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“One of the biggest grey areas”: A focus group study exploring dosage of swallowing exercises from speech-language pathologist perspectives

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Abstract

Purpose: To explore the perspectives and practices of speech-language pathologists on dosage of swallowing exercises in stroke rehabilitation.

Method: Online focus groups involved 20 speech-language pathologists working in various settings across Australia. Focus group data were recorded, deidentified, and analysed using inductive thematic analysis guided by an interpretivist phenomenological approach.

Result: Analysis resulted in four main themes: (1) “Getting the most bang for your buck”: Importance of dosage in swallowing, (2) “No patient is identical”: Personalising swallowing exercise dosage to the patient, (3) “You’ve got what you should do, and then what you can do”: Gap between recommendations and practical application, and (4) “Not much guidance out there about dosage”: More research needed to guide dosage. Speech-language pathologists agreed that dosage was theoretically important for swallowing exercises, but practical application of dosage was impacted by patient factors, limited access to resources, and lack of research-based guidelines.

Conclusion: Speech-language pathologists reported trying to provide optimal care despite multiple barriers to prescribing dosages of swallowing exercises in practice. Personalising exercise dosage to the patient, creative clinician strategies, improved and equitable access to resources, and research-based guidelines on swallowing exercise dosages are needed to address these barriers.

Keywords: *dysphagia; stroke; rehabilitation; exercise dose; qualitative; focus groups*

Introduction

Difficulty swallowing, also known as dysphagia, is a serious and prevalent problem with significant negative impacts. Stroke is the most common cause of dysphagia in adults, with up to two-thirds of patients developing dysphagia after stroke (Martino et al., 2005). Dysphagia after stroke is associated with poorer outcomes, decreased quality of life, increased morbidity, and a higher risk of death (Altman et al., 2010). Further, patients with dysphagia are more likely to develop pneumonia, require non-oral or tube

feeding, stay longer in the hospital, and be discharged to post-institutional care (Arnold et al., 2016).

Swallowing rehabilitation, which starts with assessment, can reduce the symptoms and severity of dysphagia, and improve swallowing ability and quality of life (Bath et al., 2018; Speyer et al., 2022). Swallowing assessment can include instrumental assessment of impaired swallowing physiology or structures, such as videofluoroscopic swallowing studies (VFSS) or fiberoptic endoscopic evaluation of swallowing (FEES; Bax et al., 2014; Costa, 2010). Rehabilitation can involve swallowing exercises to improve underlying impairments

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by strengthening weakened swallowing muscles (Burkhead et al., 2007) and/or through skill-based swallowing training (Huckabee & Lamvik-Gozdzikowska, 2018). Swallowing exercises include indirect strengthening exercises (where the patient does not swallow), such as chin tuck against resistance (CTAR) or expiratory muscle strength training (EMST), and direct exercises (that involve swallowing) such as an effortful swallow or Mendelsohn manoeuvre (Speyer et al., 2022).

Despite the importance of swallowing rehabilitation, research on optimal dosages of swallowing exercises is inconclusive. Dose, or dosage—referring to the amount, frequency, intensity, duration, and type of exercise—is one key aspect of stroke interventions (Pescatello et al., 2014; Schneider et al., 2016). However, optimal or recommended dosages of swallowing exercises after stroke have not been determined (Felix-Lusterman et al., 2021). In a systematic review of post-stroke dysphagia studies, Choy et al. (2023) found inconsistent dosages of swallowing exercises and few evidence-based rationales for dosage selection. Inconsistent dosages prevent comparison or synthesis of research, and highlight the lack of guidelines for optimal swallowing exercise dosages (Choy et al., 2023; Krekeler et al., 2021). Further high-quality trials are needed to investigate the effect of swallowing exercises and different exercise dosages after stroke (Bath et al., 2018).

Speech-language pathologists need to continue providing swallowing rehabilitation in the context of this paucity of research on swallowing exercise dosages. However, speech-language pathologists' clinical decision-making on the dosage of swallowing exercises is unknown. Speech-language pathology surveys and medical record audits document wide variability in dysphagia practice, but do not explain the underlying reasons for these findings (Carnaby & Harenberg, 2013; Choy et al., 2023; Jones et al., 2018). No in-depth, qualitative research has specifically explored speech-language pathology perspectives on dosage of swallowing exercises. Thus, research is needed to understand how clinicians view and prescribe swallowing exercise dosages to identify how to improve dosage prescription and implementation.

Therefore, the overall aim of this study was to explore the perspectives and practices of speech-language pathologists on dosage of swallowing exercises in stroke rehabilitation. Understanding dosage from the perspective of speech-language pathologists can identify practical issues impacting dosage and potential directions for improvement. Specific aims were to understand the views of speech-language pathologists on the role of dosage, decision-making around dosage prescription, and barriers and facilitators to dosage implementation in clinical practice.

Method

Ethical approval for this study was received from the local human research ethics committee (ETH02805).

Researcher reflexivity

The research team consisted of a mix of academic and clinical staff from multiple disciplines (speech-language pathology, physiotherapy, rehabilitation counselling, and medicine). The lead author and focus group moderator (JC) identifies as a female speech-language pathologist and is a PhD student with eight years' clinical experience in post-stroke dysphagia rehabilitation. The lead author had a collegial relationship with three participants but was otherwise unknown to them. Data analysis was conducted by two speech-language pathologists with clinical experience in post-stroke dysphagia rehabilitation (JC, SYC) and a rehabilitation counsellor (RP) with no clinical experience in dysphagia rehabilitation but extensive experience in qualitative research.

Focus groups

Semi-structured focus groups were conducted using established methods (Barbour, 2008). Individual and collective views on the dosage of swallowing exercises were explored through interactions between participants in focus groups (Kitzinger, 1994). The lead author (JC) developed a topic guide with key questions and probing questions using related literature (Box 1), including a systematic review on dosages of swallowing exercises (Choy et al., 2023) and evidence on the behaviour change framework (Michie et al., 2005). This framework consists of 12 theoretical behaviour change domains (e.g. knowledge, beliefs about consequences, social influences, and environmental context; Michie et al., 2005), which informed the design of the probing questions. A pilot of the topic guide involved using the questions with two speech-language pathologists who provided feedback on its revision. Revisions included adding in an explanation of dosage, an online poll to rate the importance of dosage, and wording edits. Constant comparison analysis across the focus groups meant that questions probing for further insights could be added to the topic guide. (Box 1).

Online focus groups were used to facilitate participation from different locations, while mitigating infection risk due to COVID-19. Focus groups were conducted using Zoom conferencing software (Zoom Video Communications, 2023); audio and video were recorded using Zoom. We conducted focus groups between February and March 2022. Focus groups lasted between 63 and 85 min, with an average of 73 min. A professional transcription service transcribed group discussions verbatim from audio recordings. The lead author (JC) checked transcripts for accuracy against video recordings.

The lead author also moderated the focus groups by asking key questions, flexibly using probing questions, and encouraging interaction between members. The lead author wrote field notes after focus groups to document initial thoughts, contextual details,

Box 1 . Indicative focus group interview guide.

- (1) What do you think the dosage of swallowing intervention is?
- (2) In your opinion, how important is dosage of swallowing intervention on a scale of 1–10 (1 = not important, 10 = very important to the outcome of intervention) [Zoom poll]? What are your reasons for that rating?
- (3) How do you, as clinicians, decide what dosage of swallowing intervention to prescribe your patients?
- (4) What do you find challenging about prescribing swallowing exercises and dosages?
- (5) What are the barriers in achieving your target exercise dosages?
- (6) What are the facilitators in achieving your target exercise dosages?
- (7) In your opinion, what are the main issues we need to deal with, in order to improve the prescription and implementation of swallowing exercise dosages?
- (8) Any other thoughts or questions you have on this topic or on things that have come up during the session?

Probe questions included asking about different components of dosage (e.g. frequency, intensity, duration, and type), the influence of research/evidence, personal or therapist factors, patient factors, workplace setting, resources, and other people.

group dynamics, and coding memos to highlight interesting discussions or thoughts. Some repetition of ideas was observed after four focus groups. An additional focus group was conducted to check for thematic saturation. As no further themes were developed, data collection ceased with the five focus groups.

Data analysis

Data were analysed using inductive, experiential thematic analysis to identify, interpret, and report patterns within the data with a phenomenological approach guided by an interpretivist perspective (Braun & Clarke, 2006). The study methodology reflected a coding reliability framework (Braun & Clarke, 2022). Three researchers (JC, RP, and SYC) familiarised themselves with the data through reading and re-reading transcripts and recording written memos on initial ideas. The same three researchers (JC and either RP or SYC) independently generated initial semantic codes for each data item in Microsoft Word and came to a consensus on each code through discussion. JC coded all transcripts, while SYC coded three transcripts and RP coded two transcripts. The lead author (JC) organised codes and associated data extracts using NVivo (released in September 2022; QSR International Pty Ltd, 2022) and transferred codes to an online interactive board. Two researchers (JC and RP) independently collated codes into potential themes. All authors discussed themes and codes to reach consensus on the final themes. A summary of themes was sent to consenting participants for respondent validation. Two participants responded to confirm that the summary reflected the views

expressed in their focus groups and suggested no changes to the summary.

Participants

To be included in the study, participants needed to be an Australian-Certified practising speech-language pathologist with any years of experience, as long as they had provided swallowing intervention in the last year to at least one adult with post-stroke dysphagia. Given that speech-language pathology practice is influenced by clinical setting and experience (Jones et al., 2018), we aimed to recruit participants from different settings and with varying levels of experience. Study information and advertisements were distributed through swallowing interest groups in different states, speech-language pathology email groups, and social media (i.e. Twitter and Facebook). Snowball sampling was conducted by asking focus group participants to send study details to eligible and interested colleagues. Prospective participants completed online consent and a demographic survey through REDCap (research electronic data capture; Harris et al., 2009) hosted at the University of Sydney.

Twenty-nine speech-language pathologists consented to the study, but only 20 participated. Reasons for not participating were due to work, being non-contactable, or being unavailable at the scheduled focus group times. Three to five speech-language pathologists participated per group in five focus groups. Participants were allocated to focus groups based on their availability. Each focus group contained speech-language pathologists working in different settings.

Speech-language pathologists ranged in age, years of experience, and workplace settings. Ninety-five percent of participants identified as women, most were aged between 21 and 40 years and worked in metropolitan (metro) settings. Participant characteristics reflected the Australian speech-language pathology workforce (Bennett et al., 2019). See Table I for participant characteristics.

Result

Four themes encapsulated the data, three of which contained either two or three subthemes. Themes were: (1) “Getting the most bang for your buck”: Importance of dosage in swallowing, (2) “No patient is identical”: Personalising swallowing exercise dosage to the patient, (3) “You’ve got what you should do, and then what you can do”: Gap between recommendations and practical application, and (4) “Not much

guidance out there about dosage”: More research needed to guide dosage. See Table II for themes and subthemes. These themes are discussed using supporting quotes identified with participant codes, as listed in Table I.

“Getting the most bang for your buck”: Importance of dosage in swallowing

Participants described the theoretical importance of the dosage of swallowing exercises. Participants considered swallowing exercise prescriptions incomplete without dosage. One participant reported: “dosage is an essential component when we’re prescribing those exercises. We can’t just say, do this exercise and not give an amount, a repetition, or sets per day” (FG2P2). Participants’ views on dosage were based on research about exercise in general being extended to swallowing exercises. Participants applied

Table I. Focus group participant characteristics ($n = 20$).

Focus group and length (h:min)	Participant code	Age range (years)	Sex	Years of practice	Years of practice in stroke rehabilitation	Work settings	Geographic area	State/territory
1 (1:03)	FG1P1	21–30	Female	6–10	6–10	Private practice	Rural	NT
	FG1P2	31–40	Female	6–10	6–10	Community	Metropolitan	NSW
	FG1P3	31–40	Female	10–20	10–20	Subacute and outpatient	Rural	NSW
	FG1P4	41–50	Female	10–20	10–20	Community and disability	Metropolitan	QLD
2 (1:08)	FG2P1	21–30	Female	2–5	<2	Acute and subacute	Metropolitan	NSW
	FG2P2	21–30	Female	2–5	2–5	Subacute	Metropolitan	NSW
	FG2P3	31–40	Female	2–5	<2	Acute and private practice	Rural	NSW
	FG2P4	31–40	Female	6–10	6–10	Acute and subacute	Metropolitan	VIC
	FG2P5	41–50	Male	10–20	10–20	Acute, subacute, and outpatient	Metropolitan	VIC
3 (1:25)	FG3P1	21–30	Female	6–10	2–5	Subacute	Metropolitan	NSW
	FG3P2	21–30	Female	6–10	2–5	Subacute and outpatient, community, disability, and private practice	Metropolitan	NSW
	FG3P3	21–30	Female	6–10	6–10	Acute and subacute	Rural	QLD
	FG3P4	31–40	Female	6–10	6–10	Subacute and outpatient, community, and RACF	Rural	NSW
	FG3P5	51–60	Female	>20	>20	Community and private practice	Metropolitan	VIC
4 (1:15)	FG4P1	21–30	Female	6–10	2–5	Outpatient, community, RACF, and disability	Rural	QLD
	FG4P2	31–40	Female	10–20	10–20	Acute and subacute	Metropolitan	VIC
	FG4P3	41–50	Female	>20	>20	Acute, outpatient, and community	Rural	NSW
5 (1:14)	FG5P1	21–30	Female	2–5	<2	Community and private practice	Metropolitan	NSW
	FG5P2	21–30	Female	2–5	2–5	Acute and subacute	Metropolitan	NSW
	FG5P3	31–40	Female	6–10	6–10	Private practice and disability	Metropolitan	NSW

Note. NSW = New South Wales; NT = Northern Territory; RACF = residential aged care facility; QLD = Queensland; VIC = Victoria.

Table II. Main themes and subthemes from focus groups.

Main themes	Subthemes	Exemplar quote
"Getting the most bang for your buck": Importance of dosage in swallowing	N/A	"Dosage is an essential component when we're prescribing those exercises. We can't just say, do this exercise, and not give an amount, a repetition, sets per day" (FG2P2).
"No patient is identical": Personalising swallowing exercise dosage to the patient	Patient goals and perception of swallowing exercises influence buy-in	"There's so much around the patient's buy-in ... if you've got someone who's really engaged and committed and kind of with you in what you're trying to do, I think their chances of having any success are much higher" (FG3P2).
	Swallowing exercise dosage depends on patient capacity	"Have a look at the patient and see what they can tolerate, and what they're willing to put up with. Some patients are willing to do a full set ... whereas some are, just no, I'm too tired" (FG3P3).
"You've got what you should do, and then what you can do": Gap between recommendations and practical application	Instrumental assessment is necessary but difficult to access	"I definitely feel more confident if I do have instrumental to back me up. But I've got provide a service either way" (FG3P3).
	Dosage prescription depends on availability of resources	"In a perfect world every workplace would have enough resources and staffing to know that we can confidently implement it at the required dosage" (FG4P1).
	Speech-language pathologist efforts to bridge the gap	"There's some inherent personality trait within our profession which assists. So we want our patients to do well ... our sort of intrinsic motivation to do well and help patients and care for patients" (FG2P5).
"Not much guidance out there about dosage": More research needed to guide dosage	Limited research leads to uncertainty	"I feel like there's not this rule or model that I can follow, and also there's not a great deal of evidence that helps you make these decisions. Because sometimes you just kind of wing it" (FG4P2).
	Learning from other disciplines	"Working as a paediatric therapist I always felt more confident in delivering because the evidence is there ... But I think in the adult speechie world ... it's an area that is just lacking in the research evidence" (FG4P1).

principles of motor learning to swallowing exercises, including the need for high dosages to improve outcomes, as seen in the quote: "those principles of motor learning come into it ... if I want a good outcome, I have to have a good dosage" (FG3P3). Participants' experiences also influenced their views on dosage. Improved outcomes after high dosages of swallowing exercises reinforced the importance of dosage. Conversely, participants who had seen minimal improvement after high dosages of swallowing exercises reported reduced confidence in dosage.

Based on wider research and experience, participants cited many benefits of dosage, including providing structure to patients and clinicians, improving consistency of care, and maximising exercise opportunities. One participant described their views on the role of dosage in swallowing intervention: "if you have dosage, you offer structure. So that's how I see it. You're offering a consistent, structured programme for their swallow ... it's giving them the best opportunity" (FG3P1). Participants also stated that dosage improved patient motivation and adherence by providing a target to work towards, as seen in the following quote: "they're more likely to comply with it if they've got something to measure to as well. Or know

what they need to do throughout the day. So that's probably why dosage is important" (FG2P3). Overall, based on research and experience, participants reported that the dosage of swallowing exercises was essential in improving outcomes, consistency of intervention, and patient adherence.

"No patient is identical":

Personalising swallowing exercise dosage to the patient

Participants indicated that the dosage of swallowing exercise should be tailored to the patient, as multiple factors influenced their approach to, engagement with, and capacity for swallowing intervention. Two subthemes explored this theme: (1) patient goals and perception of swallowing exercises influence buy-in and (2) swallowing exercise dosage depends on patient capacity.

Patient goals and perception of swallowing exercises influence buy-in

Participants agreed that a patient's buy-in impacted their engagement with swallowing exercises. Participants observed that motivated and engaged patients completed higher dosages of exercise and

achieved better outcomes. As one participant stated: “there’s so much around the patient’s buy-in... if you’ve got someone who’s really engaged and committed and kind of with you in what you’re trying to do, I think their chances of having any success are much higher” (FG3P2).

Patients’ personal goals influenced their buy-in to swallowing intervention, as highlighted in the quote: “making sure that they are actually motivated often depends on what they want to do or their goals” (FG1P4). A patient’s personality, background, experiences, and perception of quality of life shaped their goals. While some patients were motivated to improve their swallowing, patients’ goals often differed from their speech-language pathologists’. Speech-language pathologists prioritised swallowing, achieving higher exercise dosages, and reducing aspiration risk. In contrast, some patients prioritised walking and not doing swallowing exercises, even if it meant accepting aspiration risk. One participant described patients whose goals did not align with speech-language pathology goals:

It’s a big deal that they’re aspirating, and they can’t have a cup of tea. But it’s often interesting that they don’t seem to see it quite the same or they want a cup of tea but they’re just going to have it regardless. And yep, “I cough a lot, but I’ll deal with that.” Versus you think if they tried to walk and they fall, I don’t know, would they have a lot more issue with that? (FG1P3)

Patients’ perceptions of swallowing exercises also impacted their buy-in to intervention. Patients who recognised the reason for swallowing exercises more readily engaged in intervention, as discussed in the following response:

Knowing that this, doing this is going to equal this, there that also then adds to that motivation and that drive, to go, I understand the why behind this. Therefore, I am going to 100, 110% throw myself into it. (FG4P1)

In contrast, patients with negative perceptions of swallowing exercises could deprioritise swallowing intervention. Some patients did not think that swallowing exercises would help, while others considered swallowing exercises “foreign” or “funny”. This is exemplified in the quote:

Swallowing exercises don’t feel very familiar or very concrete and so, you know, when the physio comes along to do some exercises, they’re like, “oh, I’m familiar with what a physio does. Yep, I’m good with exercising my body.” But when you come along and you ask someone to do chin tucks, that just feels so foreign that, that can also mean they deprioritise it in their daily schedule. (FG1P2)

One participant also considered that the limited variety of swallowing exercises was boring for patients: “you’re just giving the same exercises again and again ...

there’s not that much variety out there, so therefore it’s sometimes difficult to keep the motivation going with patients” (FG2P5). Overall, participants reported that patients’ goals and perception of swallowing exercises influenced their “buy-in” to swallowing intervention and thus were important factors to consider.

Swallowing exercise dosage depends on patient capacity

Participants reported that the dosage of swallowing exercise depended on patients’ capacity, as influenced by various internal and external factors. Internal, or patient-specific, factors included medical presentation, co-morbidities, cognition, mood, physical difficulties, and fatigue. An example of the impact of fatigue on patient capacity is seen in the quote: “some patients are willing to do a full set... whereas some are, just no, I’m too tired. I’ve been dragged out the bed to do this and that and that, and now I can only do what I can do” (FG2P5).

External, or environmental, factors included time availability, length of stay, need for interpreters, and support from other people. Support from family and friends could motivate patients, increase adherence to recommendations, and provide one-on-one assistance to complete swallowing exercises and increase exercise dosage. This is reflected in the following quote: “the support of the family I find is quite important, especially if the patient is quite unable to initiate or being independent in doing those exercises. So, I think having a support person present would change my intensity” (FG5P2).

Participants reported that it was important to match the dosage of swallowing exercise to the patients’ capacity levels. One participant recognised the factors that could impact on capacity levels and the need to adapt dosage to their patient:

They’re trying to juggle in their swallow or their communication, or their physio, or their OT [occupational therapist], dealing with that diagnosis of a new stroke... there’s so many things that it’s kind of me going, okay, this is what I would like to do. How much can you manage? (FG3P3)

As such, the ultimate measure for prescribing swallowing exercise dosage was the patient’s capacity level. Participants essentially prescribed the highest dosage that patients could achieve, as seen in the quote: “it’s trying to just aim for the highest intensity as well that the patients can tolerate” (FG2P1). In summary, patient capacity to complete swallowing exercises varied due to internal and external factors and was an important aspect of personalised dosage prescription.

“You’ve got what you should do, and then what you can do”: Gap between recommendations and practical application

Participants described a gap between research-based recommendations for swallowing intervention and

real-world challenges to following recommendations in practice. Participants reported frustration at this disconnect and attempted to circumvent it through various methods. This theme included three sub-themes: (1) instrumental assessment is necessary but difficult to access, (2) dosage prescription depends on availability of resources, and (3) speech-language pathologist efforts to bridge the gap.

Instrumental assessment is necessary but difficult to access

Participants considered instrumental assessment is necessary for diagnosing swallowing impairment and guiding rehabilitation. Instrumental assessment increased clinician confidence in two ways; firstly, confirming that they were providing the right type of exercise to address the swallowing impairment and, secondly, that they were not causing any harm. Instrumental assessment was also one of the few objective ways to monitor swallowing and determine when to alter dosage. One participant pointed out the importance of instrumental assessment in guiding the prescription of swallowing exercises:

I honestly wouldn't start swallow rehab without doing a fluoro [VFSS] and seeing what was wrong... I do not have x-ray vision. And as much as you could put together a puzzle from their neuroanatomy and their deficits, there's just no way I'm going to get it right. (FG3P1)

However, despite its perceived importance, participants reported limited access to instrumental swallowing assessment. Access limitations include lack of on-site instrumental assessment facilities, long travel times to other sites for assessment, and radiology staff blocking procedures. Access to instrumental assessment varied across settings. Participants working in community, disability, and rural settings reported more difficulty accessing instrumental assessment. However, even when instrumental assessments were available, participants reported reduced time for intervention due to assessment wait times, as in the following quote:

They might actually be in inpatient rehab for 10 days before we have a fluoro. Before we can even figure out what exercise to give them, and by then they're already 10 days into, you know, potentially only a 30 day rehab admission. (FG4P2)

Participants recognised the gap between the need for instrumental assessment and the inability to access it. One participant's description of this gap was: "it's knowing that from a gold standard and an evidence perspective that I absolutely need to do a fluoro. But on a practical, on the ground sense, what I'm being told, nup. And it's above my head" (FG3P3). In brief, instrumental assessments could objectively guide swallowing rehabilitation and thus increase clinician confidence. As a result, difficulty

accessing instrumental assessment was a significant barrier to prescribing swallowing exercise dosages.

Dosage prescription depends on availability of resources

Participants reported that more resources and staffing were necessary to increase dosages of swallowing exercises. Participants reported learning about therapy devices with specific dosage prescriptions that were easy for patients and family members to use. However, swallowing therapy devices and equipment were expensive, often had to be paid out of pocket, and were not accessible to patients or clinicians at many sites. Accordingly, participants reported that dosage prescription, in practicality, depended on what equipment they had access to. This again, highlighted the gap between research and what was available in practice, as seen in the participant quote:

I get frustrated at the disconnect between what I read in the literature and what my students tell me about, we're going to do some EMST with this patient. And I say, love to, erm, I don't have a spare \$80, \$90 for that device. And I'm not sure that we're going to get one for them in the next week or two weeks... that gap between being able to bring that to an average patient in an average hospital I think is still a challenge for us. (FG2P4)

Furthermore, participants reported that a sufficient dosage of swallowing exercises required more staff. Participants reported having difficulty managing busy mixed workloads because of limited staffing, working in sole clinician or part-time roles, and needing to cover staff absences. Swallowing was not the only aspect of speech-language pathology client need, with clinicians needing to prioritise other areas as well, such as communication. These factors reduced participants' ability to provide sufficient frequency of sessions and exercise dosages. One participant reported uncertainty about being able to follow through with adequate dosages of swallowing exercises due to staffing challenges:

Am I really going to get to do as much therapy as I hope? ... The rehab facility I work at part-time, we're the least funded for—in terms of Allied Health. We're not full-time, and then as soon as you have sick leave or annual leave or—any of those things, I guess, will I actually follow through? (FG1P3)

Participants considered allied health assistants and students as a potential way to increase the dosage of swallowing exercises. Although allied health assistants were able to increase the dosage of swallowing exercises, not all sites had employed assistants. Speech-language pathology students were considered either a helper or a hindrance to increasing increasing swallowing exercise dosages. While competent students later in their degrees could increase the frequency of sessions, novice students requiring more supervision could reduce direct patient time. Overall, equipment,

staffing, and students impacted on the implementation of swallowing exercise dosages. Participants reported that more resources and staffing were needed to increase the dosage of swallowing exercises in practice.

Speech-language pathologist efforts to bridge the gap

Participants reported aiming to provide the best possible care despite barriers in clinical settings. One participant described an “intrinsic personality trait within our profession ... to do well and help patients and care for patients” (FG2P5). Participants reported various approaches they took to bridge the gap between recommendations and practical application.

Given the limited access to instrumental assessment, participants reported relying on skills in non-instrumental assessments, such as bedside reviews, or seeking out alternative instrumental assessment options, such as mobile FEES services. As a result of limited access to resources, participants described alternative ways of accessing equipment for their patients, such as repurposing physiotherapy or occupational therapy equipment for swallowing exercises. One participant reported “stealing” resistance bands from the physiotherapy gym to give to patients. Another participant explained using trial and error to access affordable equipment for CTAR exercises:

We find that the balls, the Saebo balls, which cost about \$12 each, they're really great for CTAR... our access to finding the right equipment to do CTAR, and the affordability of it, we can just sneak that past our boss without having to charge the patient. (FG3P5)

Further, due to limited staffing, participants reported strategies to increase swallowing exercise dosage outside of sessions, including setting regular times for independent practice, providing visual tick sheets, training carers, or using apps. Group therapy sessions were also a resource-efficient way to increase swallowing exercise dosages. One participant described trialling a swallowing therapy group in their workplace:

Having quite a big caseload, trying to get any sort of frequency of swallow therapy in was really hard for me. And then when I worked out I had many patients doing the same sort of swallow rehab. So, we started a group. And it's really fun... I'm finding it a really useful way to do swallow rehab for inpatients. (FG3P1)

In summary, participants reported using various strategies to implement recommendations despite limited resources and staffing, in order to provide the best possible care to patients.

“Not much guidance out there about dosage”: More research needed to guide dosage

All focus groups reported that limited research was one of the main barriers to prescribing swallowing

exercise dosages. This theme had two subthemes: (1) limited research leads to uncertainty and (2) learning from other disciplines.

Limited research leads to uncertainty

Participants reported that research guiding prescription of swallowing exercise dosages was lacking. Participants expressed wanting to do “the right thing” and “what we're told” (FG3P5) by following research, but found it difficult to find research to guide their practice. Research on swallowing exercise dosages was “disparate” and “not as readily accessible” (FG5P2). Swallowing research conducted with different patients, settings, and dosages made it challenging to extrapolate key information. Participants also reported insufficient high-quality randomised controlled trials in swallowing. Further, participants stated that research did not account for multiple competing factors in real-life settings and that research populations did not match clinical populations. The lack of research-based guidelines on swallowing exercise dosages is exemplified in the response: “not having clear guidelines and knowing exactly what is optimum. I mean I think, if we knew exactly what was the perfect amount, we'd all be doing it, but no one really knows what's perfect” (FG2P1).

Limited relevant research led to uncertainty and reduced confidence on dosages of swallowing exercises. Participants across all settings and years of experience expressed uncertainty when prescribing swallowing exercise dosages. Participants described their approach to prescribing swallowing exercise dosages as “an educated guess” (FG1P2), “winging it” (FG1P4), and “trial and see” (FG5P3). Limited research and clinician uncertainty was further seen in how one participant used the focus group to ask for advice from other participants on dosages of swallowing exercises.

Given limited research on dosages of swallowing exercises, participants conveyed multiple research needs. Participants requested summarised guidelines or position papers for swallowing exercise dosages, as encapsulated in the quote: “just give me a guideline, please” (FG1P4). Participants also reported that a better understanding of swallowing physiology and impairment was needed to guide swallowing exercises, as seen in the following quote:

I'd like the research to be able to guide us to what's actually happening physiologically to the swallow when you do each exercise... then we can get some understanding of what's happening, and then we can work out the frequency. (FG2P5)

Participants also stated the need for conducting research on the different dosage components of swallowing exercises. Participants requested guidance on the “magic number” (FG3P5) or “rep[etition] ranges” (FG3P3) for different types of swallowing

exercises. Research was also needed on how and when to increase repetitions, how to progress swallowing exercise difficulty, how to select the correct exercise type, and the optimal time frame or length for swallowing rehabilitation. Overall, lack of research and evidence-based guidelines reduced clinician confidence in prescribing swallowing exercise dosages. Participants requested more practical research and guidelines to support evidence-based dosage prescription.

Learning from other disciplines

Participants considered research on swallowing exercise dosages lacking compared to other areas of practice. Participants contrasted swallowing exercise dosages with specific dosage recommendations for limb exercises in physiotherapy, and with structured intervention programs in paediatric speech and stuttering. These perceived “clear cut” guidelines, based on high-quality bodies of evidence, increased confidence when delivering intervention and selecting dosage. In contrast, the lack of similar guidelines for swallowing exercise dosages reduced clinician confidence. The perceived difference in evidence for dosage across areas is reported in the following quote:

Working as a paediatric therapist I always felt more confident in delivering because the evidence is there. We know like I’ll be doing ReST therapy [Rapid Syllable Transition Treatment for Childhood Apraxia of Speech], for example, you know, like, frequency, and delivering that in, it’s an hour and you do it in that block. But I think in the adult speechie world... it’s an area that is just lacking in the research evidence. (FG4P1)

Participants expressed that exercise recommendations on repetitions, frequency, and duration, as in other areas of practice, should similarly exist for swallowing exercises. Even though some participants suggested that no “optimum” amount for swallowing exercise dosages existed due to variation between patients and exercises, most participants requested specific numbers or dosage ranges to guide swallowing dosage prescription. They reported a need for randomised controlled trials comparing different dosages of swallowing exercises “like they’ve done in other fields” (FG4P3) to develop comparable dosage guidelines.

Given the limited evidence guiding swallowing exercise dosages, participants discussed learning from other disciplines. This learning included using exercise principles from other disciplines or applying recommended dosages for other exercise types to swallowing exercises. One participant applied the exercise principle of progressive overload to swallowing exercises, as described in the example: “I want you to do ten swallows at a six out of ten effort. And then we’re going to mix it up... stick your tongue out further, or squeeze harder, or do this. For that ten out

of ten” (FG3P3). Participants reported that research was needed exploring the impact of these exercise principles on swallowing exercises and outcomes. In summary, comparison with other disciplines raised questions on why similar dosage recommendations did not exist in swallowing and provided potential principles for swallowing exercise dosages.

Discussion

This study explored the perspectives and practices of speech-language pathologists on dosages of swallowing exercises in stroke rehabilitation. To our knowledge, this is the first study to qualitatively explore the role of dosage in swallowing, clinical decision-making around dosage prescription, and barriers and facilitators to dosage implementation from the perspective of speech-language pathologists. Consistent with other areas of practice, speech-language pathologists considered that dosage was important, but needed to be personalised to patients. Barriers to prescribing swallowing exercise dosages included limited access to resources and research-based guidelines. However, one of the greatest facilitators to dosage implementation was speech-language pathologists themselves, and their efforts to mitigate barriers and learn from other disciplines.

Speech-language pathologists’ views on the role of dosage in swallowing exercise reflect widely accepted views on dosage in stroke rehabilitation. The importance and benefits of dosage in optimising outcomes in swallowing rehabilitation are similarly espoused by experts in the field (Burkhead et al., 2007; Krekeler et al., 2018). In particular, the need for higher dosages, as reported by speech-language pathologists, is in line with the principles of motor learning in stroke rehabilitation (Kleim & Jones, 2008). However, speech-language pathologists described both the theoretical importance of dosage in swallowing and the practical challenges around dosage in clinical practice, consistent with research on stroke rehabilitation. In a qualitative study, positive effects of high intervention dosages and negative system-level issues hindering dosages in practice were reported by stroke rehabilitation clinicians (Connell et al., 2018). Overall, like wider stroke rehabilitation, a clinical perspective revealed both the importance and the challenges of providing high dosages of swallowing exercises in clinical practice.

That speech-language pathologists consider personalising swallowing exercise dosage to be important is also a central concept in stroke rehabilitation (Last et al., 2022). Despite the tendency to classify dysphagia as a physical impairment, holistic dysphagia management should consider all aspects of the individual (Threats, 2007). Patient-specific factors influencing dosage in this study also influence patient adherence and clinical decision-making in other studies (Jones et al., 2018; Krekeler et al., 2018). Further, the contrast between clinician and patient priorities and

negative patient perceptions of swallowing exercises in our study highlight the importance of education and patient-centred goal setting (Ghaddar et al., 2022). Overall, our findings demonstrate how swallowing exercise dosage, much like any intervention, revolves around the patient.

This study also demonstrated the gap between clinical recommendations and practical application, similar to wider research-practice gaps (McCluskey et al., 2013). Instrumental assessment and swallowing therapy devices are beneficial as seen in research (Brooks et al., 2019; Costa, 2010; Moon et al., 2018), but limited access to resources prevents translation of research to practice and limits clinical benefits. Difficulty accessing instrumental assessment and limited staffing are widespread issues described in other speech-language pathology studies (Birchall et al., 2022; Rumbach et al., 2018). Inadequate staffing and access to resources are also reported in stroke rehabilitation (Connell et al., 2018). The current study, along with these studies, advocates for better access to resources, improved staffing models, and increased training in non-instrumental or alternative assessments, to help bridge the research-practice gap in swallowing.

The pattern of clinicians trying their best to overcome barriers in clinical settings is seen in other areas of practice (Ohtaras et al., 2022). In a phenomenological study exploring communication services for school-aged children (Ohtaras et al., 2022), speech-language pathologists reported “doing the best we could” despite service delivery challenges. In medicine, the intrinsic motivation of clinicians is thought to optimise healthcare service delivery (Nantha, 2013). Research suggests that intrinsic motivation could improve clinical outcomes, job satisfaction, and clinician confidence (Nantha, 2013). Our findings, similar to those of other studies, highlight clinician motivation as a key facilitator for optimising rehabilitation, including swallowing. Further, strategies reported by speech-language pathologists to mitigate practical limitations illustrate the role of clinician motivation in optimising swallowing exercises and provide suggestions for other clinicians.

As seen in the existing evidence base, more research is needed to guide swallowing exercise dosages. Dosages of swallowing exercises across studies are inconsistent, resulting in no optimum recommendations (Choy et al., 2023). While clinical guidelines exist for stroke and dysphagia rehabilitation (e.g. Dziewas et al., 2021; Wright et al., 2012), and dosage recommendations for structured programs (e.g. Sackley et al., 2018), guidelines do not exist for dosages of swallowing exercises. This study demonstrates the impact of this evidence gap on the clinical practice of speech-language pathologists and the need for more research (Olswang & Prelock, 2015). However, as raised by some participants, optimum swallowing exercise dosages may not exist. Instead, learning from

other disciplines and applying exercise principles to swallowing exercises may guide dosage prescription, as seen in some intervention studies (Malandraki et al., 2016; McCullough & Kim, 2013). In everyday practice, speech-language pathologists could apply principles to clinical practice, collect data, and evaluate outcomes to contribute to the evidence base (Choy et al., 2023; Lof, 2011).

Limitation

As a qualitative study involving 20 speech-language pathologists, the findings should be interpreted with caution. The lead researcher, a novice qualitative researcher, was supported by supervising researchers with extensive experience to ensure rigour. While a collegial relationship existed with three of the participants, this did not involve any power relationships that might have impacted the discussion. While thematic analysis was used (Braun & Clarke, 2006), underlying assumptions and minimal qualitative experience influenced the study’s coding reliability approach (Braun & Clarke, 2022). The lead author worked on developing reflexivity by keeping a journal throughout the study and by working with a diverse research team.

Directions for future research

This study emphasises the crucial need for research on dosage of swallowing exercises. Research is essential to investigate the effects of modifying different components of dosage (e.g. different session frequencies, number of exercise repetitions, length of intervention). In particular, high-quality, large-scale, randomised controlled trials are required to draw robust conclusions on the effect of dosage on outcomes in swallowing interventions. More studies are needed to pool data and develop guidelines on dosages of swallowing exercises, such as optimal dosage ranges for different exercises and populations, and/or principles to guide dosage prescription. Further qualitative research could explore dosage of swallowing exercises from the perspective of speech-language pathologists from different countries, and from other stakeholders such as patients, family members, and multidisciplinary staff. Finally, implementation research could consider how to address the barriers and facilitators identified in this study to improve dosages of swallowing exercises in clinical contexts.

Conclusion

Dosage of swallowing exercises remains a grey area. Speech-language pathologists agreed that dosage is important in swallowing, but multiple barriers to dosage prescription and implementation exist, including variable patient factors, limited access to resources, and a lack of research guidelines. These barriers highlight the need for change within workplaces and across the discipline to improve dosages of swallowing

exercises. Changes include adequate staffing for case-loads, more equitable access to instrumental assessment and therapy resources, and further research on swallowing exercise dosages. Despite barriers, speech-language pathologists' efforts to do their best, such as personalising intervention to patients and learning from other disciplines, can facilitate improved prescription and implementation of swallowing exercise dosages.

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

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Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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