcome these barriers.

Conclusion: There is a research-practice gap in which SLPs' current practices are driven by organisational factors, their own preferences and child-specific factors. To narrow this gap, SLPs suggested the development of time-saving, evidence-based tools.

INTRODUCTION

Baker and McLeod (2011a) reported that there are at least 46 different intervention approaches available to treat phonological impairment. At present, there is limited literature to support speech-language pathologists' (SLPs') decision-making choices between intervention approaches, although this is developing (Baker & McLeod, 2011a). Within the phonological intervention literature, SLPs can experience decision fatigue and choice

overload due to the large number of approaches available to choose from; all with similar levels of supporting evidence (McCabe, 2018). An anonymised UK-wide survey of SLPs' clinical practices for children with phonological impairment (Hegarty, Titterington, McLeod, & Taggart, 2018) highlighted that SLPs tended to favour long-standing intervention approaches (e.g., phonological awareness therapy (Gillon 2000), conventional minimal pairs therapy (Weiner 1981)). Hegarty et al., (2018) also found that SLPs tended to neglect other approaches which are considered 'newer' or more complex (published since approximately 1985 ((Brumbaugh and Smit 2013)) (e.g., maximal oppositions, empty set therapy (Gierut 1989; 1991), multiple oppositions (Williams 2000)). This finding was corroborated within the wider literature (Brumbaugh & Smit, 2013; Joffe & Pring, 2008; McLeod & Baker, 2014; Oliveira, Lousada & Jesus, 2015; Pascoe et al., 2010) and is evidence of static, unchanging practices for many SLPs. However, the reasons behind choosing these practices have rarely been investigated. This was the intention of the current study.

Intervention intensity plays a significant role in the outcome (Baker, 2012) and cost (Schmitt, Justice, & Logan, 2016) of intervention. However, there is limited empirical evidence regarding the optimal intervention intensity for children with regards to phonological impairment (Baker, 2012; Warren, Fey, & Yoder, 2007) and the reporting of intervention intensity within the literature is limited (Kaipa & Peterson, 2016; Sugden, Baker, Munro, Williams, & Trivette, 2018), restricting the translation of research into practice. Warren et al., (2007) noted that the variables necessary to measure intervention intensity include:

- **Dose**: the number of teaching episodes per session (including information on session length to calculate dose rate);
- **Dose frequency**: how often therapy sessions are provided over a period of time (i.e., per week) and;

- **Total intervention duration**: the total time-period over which an intervention has been provided.

These three variables are multiplied to produce an overall cumulative intervention intensity (i.e., **dose x dose frequency x total intervention duration = cumulative intervention intensity**) (Warren et al., 2007).

Hegarty et al., (2018) explored intervention intensity provision for a fictional child named Tom who was 4 to 8 years old and presented with a moderate-severe consistent phonological impairment. The results showed that for Tom, SLPs most frequently provided one session per week lasting 21-30 minutes, eliciting 10-30 targets in single words per session over a range of 5-30 sessions to discharge (Hegarty et al., 2018). These figures provided a cumulative intervention intensity of **50-900** (i.e., 10-30 x 1 x 5-30 = 50-900).

Based on figures extracted from studies reviewed in Baker (2010), the cumulative intervention intensity for the most frequently used direct output-based approach found within the Hegarty et al., (2018) survey (conventional minimal pairs) is **3,600-7,200** (i.e., 100 x 2 x 18-36 = 3,600-7,200). This cumulative intervention intensity figure is not necessarily reported from assessment to discharge within studies. Regardless, comparing research- and practice-based cumulative intervention intensities shows that current clinical provision is below what is provided in the research. This intervention intensity research-practice gap has been echoed in Australia (Sugden et al., 2018), although the causes of this remain largely unknown. Evidence-based practice (which involves SLPs' using their clinical expertise to integrate robust, up-to-date research evidence, internal clinical evidence and any child/parent preferences or values into their clinical decision-making (Dollaghan, 2007), can increase the effectiveness and efficiency of interventions (Williams, 2005). Due to this, an exploration of the findings of Hegarty et al., (2018) was considered necessary to explore SLPs' decision-making processes with intervention and intensity provision and how these impact on their

application of evidence-based practice. In the current paper, this was explored through the use of semi-structured focus groups and interviews.

METHODS

The importance of following up and providing depth to survey findings via qualitative research (McCabe, 2018) and the need to identify ways to overcome research-practice barriers (Furlong, Serry, Erickson, & Morris, 2018) have been highlighted in the literature. Five approaches to qualitative research have been documented: narrative research; phenomenology; grounded theory; ethnography and; case study research. Thematic analysis is independent of theory and in recent years, has become an approach in its own right (Braun and Clarke 2006). Thematic analysis is a flexible research tool that can be used with a variety of research paradigms (Braun and Clarke 2006). Therefore, it permits the exploration of research data. The purpose of this study was to build upon the findings of Hegarty et al's (2018) survey of clinical practice and explore the reasons behind SLPs' current clinical practices for children with phonological impairment. This was done using a series of focus groups and 1:1 interviews with SLPs in one region of the UK; Northern Ireland. The objectives were: (1) to explore SLPs' clinical decision-making regarding intervention and intervention intensity provision; (2) to explore SLPs' application of evidence-based practice.

Participants and recruitment

SLPs who either carried a caseload of children and young people (0-18 years) with phonological impairment or managed other SLPs providing this service were included in this study. Only SLPs working within Northern Ireland were eligible to participate. For recruitment, a gatekeeper within each of the five Health and Social Care Trusts (HSCTs) in Northern Ireland disseminated an information sheet and consent form to potential participants via email. Willing participants were instructed to contact the first author. A list of potential participants was then devised and purposeful sampling was conducted to get a representative

sample (e.g., a variety of work settings, years of experience). Fifteen SLPs were recruited within three HSCTs to take part in three focus groups and six managers from the two remaining HSCTs were recruited for the interviews (*n*=21). No new themes or sub-themes were found in the final focus group or interview, indicating that data saturation was reached.

Demographic information collected via an information sheet is presented in Table 1. Most SLPs who participated in this study self-reported as specialists in developmental language disorder (DLD) (66.6%). Only one participant identified as being a specialist in SSD (P02), despite the majority of participants (13/21) having a caseload consisting of greater than or equal to 50% of children with SSD. Phonological impairment falls within the umbrella of DLD (Bishop, Snowling, Thompson, Greenhalgh, & Consortium, 2016). Due to the existence of specialist language units[1] attached to mainstream schools and a specialist language school in Northern Ireland it was expected that the majority of SLPs participating in this study would be specialists in DLD who had an interest in phonological impairment.

Additionally, within Northern Irish SLP services, there are managers of varying sub-levels (e.g., service level, team level). Within this study, all managers (*n*=6) had a caseload of children with phonological impairment. This is typical of SLP sub-management within Northern Ireland. Therefore, the managers recruited all routinely treated children with phonological impairment, but also had some element of management within their job role (e.g., developing care pathways, scheduling, resourcing). Hence, they were well placed to comment on the clinical and service-level reasons behind SLPs' current practices.

Data collection

Data collection was carried out separately within each HSCT. Data was collected from 15 SLPs in focus groups and six SLP managers in 1:1 interviews (*n*=21). This distinction was made for a number of reasons. Firstly, as 5-8 participants per focus group is recommended

[1] These specialist units/schools are designated for children with specific severe speech, language and communication needs. The children placed in these units receive specialist, intensive input from SLPs alongside teachers.

(Krueger & Casey, 2014), three SLP managers per HSCT would have been too small to conduct a focus group. Secondly, as SLP managers' schedules were difficult to co-ordinate, 1:1 interviews were practical in overcoming this barrier. Lastly, SLPs and managers were separated to minimise potential power dynamics. The separation ensured that SLPs had the opportunity to speak freely about their clinical practices. If managers were present, this may have influenced or impacted upon SLPs' responses.

Table 1 - Demographic information (*n*=21)

Participant	Years of experience	Work setting(s)	Specialist area(s)	Approximate percentage of caseload with SSD
		SLPs		
P01	26-30	Community, schools	DLD	80%
P02	26-30	Community	SSD	75%
P03	0-5	Community	-	90%
P04	11-15	School	DLD	80%
P05	0-5	School	-	66%
P06	6-10	Health centre, schools	DLD, fluency	25%
P07	0-5	Community	-	70%
P08	0-5	Health centre	-	20%
P09	11-15	Community, schools	-	30%
P10	16-20	Health centre	DLD	35%
P11	16-20	Schools	DLD	25%
P12	16-20	Community, schools	DLD	25%
P13	16-20	Community, health centre, schools	DLD	40%
P14	21-25	Community, schools	DLD	60%
P15	11-15	Community, schools	DLD	19.5%
		SLP managers		

P16	16-20	Community	Hearing impairment	50%
P17	21-25	Community	DLD	80%
P18	26-30	Schools	DLD	75%
P19	16-20	Community	DLD	80%
P20	11-15	Community	DLD	50%
P21	30-35	School	DLD	70%

N.B. "SSD" stands for speech sound disorder

Focus groups and interviews were suitable data collection methods as they can gather a considerable amount of varied data time-efficiently and provided the flexibility to immediately follow-up on participants' responses (Marshall & Rossman, 2014). The focus groups were carried out by the first author who was a PhD researcher and an SLP, alongside the second author who was an SLP working in an academic setting. The 1:1 interviews were conducted by the first author alone. The three focus groups with SLPs each lasted one hour and the six 1:1 interviews with SLP managers each lasted 45-60 minutes. Guest, Namey, & McKenna (2017) were able to identify the most prevalent themes within their study after only three focus groups. The focus groups and interviews were located within the participants' work site in a quiet, private room. All focus groups and interviews were audio-recorded (Olympus VN8700) and field notes were taken. The same topic guide was used in all focus groups and interviews for consistency (see Appendix 1). The topic guide questions were developed by the research team with input from a steering group of specialised SLPs. Questions were based on information collected from a previously completed survey (Hegarty et al., 2018) and relevant literature (Baker, 2010, 2012; Baker & Williams, 2010; Warren et al., 2007). Participants were shown the survey results in graph/table form and then were asked to comment on the reasons behind these findings. In line with the Hegarty et al., (2018) survey, three areas were investigated: (1) SLPs' use of intervention approaches; (2) SLPs' intervention intensity provision and; (3) SLPs' application of evidence-based practice.

Data analysis

Each participant was provided with a unique, anonymous numeric identifier. All recordings were transcribed verbatim by the first author. The six stages of thematic analysis (Braun & Clarke, 2006) were carried out by the first author using NVivo (version 11, 2017). Due to the exploratory nature of this study, thematic analysis was appropriate as it can be used to summarise and organise the main responses of participants (Braun & Clarke, 2012). Thematic analysis helped to draw out typical responses to address the study's objectives (Braun & Clarke, 2012). The thematic analysis process involved becoming familiar with the content of each focus group/interview, followed by the generation of initial codes and themes. Coding data often combines inductive and deductive approaches and data analysis (Braun & Clarke, 2012). This was the case in the current study. Although the overarching themes within the current study were guided by the topics outlined within Hegarty et al., (2018) (i.e., deductive), the analysis of the data collected allowed for sub-themes to originate directly from the data (i.e., inductive). The themes found were then reviewed and defined before they were triangulated with the second author and written up.

Rigour and trustworthiness

The use of verbatim transcription of semi-structured interviews facilitated rigour and dependability. Themes were corroborated by gathering data from different methods (i.e., focus groups and 1:1 interviews) across two groups (i.e., SLPs and SLP managers). The consensus process involved random sections of each transcript (i.e., from all focus groups/interviews) being reviewed by the second author to determine if the coded themes/sub-themes accurately reflected the data. There was a 91% level of agreement between the codes used by the first and second authors. When writing up the findings, dependability was maintained by providing direct quotes. Due to lack of time, member checking was not conducted. The researchers had an 'insider/outsider' position as they had

common ground with participants (i.e., being SLPs) but also had a different primary job role within this setting (i.e., researchers). Therefore, to promote the trustworthiness of the data collection process and reduce personal bias the first author kept a reflective journal. This journal supported the researcher to adopt an objective and critical evaluation of the facilitation of the focus group/interviews and participant engagement, thus reducing bias.

RESULTS

The aim of the current study was to explore the reasons behind SLPs' current clinical practices for children with phonological impairment. To fulfil this aim, SLPs' provision of intervention approaches and intensities as well as their application of evidence-based practice was explored. The main themes and sub-themes found are shown in Figure 1. The findings from each theme are presented below.

Theme 1: SLPs' use of intervention approaches

This theme encompasses how and why SLPs currently provide intervention. Three sub-themes were identified: eclectic intervention provision; SLPs stick to what they know and; child-specific factors influence clinical decision-making.

Sub-theme 1: Eclectic intervention provision

The majority of SLPs reported using a "*mixture"* (*P05*) of intervention approaches and providing a variety of approaches within one session. Most SLPs perceived this as a less ideal way of practicing. While some SLPs linked their eclectic practices to being clinically effective, others indicated that providing intervention according to its protocol rather than an eclectic combination of approaches may improve intervention outcomes:

"I find what I'm doing is effective…which is a combination of different approaches" (P20)

"…generally it works, the children do improve…but perhaps they would get better faster…if we stuck to the one approach by the letter of the law…" (P21)

SLPs linked eclectic practices to the limited availability of manualised intervention protocols (i.e., "*a really practical resource that really tells you how to do it"* (*P17*)) and the fact that "*replication of research is difficult*" (*P21).*

Sub-theme 2: SLPs stick to what they know

In relation to SLPs' choice of intervention approach, there was a clear distinction between the older, more "*historically*" (*P16*) used approaches (e.g., speech discrimination, conventional minimal pairs, phonological awareness therapy) and the newer, less frequently used approaches (e.g., complexity approaches, multiple oppositions). The current study established that the 'old versus new' way of thinking was often linked to SLPs' familiarity with an approach and when they were introduced to it:

"*As an undergrad we wouldn't have had that [multiple oppositions] in our training" (P13)*

"…you go with what you know…which isn't necessarily the right thing, but you go with what you're familiar with" (P20)

The data showed that SLPs' understanding of an approach impacts on their use of it. In particular, this was noted as a reason for SLPs not using the complexity approaches:

"…in terms of looking at things like your umm empty set, your maximal oppositions…your cluster work, all of that is something that therapists [SLPs] I think still are finding hard to grasp…." (P17)

SLPs also highlighted that confidence levels affect decision-making. Confidence was mentioned in reference to: SLPs' self-confidence in how to carry out an unfamiliar approach; SLPs' confidence in the effectiveness and evidence-base of unfamiliar approaches and; SLPs' loss of confidence in an approach when they cannot replicate it clinically:

"…If someone feels that they maybe don't have a complete grasp of it then they're reluctant to give it a go…" (P10)

SLPs' personal experiences with the effectiveness of interventions also plays a role in their justification for not deviating from their favoured approach(es):

"…or one that you've done and you've worked out 'well that works' and you're more inclined to try again because it's worked before as opposed to veering and trying something different" (P15)

Moreover, SLPs' preferential use of approaches using simpler, developmental target selection criteria was linked to their perceived quality of the existing literature:

"I think another thing that's sometimes can affect therapists [SLPs] is that the research just isn't that robust…" (P02)

The data also showed that ease of access to intervention materials played a role in some SLPs' preference of conventional minimal pairs over more complex approaches. Notably, SLPs linked the time pressure of producing materials with implementing a potentially less efficient and effective intervention approach:

"…and if you're familiar with something that works already that mightn't be as effective or as quick, you know you tend to think, 'well I know this well and I have the resources to do it, why would I change it?'" (P08)

However, some SLPs reported trialling the complexity approaches (i.e., maximal oppositions, empty set, 2/3-element onset clusters) clinically. SLPs reported difficulty choosing suitable children for these approaches and often abandoned them, reverting to their traditional practices:

"I think when we have used it here whether it's to do with some of the children we have who have other difficulties…we found that yes you can get the, the complex clusters or whatever but in terms of generalisation or in terms of them retaining it, it hasn't always been that successful so then it makes you a little bit less likely maybe to do it the next time…" (P01)

"…I'm struggling a lot with the complexity approach with those children [children with concomitant difficulties and other diagnoses]. They're the ones I've had to abandon it

with…" (P04)

SLPs' motivations for trying the complexity approaches included increased awareness and the pressure to try it because it is so "*on trend" (P04)*. SLPs also reported difficulties using the complexity approach protocols in clinical practice, illustrating that SLPs may be eclectically implementing these approaches:

"…it's not the maximal oppositions, it's the multiple oppositions umm…but I would use it because I've, I've been made aware of it." (P20)

"I've found it successful, but I have to say I don't know when I look at the research for it…I have to hold my hands up and say I am not using it in the gold standard form…" (P04)

Sub-theme 3: Child-specific factors influence clinical decision-making

SLPs also discussed some reasons for their typical selection of intervention approaches. One reason was child-specific factors. When choosing between approaches with different target selection criteria SLPs' considered the child's temperament, resilience and the level of difficulty of an intervention for a child, with the more complex approaches being seen as "*genuinely too complex" (P07)* for some children:

"…for example working on the empty set, you know to work on two sounds they haven't any knowledge of I think is you know is something that I don't think many people would just want to jump in to do, I certainly, I don't umm because the child can be so easily put off, and I think you're trying to get some sort of success…" (P02)

Linked to this, the use of a hierarchy in which SLPs begin therapy using what they perceive to be an easier, more accessible approach and progress to more difficult approaches depending on the child's response to therapy, was also reported in the data. SLPs specified that only when a child does not respond to their typically provided intervention do they look further afield for other, more unfamiliar approaches:

"…it's something that I would think about maybe later in intervention if I think 'ahh well I've tried conventional minimal pairs and their auditory discrimination's good' …they're still not really getting anywhere I'll try maximal oppositions…" (P08)

Theme 2: Intervention intensity provision

The data illustrated that SLPs apply an "*ad hoc*" (*P01*) approach to intervention intensity provision. Differences between the provision of intervention intensity in research and practice were explored and three sub-themes were found: feasibility in clinical practice; job role and; the role of parents.

Sub-theme 1: Feasibility in clinical practice

In terms of intervention intensity provision, variation existed both between and within HSCTs on all aspects of the Warren et al., (2007) intensity formula. SLPs also noted differences in provision depending on the severity of the child's difficulty (i.e., session length, total intervention duration) and if they had other co-morbidities or difficulties (i.e., dose):

Dose

"…it's actually not that hard to get a hundred [targets elicited] you know if you are playing a game…you can actually get those targets quite easily…" (P03)

"…if you've got a 3-year-old child with poor attention I would find it hard to keep them on task for a hundred trials…" (P20)

Dose frequency

"*I suppose at the minute I don't do two sessions per week…but I do think it's something that could be, could be achieved…" (P20)*

"…only our children within language class would be getting more than one session per week" (P13)

Session length

"…I would have like a half hour session…" (P03)

"…we within this [Health and Social Care] Trust would also have what we would call our complex sessions for more complex children…and that would allow then for 40-45 minutes…" (P16)

Total intervention duration

… I definitely wouldn't be doing 21–30 sessions… I suppose for my more severe ones I would maybe …" (P19)

"…there wouldn't be very many circumstances where a child would get more than 6 weeks…[once weekly] that's really our option…" (P06)

SLPs illustrated that clinical realities (e.g., resources, large caseloads) and the pressure to remediate a child's difficulty within a short-time frame act as barriers to being able to practically carry out the intervention intensities provided in the literature:

"…we're generally working with a child once a week for thirty minutes…that can have an impact in getting the optimal time to actually work with them and short blocks as well, blocks of six weeks, so you sort of feel under pressure to reach an end goal and get there when maybe you don't have enough time to do that" (P10)

"I mean that's the first thing definitely, resource is limited…the recommendations in the literature I, I just don't feel that we could ever meet that" (P16)

Sub-theme 2: Job role

Some SLPs reported being *"stuck" (P10)* in what they can provide within their service. On the other hand, SLP managers tended to be more flexible due to having smaller, more specialised caseloads:

"If you're a specialist you can block out an hour for a session and that would be about kind of 40, 45 minutes, 45 minutes contact……and then your write-up time…there is a bit more flexibility". (P20)

Work setting also related to SLPs' responses regarding the feasibility of increasing aspects of intervention intensity provision, with trends showing that SLPs working in school teams and language units were able to provide more intensive intervention than community-based SLPs:

"…there would be no point were you would even consider imagining you could see a child three times a week in the community clinic" (P10)

"…in schools that might be more feasible…even if you saw them for a shorter session twice or three times a week" (P08)

Sub-theme 3: The role of parents

Having parents' agreement to increase intervention intensity provision was reported as paramount. Scepticism that parents would participate in the number of sessions provided in the literature (i.e., 2-3 sessions per week) was noted:

"…I can't imagine a parent coming in twice a week…" (P11)

SLPs reported that they work "*in partnership with the parents" (P20)* to empower them to continue intervention at home. Parents carrying out SLP tasks at home was identified as a possible way of increasing intervention intensity, although it was recognised that the intensity received would be difficult to calculate:

"…although the dose [dose frequency] is what we're maybe seeing them once a week it's also depends on what the parent is doing at home…" (P09)

SLPs' perception was that it is difficult to rely on parents to increase intervention intensity due to their understanding of SLP interventions and their other family priorities:

"…they're real people…and they have lots of other demands and commitments…" (P13)

"…parents do feel able to do some of those approaches maybe better than others." (P07)

Theme 3: Overcoming research-practice barriers

SLPs' application of evidence-based practice was explored. Three sub-themes were identified: research-practice barriers; bridging the research-practice gap and; change in practice. SLPs reported referring to their own experiences and the experiences of their colleagues when decision-making regarding interventions and intensities for children with phonological impairment:

"I think that probably the biggest evidence base that I go on isn't, probably isn't so much the research, more what I see working day to day, child to child you know". (P07)

Sub-theme 1: Research-practice barriers

Within the data, SLPs reported facing difficulties such as isolation from colleagues and not being able to attend conferences or training events due to funding constraints. Moreover, limited awareness of, and keeping up to date with the current research were identified as hurdles to translating research into practice. Lack of time to read and understand the literature and difficulty transferring research recommendations into practice were also noted as research-practice barriers:

"I mean you're really sometimes very isolated and going through it by yourself and learning as you go…" (P04)

"…we don't have a lot of time to umm get into the nitty gritty of research…and to read it and apply it as much as I think we all would like to…" (P21)

"…there's a difference between the ideal run of the clinical research and what we do in real life" (P11)

Sub-theme 2: Bridging the research-practice gap

To overcome the barrier of time constraints, SLPs advocated for the introduction of protected thinking time within their work schedule:

"…it would just be lovely to have some time in your week where you could actually put your mind to reading the evidence, familiarising yourself with it, building up your confidence with it, getting your resources together and then feeling ready to go with it" (P10)

SLP managers, whilst acknowledging that time is a prominent barrier, reported that it may not be the lack of time that restricts SLPs, but an inefficient use of time:

"…it's a response from everybody 'oh its time, its time', but actually I think it's not about time, it's about how we use the time" (P16)

To reduce barriers with replicating research in practice, suggestions included SLPs developing their own evidence-base (e.g. conducting single-case studies) and upskilling themselves to co-produce clinically feasible research studies:

"…if we all maybe had more skills then we would be doing more little studies…and then that would add to the research base for things…" (P19)

Enablers associated with literature searching and access were primarily noted by SLP managers and included identifying a research champion to cascade information to others and seeking out access to journals via a university library, the Royal College of Speech and Language Therapists (RCSLT) or 'What Works' websites:

"…it's much easier where you're not going out to look for the evidence yourself it's there and the Communication Trust, their website you know the What Works…it's good to have the database of everything…" (P12)

Additionally, access to continuing professional development training was expressed as a way of overcoming the barrier of accessing up-to-date research. SLPs consistently reported that attending training workshops raised their awareness of unfamiliar approaches and got them to question if their clinical decisions are truly evidence-based:

"…the maximal oppositions I just think possibly because it's harder, and it's maybe not, there's maybe less known about it. I suppose I know about it because of the, I went to the...speech sound disorder day…" (P19, HSCT05)

Other facilitators for closing the research-practice gap included attending journal clubs and clinical excellence networks (CENs) and learning from SLP students:

"…I would love to start a journal club. We don't have one…" (P17, HSCT04)

"I think that access to these umm groups or you know the CEN…is umm invaluable…" (P18)

Lastly, SLPs consistently reported the importance of peer support, including second opinions and sharing learning, as a facilitator to evidence-based practice:

"…it's easier to do research and to take actions as a group and to…compare results rather than going it alone" (P20)

Sub-theme 3: Change in practice

SLPs reported that a shift to more research-informed practices was possible. There was recognition that using research alongside their current decision-making techniques (i.e., their own clinical experiences, child/parent preferences, and child-specific factors) may have long-term, positive effects on the child and the SLP service:

"…we need to shift and think 'well it is time well spent looking at research and the evidence base…because then your interventions are going to be more effective'…" (P19)

SLPs noted that it would take someone "*being brave enough to say, 'let's change the approach all together'" (P10)* to initiate this change. A change in thinking and culture within

the SLP profession was seen as crucial. SLP services which prioritise intervention quality over the quantity of children seen would prove beneficial to initiate and sustain practice change:

"…the perception is…that seeing [children] is more important than the quality of what you've done and the time they've been in with you…so there almost needs to be a change in thinking around that…" (P21)

DISCUSSION

The data showed that SLPs tended to use long-standing approaches (e.g., conventional minimal pairs, speech discrimination therapy), often in an eclectic combination, and only progressed to using more complex approaches if the child did not respond to their typical provision. This finding is corroborated by the existing literature (Brumbaugh & Smit, 2013; Furlong et al., 2018; Joffe & Pring, 2008; Lancaster et al., 2010; McLeod & Baker, 2014; Oliveira et al., 2015; Pascoe et al., 2010; Sugden et al., 2018). Indeed, Brumbaugh & Smit (2013) found that when considering a wide range of phonological interventions, even newer graduates used longer standing approaches (e.g., phonological awareness therapy, the cycles approach (Hodson and Paden 1991)) and were less familiar with newer approaches (e.g., Metaphon (Howell and Dean 1987), multiple oppositions). A particularly clinically relevant finding of the current study was that even though SLPs are not using newer, more complex approaches, there is an awareness that these approaches may be more appropriate for a child's specific presentation (e.g., multiple oppositions for phoneme collapse). These actions may have a negative impact on a child's therapy outcome. While the child's needs were key to SLPs' practices, these findings raise questions around whether SLPs are providing the most effective and time-efficient interventions for children with phonological impairment from the outset of therapy.

Avoidance of the complexity approaches has been reported throughout the literature (Brumbaugh & Smit, 2013; Joffe & Pring, 2008; Pascoe et al., 2010; Sugden et al., 2018). This practice, at least in part, may be due to the inconsistent research findings in this area (Dodd et al., 2008; Rvachew & Nowak, 2001). Unclear research (e.g. inconclusive findings, methodological pitfalls) has previously been identified as a barrier to evidence-based practice for SLPs (McLeod & Baker, 2014; O'Connor & Pettigrew, 2009) and was also reported within the current study. Uniquely, SLPs within the current study reported trialling the complexity approaches with mixed success. SLPs described difficulties choosing appropriate children for these approaches and implementing the protocols clinically. Matching an approach to a child's difficulty/ies is of paramount importance as the complexity approaches appear to be better suited to children with moderate-severe phonological impairment and no co-morbidities, aged approximately four years and over with at least six sounds excluded from their phonetic and/or phonemic inventories across three manner classes (Baker & Williams, 2010).

Limited access to intervention materials was also found to play a role in SLPs' choice of intervention. SLPs may be more open to changing intervention practices if resources were easily accessible and available (McCabe, 2018). The development of resources for the more unfamiliar approaches could support SLPs to deviate from their typical provision. Moreover, SLPs reported using approaches due to understanding, familiarity and comfort. This outcome has confirmed the suspicions of Storkel (2018) that SLPs do not routinely use the complexity approaches due to a lack of familiarity with the protocols. Sharing knowledge and learning from each other's clinical practices could support behaviour change (McCabe, 2018). Therefore, in line with the suggestions of the SLPs within the current study, clinically trialling approaches within services, sharing experiences and partaking in peer observation may encourage SLPs to use approaches that are out of their comfort zone.

Little is known on the optimal intervention intensity for children with phonological impairment (Baker, 2012). However, some preliminary evidence has been accrued on some aspects. For example, a dose of approximately 100 trials per session is often provided for conventional minimal pairs (Baker & McLeod, 2004; Weiner, 1981), multiple oppositions (Williams, 2005) and the complexity approaches (Gierut, 1998). Moreover, Allen (2013) highlighted that using a more intense dose frequency (3 sessions per week) was more effective than a lower dose frequency (1 session per week) for the same total amount of sessions (n=24) when using the multiple oppositions approach (Williams 2000) with preschool children. Total intervention duration can be difficult to gather from the literature. This is because research studies often last for a pre-determined amount of time influencing replicability in the clinical context. While there is some research-based information that SLPs can use to guide their clinical practices, more robust research considering all aspects of intervention intensity is necessary, with SLPs co-producing research studies to increase their clinical replicability.

SLPs within the current study had varying opinions on achieving the research-based intervention intensities in clinical practice. It was conveyed that SLP managers or specialised SLPs had more flexibility to offer a higher intervention intensity; usually due to the fact that they worked in a more specialist setting where they had easier, more frequent access to children than more generalist, community-based services. In terms of intervention dose, some SLPs noted that a dose of 100 targets per session was achievable in clinical practice, while others disagreed quoting time-constraints and child-specific factors (i.e., attention and listening skills) as barriers. The inability to increase dose noted by some SLPs may also be linked to the treatment of other aspects of a child's speech, language and communication needs alongside phonology within one session, making it difficult to elicit the specified amount of targets for the phonological intervention. This requires further investigation.

Within the current study, SLPs stated that parental support was integral to their practices, which has been corroborated within the literature (Furlong et al., 2018). SLPs noted that homework was often a considerable part of their intervention for children with phonological impairment and could be used to increase intervention intensity provision. In line with this Sugden, Baker, Munro, & Williams (2016) found that parents are often willing to complete SLP work at home. Working with parents as facilitators has been found to be beneficial (Sugden et al., 2016; Tosh, Arnott, & Scarinci, 2017) and may be a possible avenue to increase intensity provision. However, more robust evidence is necessary to support the role of parents in addressing service delivery challenges (Tosh et al., 2017).

SLPs' decision-making focuses on using their own experiences, the experiences of their colleagues and factors independent to the child and their parent/carer. This finding has been corroborated elsewhere in the literature (Furlong et al., 2018; McCurtin & Clifford, 2015; McLeod & Baker, 2014; Zipoli & Kennedy, 2005). While it is important to acknowledge the invaluable contribution that SLPs' clinical experiences and child-specific factors bring to decision-making, the implementation of research is also required (Dollaghan, 2007). Many barriers to evidence-based practice were uncovered in the current study. These barriers were often universal, for example lack of time has been reported by SLPs throughout the world (McLeod & Baker, 2014; O'Connor & Pettigrew, 2009; Zipoli & Kennedy, 2005), as well as within other allied health professions (Harding et al., 2014). Difficulties accessing and searching the literature were also reported as barriers to putting research into practice. Corroborating this, the wider research also states that literature searching can be challenging, particularly for those who qualified before electronic literature searching became common (Harding et al., 2014; McLeod & Baker, 2014).

Within the current study, the investigators were particularly interested in how SLPs can overcome evidence-based practice barriers. To reduce difficulties associated with replicating

research in practice and tying in with the recommendation of Ebbels (2017), suggestions included SLPs developing their own evidence-base (e.g. completing single case studies with children on their caseload) and upskilling themselves to co-produce clinically feasible research. This finding highlights SLPs' willingness to bridge the research-practice gap by themselves becoming more involved in research projects. SLPs also indicated that they would benefit from approaching evidence-based practice activities as a group, rather than individually. The use of peer learning and support has been widely recommended (Baker & McLeod, 2011b; Harding et al., 2014; McCabe, 2018) and may be beneficial when moving forward in attempts to support SLPs to implement evidence-based practice.

SLP managers noted that being time efficient and accessing ready-made resources could facilitate SLPs' implementation of evidence-based practice. Increasing SLPs' awareness of interventions (e.g., via training) and their level of confidence with newer approaches (e.g., via trialling) were also considered enablers to implementing evidence-based practice. These are practical suggestions, which if implemented could support SLPs' ongoing, consistent implementation of evidence-based practice. SLPs also conveyed that an online, evidence-based resource to support their clinical decision-making between intervention approaches and their implementation of these, would be clinically useful. The development of an evidence-based clinical resource is commensurate with the literature as McCabe (2018) noted that accessing decision-making tools would improve clinical practice for SLPs. This is an area for further investigation.

LIMITATIONS

This study outlined the results of a qualitative exploration of the perspectives of 21 SLPs within Northern Ireland. As this study focused on SLPs from Northern Ireland only, the results may not be generalisable to the wider SLP population and thus should be interpreted carefully. To minimise this limitation, SLPs and SLP managers from across all five HSCTs in

Northern Ireland participated. It is also important to note that like Northern Ireland, many areas of the UK provide paediatric SLP services through a similar National Health Service system. Lastly, due to the close-knit nature of SLP services within Northern Ireland, it is possible that an element of response bias was present. This was minimised as the first author did not know any of the participants prior to their engagement with the study. Bias in analysis was also possible but minimised by verbatim transcription, reflective diary keeping and multiple-analyst triangulation.

CONCLUSION

Within this study, the reasons behind SLPs' clinical practices for children with phonological impairment were explored. SLPs' tend to use familiar, often eclectic approaches to remediate phonological impairment despite being aware that other potentially more effective and time-efficient interventions exist. SLPs only tend to deviate if the child does not respond to their typical provision. Building on the work of Furlong et al., (2018), the current study found that SLPs' practices are often driven by their own preferences and child-specific factors. On the whole, the findings regarding SLPs' current practices illustrate a research-practice gap. The possibility of implementing more evidence-based intervention intensities had mixed responses which often depended on the SLPs' job role, work setting and work organisation. Levels of perceived feasibility varied for each of the intervention intensity variables outlined by Warren et al., (2007). As optimal levels of intervention intensity are not yet known (Baker, 2012), more robustly designed, clinically feasible research considering intervention intensity is necessary.

SLPs reported that the provision of decision-making tools, manualised intervention protocols, easily accessible intervention materials and peer support opportunities would support their evidence-based clinical management of children with phonological impairment. Supporting SLPs to use more research in practice would assist their use of the true evidence-

based practice. The use of all elements of evidence-based practice could impact positively on SLPs' provision of the most cost- and time-efficient service possible, decrease waiting lists, expand service resources (Dodd, 2007) and most importantly, improve all aspects of clinical practice for children with phonological impairment (Ebbels, 2017).

STATEMENT OF ETHICS

All subjects gave their written informed consent to participate. Ethical approval was granted from the Research Governance Filter Committee, Institute of Nursing and Health Research at Ulster University. Research governance was approved for all five Northern Ireland HSCTs.

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Appendix 1: Topic guide for focus groups and interviews

FOCUS GROUP/INTERVIEW GUIDE

General group introductions:

Ask the participants to introduce themselves in turn and state their job title.

Current intervention use

1. This graph/table shows the results of a recent UK wide survey looking at Speech and Language Pathologists' (SLPs') current intervention practices with children with phonological impairment; please take a moment to look over the graph/table.
   Can you tell me what you believe is the reasoning behind SLPs' choices of the most and least used approaches?

Intervention intensity provision

2. The following table details information regarding:
   - The currently provided intensity and the 'ideally perceived' intervention intensity for a child with phonological impairment and;
   - The intensity recommended in the literature for three phonological intervention approaches of interest.

What are your thoughts on these results?

Evidence-based Practice in SLP

3. **Evidence based practice (EBP)** is the implementation of professional experience, research evidence and individual client factors into clinical decision-making.
   This graph shows the results of a recent UK wide SLP survey highlighting reported barriers to accessing evidence-based practice. Can you tell me what would help you to apply the evidence-base for the three approaches of interest into clinical practice?