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Administering the Lidcombe Program to children who stutter with concomitant disorders: Insights from an exploratory retrospective chart review study

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ABSTRACT

Purpose: Children who stutter (CWS) in clinical settings may present with concomitant disorders (CDs), which can complexify the delivery of the Lidcombe Program (LP). However, there is limited evidence on how CDs influence treatment outcomes in CWS, leaving clinicians with little guidance regarding best practices with these children. This exploratory study, conducted in partnership with a rehabilitation center's clinical team, aims to understand which CDs and suspected CDs speech-language pathologists document when treating CWS with the LP and their relationship to treatment characteristics and outcomes.

Method: A retrospective chart review was conducted on 47 children diagnosed with developmental stuttering who received the LP between 2016 and 2018.

Results: 38 CWS (80.9 %) had either at least one confirmed (59.6 %) or suspected (21.3 %) CD, of which 61.7 % were language-related and 27.6 % attention-related. CWS with diagnosed and suspected CDs had significantly higher stuttering severity rating (SR) scores post-treatment as compared to CWS without CDs ($p = .001$), although all groups significantly reduced their stuttering. There were high drop-out rates in all groups. CWS with diagnosed and suspected CDs who dropped out had significantly higher SR scores than CWS without CDs who progressed to Stage 2 ($p = .011$ and $p = .014$, respectively).

Conclusion: The LP is effective in improving fluency in both CWS with and without CDs. However, CWS with diagnosed or suspected CDs finished or dropped out of Stage 1 with significantly higher SR scores than CWS without CDs. Future research is needed to confirm these results and investigate the factors underlying the observed differences.

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1. Introduction

Stuttering, which has been historically defined as a disorder of speech in the field of speech-language pathology, is present in more than 5 % of children during their childhood (Reilly et al., 2009; Yairi & Ambrose, 2013). Speech-language pathologists (SLPs) working with children who stutter (CWS) and their families have treatment goals that may focus on improving fluency or reducing negative attitudes towards stuttering and communication (Sjøstrand et al., 2024; Van Eerdenbrugh et al., 2023). When SLPs address stuttering in CWS, multiple factors can confound the child's clinical profile. One of these factors could be concomitant disorders (CDs). For instance, CWS with CDs are often considered complex cases and could emerge as a concern for SLPs (Unicomb et al., 2013). SLPs have identified CDs as a significant challenge in the implementation of treatment (Van Eerdenbrugh et al., 2018), and they reported a lower sense of self-efficacy when administering treatment to a CWS with CDs (Erickson et al., 2023). This paper explores the impact of CDs on stuttering treatment.

1.1. Concomitant disorders and stuttering

The World Health Organization (WHO) defined comorbidity (or concomitance) as “the presence of one or more additional diseases or disorders occurring concomitantly with a primary disease or disorder” (Cohen, 2017). Population-based studies have highlighted a high occurrence of CDs in CWS. Briley and Ellis (2018) reported that CWS had a 5.5 times higher risk of presenting a CD than their non-stuttering peers, with nearly 52 % presenting with at least one CD. The most frequently reported CDs were learning disabilities (32.9 %), attention-deficit/hyperactivity disorder (25.6 %) and other developmental delay (23.9 %). Choo et al. (2020) found that 60.3 % of CWS had at least one CD, with attention-deficit/hyperactivity disorders (26.5 %), asthma (46.3 %) and autism (10.4 %) being the most prevalent. Merlo and Briley (2019) reported that CWS were at greater odds of presenting sleep problems, including insomnia (18.9 %), excessive sleepiness (9.1 %) and fatigue lasting more than three days (16.2 %). In a prospective longitudinal cohort study, Unicomb et al. (2020) found that 6.9 % of 160 CWS also had a speech sound disorder. Also in a longitudinal study, Arenas et al. (2017) found that 17.01 % of their sample of children who are hard of hearing also stuttered at one point in time. Other notable identified prevalent CDs in CWS in population-based studies were eczema (Strom & Silverberg, 2016b), hay fever, and respiratory, food and skin allergies (Briley & Merlo, 2020; Strom & Silverberg, 2016a).

Clinical-based studies have also underscored a high prevalence of CDs in CWS. Blood et al. (2003) surveyed SLPs who reported on a total of 2628 CWS and found that 62.8 % of CWS had at least one CD, with speech/articulation disorder being the most common (33.5 %) while attention-deficit/hyperactivity disorders were rarer (5.9 %). In their study, Arndt and Healey (2001) also surveyed SLPs who reported that 44 % out of 467 CWS had a verified concomitant speech and/or language disorder. More recently, in a retrospective study conducted in a student-led clinic, Unicomb et al. (2024) found that 45.9 % of their sample had at least one CD, with language and speech-sound disorders being the most prevalent. In an observational study interested in the relationship between mouth breathing and speech disorders, Alhazmi (2022) found that 19.2 % of children with mouth breathing also were CWS. The findings above regarding CDs were substantiated by Pruett et al. (2021), who conducted an analysis of approximately 2.8 million patient records to explore the CDs associated with stuttering. In summary, despite variations across studies, it is evident that CWS with CDs represent a substantial proportion of the CWS population.

1.2. Concomitant disorders and the Lidcombe Program for early stuttering

When the treatment aim is to improve fluency, the Lidcombe Program (LP) is a frequently used treatment worldwide. This behavioural treatment consists of two phases, one focused on achieving fluency using verbal contingencies from the parent (Stage 1) and the other on its long-term maintenance (Stage 2) (Onslow et al., 2017). As pointed out by others (Brignell et al., 2021; Hofslundengen et al., 2022; Laiho et al., 2022), several randomized controlled trials (RCTs) have explored the effectiveness of the LP in different rehabilitation settings (Arnott et al., 2014; Bridgman et al., 2016; de Sonnevile-Koedoot et al., 2015; Jones et al., 2005; Koushik et al., 2019; Lattermann et al., 2008; Lewis et al., 2008; Trajkovski et al., 2019).

According to the hierarchy of scientific evidence endorsed by the American Speech and Hearing Association (ASHA), RCTs represent the highest level of evidence (ASHA, 2004), and the LP has the strongest empirical support in this regard (Nye et al., 2013). However, although RCTs are generally regarded as providing robust scientific evidence, they have certain limitations. For instance, the clinical validity of RCTs may be limited due to their experimental nature, with controlled settings and homogenous participant groups leading to the a priori exclusion of potential confounding variables (Negrini et al., 2019), resulting in an inability to fully capture the complexity of real-world clinical scenarios (Arienti et al., 2021). Moreover, methodological flaws concerning shortcomings in reporting the patient selection procedure (e.g., reasons for exclusion criteria or participant drop-outs) and the presence or absence of CDs are hindering the generalizability of study results as these factors may directly affect treatment outcomes (Malmivaara, 2019). In the field of rehabilitation, documenting and including CDs is of special interest because the multimorbidity may affect clinical decisions and patients' response to treatment (Meyer et al., 2020).

Looking at the body of evidence pertaining to the effectiveness of the LP, current studies usually exclude CWS with CDs without offering a clear rationale. As highlighted in a paper examining the clinical caseload of preschool-aged CWS from a private clinic, the presence of CDs was the main source of exclusions from studies on the effectiveness of stuttering treatments, such as the Lidcombe Program (Bridgman et al., 2019). In addition, there is a variability in the specific excluded CDs among previously identified RCTs. For example, Arnott et al. (2014) excluded children with “attention-deficit/hyperactivity disorder, intellectual disability, developmental delay, or autism spectrum disorder” (p.4), whereas Bridgman et al. (2016) excluded “children with attention-deficit/hyperactivity

disorder or intellectual disability" (p.3), and de Sonnevle-Koedoot et al. (2015) excluded children with a "diagnosis of an emotional, behavioral, learning, or neurological disorder" (p.3), while Koushik et al. (2019) excluded children based on "parent reports of an attention deficit hyperactivity disorder or intellectual disability" and "severe speech or language disorder" (p.2). Some studies are less specific, such as Lattermann et al. (2008), which included only children with "no history of neurological disorder" (p.3), and Lewis et al. (2008) only included children with a "history of normal development apart from stuttering" (p.4). Other studies present limited information regarding the inclusion or exclusion criteria of CWS with CDs. For instance, Jones et al. (2005) did not report the presence or absence of CDs in their study sample. Although mentioning the inclusion of children with concomitant speech, language, or developmental disorders in their study, Trajkovski et al. (2019) did not conduct a stratified data analysis according to CDs status, thus limiting the interpretation of their potential impact on treatment effectiveness. Rationales for the exclusion of CWS with CDs were rarely provided with some exceptions, such as Koushik et al. (2019), which stated that children with a severe speech or language disorder would gain more benefits from receiving treatment addressing their language difficulties before receiving treatment for their stuttering.

To date, there is a paucity of studies examining the interaction between CDs and the efficacy and effectiveness of the LP. Nevertheless, a few studies provide initial insights into this area. A clinical case series study involving five CWS with a concomitant speech-sound disorder (SSD) concluded that concurrent treatment for both disorders, including the LP program and a direct approach for the SSD, was both efficacious and safe (Unicomb et al., 2017). A follow-up study, conducted approximately 40 months after the completion of Stage 1 of the Lidcombe Program, included four of the original children. The study concluded that children with concurrent stuttering and SSD who were treated simultaneously might be more likely to experience long-term relapses in both disorders (Unicomb et al., 2022). Moreover, when considered together, stuttering severity, mean length of utterance, and receptive language could predict 35–45 % of the variance in the time taken to complete Stage 1 of the LP (Rousseau et al., 2007). In Druker et al. (2019), CWS displaying elevated ADHD symptoms required 25 % additional clinical intervention time to attain successful fluency outcomes.

1.3. Rationale and purpose of the current study

This study was conducted as part of a research program in partnership with the clinical team at a rehabilitation centre. It is supported by a clinical research funding program motivated by questions from clinical teams. In the case of this study, the original question from the clinicians was to understand whether CDs in CWS impact the efficiency or effectiveness of the LP. The centre primarily uses the LP approach with children under the age of 8. However, clinicians felt that a significant proportion of their patients had CDs and that these children responded less well to the LP, which made them feel challenged by this population. This echoes studies suggesting that SLPs identify CDs in CWS as being challenging (Unicomb et al., 2013); Van Eerdenbrugh et al. (2018) and as having an impact on their clinical decision making (Bridgman & Erickson, 2023). The current evidence base offers limited guidance since most of the evidence regarding the LP focuses on populations of CWS without CDs or only considers a limited set of CDs. However, prevalence studies show that in clinical practice, CWS with CDs are likely to constitute a substantial proportion of SLPs' caseloads (Unicomb et al., 2024) and that the types of CDs encountered are diverse (Pruett et al., 2021). A comprehensive understanding of the impact of CDs on treatment outcomes for CWS undergoing the LP is crucial to address this gap in knowledge and enhance patient-centered care as well as to inform clinical decision making. To inform high-quality prospective studies with results that are meaningful for clinical practice, it is important to better identify and target the most significant associated disorders regarding speech treatments. Since there can be multiple obstacles in getting timely formal clinical diagnoses for a range of the disorders often found to be associated with stuttering, the clinical reality for clinicians is that they make clinical decisions based not only on formally confirmed disorders, but also on disorders they suspect. Therefore, the goal of this exploratory study is to better understand which CDs and suspected CDs SLPs in a rehabilitation centre document when treating CWS with the LP, and the relationship between those documented CDs and treatment characteristics and outcomes of the LP. Specifically, the research questions were:

1. What are the types and proportion of CDs and suspected CDs documented by the SLPs in their files on CWS who received the LP in a Canadian rehabilitation centre?
2. What is the relation between CDs and suspected CDs documented in the SLPs files, treatment characteristics and treatment outcomes during the treatment phase of the LP (Stage 1) in CWS who received the LP in a Canadian rehabilitation centre?

Although this study is exploratory in nature, based on previous research and clinical experience, it was predicted that (a) SLPs will document CDs and suspected CDs related to their field (i.e. language disorder, speech sound disorder) and (b) that there will be a high percentage (>50 %) of CWS with at least one CD or suspected CD in the studied caseload (research question 1). It was also expected that treatment in CWS with CDs or suspected CDs will be less efficient or effective regarding at least one of the studied characteristics and outcome variables (i.e., longer treatment duration, more sessions, increased frequency of sessions, or higher stuttering severity scores pre or post treatment) (research question 2).

2. Methods

2.1. Study design and setting

This is a retrospective study (Hess, 2004) of clinical patients' charts at a rehabilitation centre in the city of Montréal (province of Québec, Canada) that specializes in hearing and communication disorders (Raymond-Dewar Rehabilitation Centre, Integrated

University Health and Social Service Centres of Centre-Sud-de-l'Île-de-Montréal). The study is exploratory in nature. It has received ethics approval of the Centre for Interdisciplinary Research in Rehabilitation of Greater Montreal (CRIR #1425–0619).

2.2. Clinicians/participants

Participants were children who consulted for developmental stuttering between 2016 and 2018. The patients' charts were part of the caseload of four experienced SLPs (mean years of experience > 10 years) affiliated with Raymond-Dewar Rehabilitation Centre. All SLPs possessed graduate degrees in speech and language pathology and were licensed by the professional regulatory body in the province of Québec, Canada, which is the "Ordre des Orthophonistes et Audiologistes du Québec". Moreover, all SLPs had been trained by the Lidcombe Program Trainers Consortium.

2.3. Inclusion and exclusion criteria

Charts were included according to the following criteria: (1) aged between 4 and 7 at the time of treatment, (2) diagnosis of developmental stuttering, (3) underwent the LP, and (4) received treatment during the period January 1, 2016, to December 31, 2018. The diagnosis of developmental stuttering was made by a SLP at initial assessment, based on case history, parental reports of stuttering, and observed stuttering severity at the time of assessment. The timeframe was selected for two reasons. Firstly, charts from before 2016 were difficult to access due to a system change at the rehabilitation centre at the end of 2015. Second, a three-year frame aligned with the limited resources of our exploratory research project. The age range of the included charts was defined based on the clinical team's practice of predominantly offering the LP to children aged 4–7. The exclusion criteria were: (1) being aged 8 years or older at the time of treatment, (2) did not undergo the LP as a treatment approach, and (3) initiating treatment after 2018.

2.4. Procedures and data collection

Data collection occurred in multiple phases. Initially, meetings were held with the SLPs at the rehabilitation centre to discuss the variables of interest. These discussions aimed to align the clinical questions and study objectives with the data available in the clinical files. Following this, data from four patient charts were extracted to operationalize the variables and determine which data could be feasibly gathered. Subsequently, the targeted variables were re-evaluated to proceed with the complete data extraction. This process involved three individuals (SF, MF, LL), who worked with the centre's SLPs to assist with the interpretation of notes in the patient charts. Data extraction began in February 2020 but was interrupted due to COVID-19 restrictions, resuming in June 2021 and concluding in October 2021. To identify charts meeting the inclusion criteria, an initial search was conducted by the archives service of the rehabilitation centre, resulting in 162 charts. After review, some cases were excluded due to duplicates ($n = 4$), age outside of the inclusion criteria ($n = 41$), no treatment ($n = 57$), no LP administration ($n = 8$), transfer to another unit mid-treatment ($n = 1$), or missing information on the presence or absence of CDs ($n = 4$). Ultimately, 47 charts met the inclusion criteria and were included in the analyses. The development of the data extraction sheet was carried out in collaboration with the clinical team. Data on concomitant disorders, sociodemographic and stuttering-specific characteristics from anamnesis, and treatment data from treatment plans and written reports from treatment sessions were extracted from both paper and electronic charts.

2.5. Definition of variables of interest

2.5.1. Sociodemographic characteristics

Continuous variables obtained from the children's medical charts included age in years. Nominal variables included the child's sex and native language, categorized as French versus other. Regarding the child's sex, the rehabilitation centre's form offers only 'boy/girl' options, providing no further details on whether this refers to biological sex or gender identity. However, based on the prevailing health policies in the province of Quebec at the time, it was assumed that this data reflects the sex assigned at birth (male versus female). Lastly, the number of spoken languages (interval variable) was retrieved from the initial case history charts.

2.5.2. Stuttering-specific characteristics

Data collection related to stuttering-specific characteristics was a standard part of the case history interview and initial assessment conducted by the clinician. Variables in this section include continuous variables, such as age at onset of stuttering in months, age at start of treatment in months and onset of stuttering to treatment interval in months (which was defined by the interval between a child's age at the onset of stuttering and the date of the first treatment session). Variables that were two-category nominal included the presence or absence of a history of stuttering, determined by whether a close blood-related family member (such as siblings, parents, or grandparents) was reported to have a stutter, and prior treatment for stuttering.

2.5.3. Concomitant disorders

The criteria to establish the existence of CDs in CWS lack a clear consensus in the literature. While some studies suggest that a CD is a diagnosed disorder by a professional (Blood et al., 2003), others suggest that suspicions of CDs emitted by professionals are enough to be a concomitant condition and that a formal diagnosis by a health care provider is not necessary (Arndt & Healey, 2001). In this study, both formally confirmed CDs and CDs suspected by the SLP assessing the child were of interest. CD status was defined as a three-category nominal variable, with one category representing children with no confirmed or suspected CDs (NCD), one category

representing children with at least one confirmed CD (CD), and the other category representing children with only a suspicion of at least one CD (SCD). In this study, for a CD to be considered diagnosed, the child must have been assessed by the appropriate professional, and the SLP must have had access to the assessment report. For a CD to be considered suspected, this information must either be documented in the speech-language assessment report for the child's stuttering and followed by a recommendation for further assessment or be mentioned by the SLPs in their clinical notes indicating that a referral was communicated to the parent (e.g., in instances where it was not included in the formal assessment report).

2.5.4. Treatment characteristics and outcomes

Variables for treatment characteristics and outcomes were continuous. The duration of the treatment was defined as the number of months during which the treatment was implemented. The number of treatment sessions refers to the total number of sessions during Stage 1 of the LP. The frequency of treatment was defined as the number of sessions per months relative to the duration of treatment. Stuttering severity prior to treatment was determined by clinician-reported scores on the 10-point Severity Rating (SR) score ranging from 0 to 9 used in the LP at initial assessment. As there was no standardized clinical protocol for documenting the results of the assessments, the specific metrics documented varied among clinicians and assessment. The sole consistent measure of fluency employed by all SLPs throughout assessments was the SR score integral to the LP. The SR score measures the extent to which stuttering interferes with the child's communication. SR score post-treatment was determined by clinicians' reported stuttering severity on the SR score at the last treatment session, whether the child proceeded to Stage 2 or was lost to follow-up. The overall reduction of stuttering severity was calculated by subtracting post-treatment SR scores from pretreatment scores.

2.5.5. Compliance

A three-category variable was established to assess treatment compliance. First, a child advanced to Stage 2 of the LP upon meeting the official LP criteria for Stage 1 completion. This required consistent attainment of at least four scores of 0 (representing "no stuttering") and three scores of 1 (indicating "extremely mild stuttering") on the SR scale over three consecutive weeks, as assessed by the parent in the child's daily life. Clinicians also had to observe a SR score of 0 or 1 during each of these three consecutive weekly visits in the clinical setting. Second, some participants failed to meet the discharge criteria for Stage 1 but based on clinicians' recommendations, still progressed to Stage 2 of the LP. Indeed, for some children, clinicians decided to allow entry to Stage 2 of the PL using less rigorous criteria than usual. Third, a subset of children was lost to follow-up before completion of Stage 1 of the LP for various reasons (e.g., the parent no longer believes in the need to attend treatment, family moving away). The specific reasons for each participant discontinuing Stage 1 or progressing to Stage 2 while not having met official criteria are not reported in this article, as they were not always clearly documented in the children's clinical charts.

2.5.6. Treatment type

Reviewing the charts, it was noticed that there were variations to the treatment provided to the children whose charts were retained for our study. While some children underwent the LP in its pure form, for others, the LP was paired with complementary approaches inspired by the *Palin PCI Approach* (Kelman & Nicholas, 2017), *Avoidance Reduction Treatment for Stuttering* (Sisskin, 2018) or *Fluency Rules Treatment Program* (Runyan & Runyan, 1986). The variable treatment type (two-category nominal) was created to account for this variation. As confirmed by the clinicians, complementary approaches were strictly employed to enhance the SLPs treatment based on the additional needs they identified in the child and their family, with the LP remaining the primary approach. Although the focus of this study was on the LP program, these charts were not excluded since the choice to complement the LP with another approach might reflect clinical decisions related to the presence or absence of CDs.

Table 1
Group differences for nominal variables of Sociodemographic and Stuttering-specific characteristics of CWS.

		Total (n = 47) n (%)	NCD (n = 9) n (%)	CD (n = 28) n (%)	SCD (n = 10) n (%)	p
Sex	Male	36 (76.6)	7 (77.8)	23 (82.1)	6 (60.0)	.363
	Female	11 (23.4)	2 (22.2)	5 (17.9)	4 (40.0)	
Native language	French	27 (57.4)	5 (55.6)	18 (64.3)	4 (40.0)	.757
	Other	14 (29.8)	4 (44.4)	8 (28.6)	2 (20.0)	
Spoken languages	One	16 (34.0)	3 (33.3)	9 (32.1)	4 (40.0)	.787
	Two	23 (48.9)	5 (55.6)	14 (50.0)	4 (40.0)	
	Three	5 (10.6)	1 (11.1)	4 (14.3)	0 (0)	
Family history of stuttering	Presence	26 (55.3)	5 (55.6)	14 (50.0)	7 (70.0)	.672
	Absence	19 (40.4)	4 (44.4)	12 (42.9)	3 (30.0)	
Prior treatment for stuttering	Yes	10 (21.3)	2 (22.2)	8 (28.6)	0 (0)	.166
	No	37 (78.7)	7 (77.8)	20 (71.4)	10 (100)	

Note: Data was missing for the variables Native language (n = 6), Spoken languages (n = 3), and Family history of stuttering (n = 2).

2.6. Statistical analysis

Statistical analyses were performed using SPSS software version 29. Descriptive analyses were conducted for all variables. Given the small sample size and unequal distribution, nonparametric analyses were employed. The Chi-square test was utilized to explore relationships between nominal variables, the Kruskal-Wallis test was employed to analyze differences between groups, and the Wilcoxon signed-rank test was used to analyze differences across time in paired groups. In our secondary analyses, the Kruskal-Wallis test was also employed to test for differences between groups, and post hoc Dunn's tests with Bonferroni correction for multiple testing were conducted to determine which groups differed significantly. The significance level for all analyses was set at 5 % ($p \leq 0.05$).

3. Results

3.1. Sociodemographic and stuttering specific characteristics of CWS

Between 2016 and 2018, a total of 47 charts of CWS from a Canadian rehabilitation centre met the eligibility requirements for inclusion in the study. Children's sociodemographic and stuttering-specific characteristics are presented in [Table 1](#) and [Table 2](#). Among participants, 36 (76.6 %) were male and 27 (57.4 %) reported French as their native language. A total of 16 children (34.0 %) were monolingual, 23 children (48.9 %) were bilingual, and five children (10.6 %) were trilingual. Among participants, 26 (51.0 %) reported a family history of stuttering and 10 (21.3 %) participants had received prior treatment for stuttering. The mean age at start of treatment was 73.1 months (SD: 10.5). The average age of stuttering onset was 43.2 months (SD: 11.8). The average time between the onset of stuttering and treatment was 30.3 months (SD: 11.3). No significant differences were observed between groups for all Sociodemographic and Stuttering-specific characteristics variables.

3.2. Profile of CDs documented by SLPs

Among the 47 children, nine individuals (19.1 %) had no CDs documented in their charts, while 38 individuals (80.9 %) had at least one documented CD, either confirmed by an official diagnosis or suspected by the SLP. Of these, 28 had at least one confirmed CD (59.6 %) and 10 individuals (21.3 %) had CDs were suspected but not confirmed at the time of assessment. Half of these children ($n = 19$) had more than one diagnosed or suspected CD, more specifically 11 children (23.4 %) had two CDs, seven children (14.9 %) had three CDs, and one participant (2.1 %) had four CDs. [Table 3](#) provides an overview of the different types of disorders present in the CD group and details regarding the presence of multiple CDs in CWS are provided in [Table 4](#).

3.3. Concomitant disorders in relationship to treatment characteristics and outcomes

Among the children, 38 individuals (80.9 %) received a pure version of the LP treatment. 22 children (46.8 %) ended Stage 1 because they met the discharge criteria to progress to Stage 2 while 25 children (53.2 %) ended Stage 1 before the discharge criteria were met. Out of these, four (8.5 %) progressed to Stage 2 based on clinician recommendations, while the remaining 21 (44.7 %) were lost to follow-up (see [Table 5](#) for details). Children with unmet discharge criteria but recommended to progress to Stage 2 and children receiving a modified version of the LP were only present in the CD and SCD groups.

Details for the continuous variables pertaining to treatment characteristics and outcomes are presented in [Table 6](#). The overall average duration of treatment was 7.3 months (SD: 5.3), ranging from 1 to 27 months. The mean number of treatment sessions was 15.4 (SD: 7.9), with a range of 4–43 sessions. The average treatment frequency was 2.7 sessions per month (SD: 1.3), ranging from 0.4 to 6 sessions per month. Children had an average pre-treatment SR score of 4.2 (SD: 1.8), post-treatment SR score of 1.9 (SD: 1.8), and the overall reduction in stuttering severity was 2.2 (SD: 1.6). All groups showed a significant reduction in stuttering severity pre- and post-treatment, as determined by a Wilcoxon signed-rank test. The NCD group had a mean pre- and post-treatment stuttering SR scores of 3.0 (SD: 1.0) and 0.7 (SD: 0.5) respectively ($p = .009$). The CD group had a mean pre- and post-treatment stuttering SR scores of 4.5 (SD: 1.9) and 2.2 (SD: 1.9) respectively ($p = .011$). Lastly, the SCD group had a mean pre- and post-treatment stuttering SR scores of 4.5 (SD: 1.8) and 2.4 (SD: 2.0) respectively ($p < .000$). Using the Kruskal Wallis test, a significant difference was found in post-treatment stuttering SR scores between the groups ($p = .036$). No significant differences were observed between groups for the other Treatment characteristics and outcomes variables.

Table 2

Continuous variables of Sociodemographic and Stuttering-specific characteristics of CWS.

	Total ($n = 47$) M (SD)	NCD ($n = 9$) M (SD)	CD ($n = 28$) M (SD)	SCD ($n = 10$) M(SD)	p
Age at start of treatment	73.1 (10.5)	71.4 (12.4)	73.1 (9.5)	74.5 (12.1)	.839
Age at onset of stuttering	43.2 (11.8)	41.0 (6.7)	44.3 (14.6)	42.6 (7.7)	.967
Onset of stuttering to treatment interval	30.3 (11.3)	30.4 (12.0)	29.5 (11.3)	31.9 (11.7)	.787

Note: Data was missing for the variables Age at onset of stuttering ($n = 4$), Onset of stuttering to treatment interval ($n = 4$)

Table 3
Details of the confirmed and suspected CDs.

Type of CDs	Confirmed	Suspected	Total
Language disorder	25 (53.2 %)	4 (8.5 %)	29 (61.7 %)
Attention-deficit/hyperactivity disorder	4 (8.5 %)	9 (19.1 %)	13 (27.6 %)
Learning disorders	2 (4.3 %)	4 (8.5 %)	6 (12.8 %)
Speech sound disorder	5 (10.6 %)	0 (0 %)	5 (10.6 %)
Lexical access disorder	2 (4.3 %)	2 (4.3 %)	4 (8.5 %)
Autistic spectrum disorder	3 (6.4 %)	1 (2.1 %)	4 (8.5 %)
Anxiety disorder	0 (0 %)	2 (4.3 %)	2 (4.3 %)
Other psychological disorders	1 (2.1 %)	2 (4.3 %)	3 (6.4 %)
Total	42 (63.6 %)	24 (36.4 %)	66 (100 %)

Table 4
Co-occurrence of diagnosed and suspected CDs.

Categories	LD	ADHD	LeD	SSD	LAD	ASD	AD
ADHD	9						
LeD	4	3					
SSD	4	1	1				
LAD	2	0	0	0			
ASD	4	0	0	2	0		
AD	2	0	1	0	1	0	
PSY	2	1	1	0	0	0	0

Note: LD, Language disorder; LAD, Lexical access disorder; SSD, Speech sound disorder; LeD, Learning disorders; ADHD, Attention-deficit/hyperactivity disorder; ASD, Autism spectrum disorder; AD, Anxiety disorder; PSY, Other psychological disorders.

Table 5
Nominal variables related to Treatment characteristics and outcomes.

		Total (n = 47)	NCD (n = 9)	CD (n = 28)	SCD (n = 10)	
		n (%)	n (%)	n (%)	n (%)	p
Type of treatment	Pure LP	38 (80.9)	9 (100)	23 (82.1)	6 (60.0)	.083
	Modified LP	9 (19.1)	0 (0)	5 (17.9)	4 (40.0)	
Compliance	Progression to Stage 2	Met	22 (46.8)	5 (55.6)	12 (42.9)	.054
		Unmet	4 (8.5)	0 (0)	4 (14.3)	
	Lost to follow up	Unmet	21 (44.7)	4 (44.4)	12 (42.9)	

Table 6
Continuous variables of Treatment characteristics and outcomes of CWS.

	Total (n = 47)	NCD (n = 9)	CD (n = 28)	SCD (n = 10)	
	M (SD)	M (SD)	M (SD)	M (SD)	p
Duration of treatment	7.3 (5.3)	5.9 (3.8)	7.1 (5.8)	9.0 (5.0)	.250
Number of sessions	15.4 (7.9)	13.7 (7.6)	14.8 (8.2)	18.9 (7.0)	.160
Frequency of sessions	2.7 (1.3)	2.9 (1.5)	2.8 (1.3)	2.6 (1.1)	.978
Stuttering SR score prior to treatment	4.2 (1.8)	3.0 (1.0)	4.5 (1.9)	4.5 (1.8)	.092
Stuttering SR score post-treatment	1.9 (1.8)	0.7 (0.5)	2.2 (1.9)	2.4 (2.0)	.036
Reduction of stuttering severity	2.2 (1.6)	2.3 (1.0)	2.2 (1.9)	2.1 (1.5)	.631

Note: Data was missing for the variable Stuttering severity prior to treatment (n = 2)

3.4. Secondary analysis

Given that an attrition rate of approximately 44.6 % resulted in nearly half of the children being lost to follow-up before advancing to Stage 2, secondary analyses were conducted to determine if there were differences in treatment characteristics and outcomes between these children and those who progressed to Stage 2. Thus, seven groups were created. Children progressing to Stage 2 were divided into four groups, namely, NCD children who met criteria, CD children who met criteria, CD children who did not meet criteria, and SCD children who met criteria. Children lost to follow-up were divided into NCD, CD and SCD groups. Detailed results on variables related to treatment characteristics and outcomes for these groups are presented in Table 7.

The Kruskal Wallis test showed a significant difference between groups for post-treatment severity ($p = .001$), and post hoc analyses revealed that the CD and SCD groups that were lost to follow-up had significantly higher stuttering severity at their last session than the NCD group that progressed to Stage 2 ($p = .011$ and $p = .014$, respectively). No significant differences were observed between groups for

Table 7
Secondary analysis of Treatment characteristics and outcomes for NCD, CD and SCD children according to their compliance.

Discharge criteria	Progress to Stage 2				Lost to follow up			p
	NCD		CD		NCD	CD	SCD	
	met (n =5)	met (n =12)	unmet (n =4)	met (n =5)	unmet (n =4)	unmet (n =12)	unmet (n =5)	
Duration of treatment	M (SD) 6.6 (4.4)	M (SD) 6.3 (5.0)	M (SD) 6.5 (2.9)	M(SD) 12.4 (3.4)	M (SD) 5 (3.2)	M (SD) 8.1 (7.2)	M (SD) 5.6 (3.8)	.190
Number of sessions	17.6 (8,2)	17.1 (10.0)	16.3 (4.2)	22.6 (4.2)	8.8 (2.2)	11.9 (6.5)	15.2 (7.6)	.057
Frequency of sessions	3.4 (1.6)	3.4 (1.4)	2.7 (0.7)	2.0 (0.7)	2.2 (1.2)	2.1 (1.1)	3.3 (1.1)	.112
Stuttering SR prior to treatment	2.6 (1.1)	4.0 (1.8)	3.7 (1.2)	4.0 (1.7)	3.5 (0.6)	5.3 (2.1)	5.0 (2.0)	.146
Stuttering SR post-treatment	0.4 (0.5)	1.1 (0.8)	1.7 (2.1)	0.8 (0.8)	1 (0)	3.5 (1.9)	4.0 (1.2)	.001
Reduction of stuttering severity	2.2 (1.3)	2.9 (2.0)	2.0 (1.0)	3.2 (1.1)	2.5 (0,6)	1.6 (1.7)	1.0 (1.0)	.084

Note: Data was missing for the variable Stuttering severity prior to treatment (n =2)

the other Treatment characteristics and outcomes variables. Boxplots illustrating the distribution of SR scores at the end of Stage 1 are presented in Fig. 1.

4. Discussion

This retrospective chart review study aimed to gain a deeper understanding of the management strategies employed by SLPs at a Canadian rehabilitation centre for their caseload of CWS, particularly those with complex profiles (defined as CWS with concomitant disorders). The study sought to identify the CDs that SLPs considered when administering the LP and to explore the effects of these identified CDs on the characteristics and outcomes of the treatment. The study’s expectations, which posited that a majority (>50 %) of CWS would exhibit at least one CD, were validated as 80.9 % of participants in the sample demonstrated confirmed or suspected CDs. The second expectation, suggesting that treatment efficacy and effectiveness would be reduced for CWS with CDs for at least one of the studied variables, was also confirmed. Specifically, the stuttering SR scores post-treatment were significantly higher for CWS with diagnosed or suspected CDs compared to those without CDs.

4.1. Concomitant disorders considered by speech-language pathologists when administering the Lidcombe Program

Among the 47 charts included in this study, 59.6 % of CWS presented with at least one confirmed CD and 21.3 % more with at least one suspected CD. Due to differences in study methodologies and definitions of CDs, it is challenging to directly compare these results with other studies. However, a notable trend is that all CDs reported by SLPs fall within the scope of speech-language pathology or are typically associated with related fields (e.g., neuropsychology). This observation aligns with existing clinical studies (e.g. Arndt and Healey 2001; Blood et al. 2003; (Unicomb et al., 2024)). For example, in Unicomb et al. (2024) retrospective analysis of 181 client

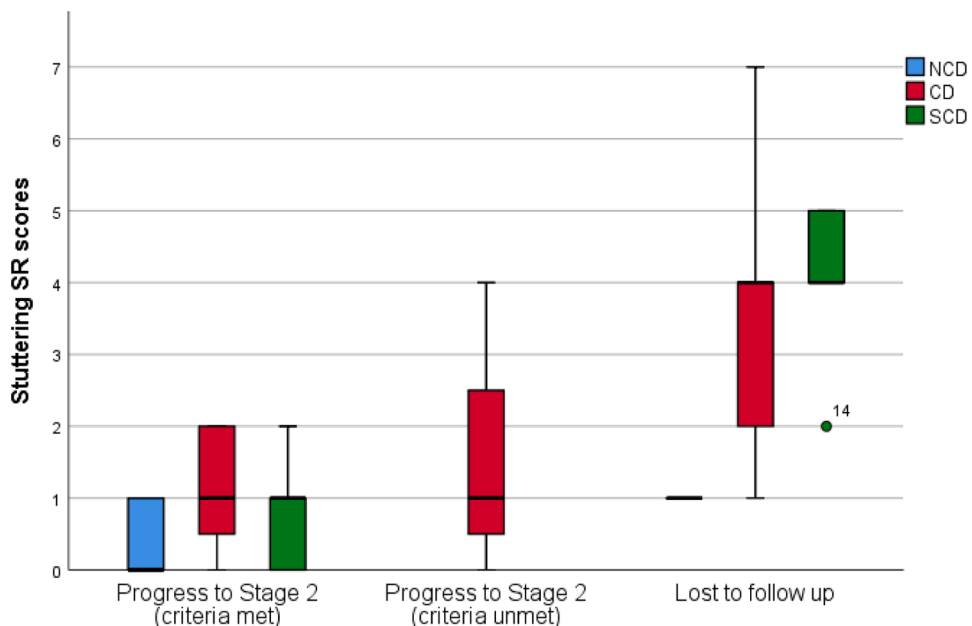


Fig. 1. Distribution of Stuttering SR scores post-treatment.

records, 45.9 % of children were reported to have at least one CD, with speech sound disorders (39.2 %) and developmental language disorders (12.2 %) being the most prevalent. In [Arndt and Healey \(2001\)](#), 44 % of the CWS had a confirmed CD, and 42 % of the remaining CWS had a suspected CD, bringing the total of CWS with either a confirmed or suspected CD to 67.2 %. In their survey, [Blood et al. \(2003\)](#) stated that 62.8 % of their sample of CWS had at least one confirmed CD. If the proportion of children with a confirmed CD in this study (59.6 %) is considered, it is higher than reported in [Unicomb et al. \(2024\)](#) and [Arndt and Healey \(2001\)](#), but lower than in [Blood et al. \(2003\)](#). However, when considering the combined proportion of confirmed and suspected CDs in this study (80.9 %), it is higher than what has been reported in previous clinical studies. These results, when viewed in the context of other clinical studies, could suggest that CDs influence referrals and attendance at clinics, potentially shaping parental help-seeking behavior and affecting the observed proportions of CDs in clinical samples ([Unicomb et al., 2020](#)). While the current study does not directly examine referral rates or help-seeking behaviors, these factors may provide a framework for understanding the higher prevalence of CDs observed in our sample.

Furthermore, the decision to include both diagnosed and suspected CDs when studying the relationship between the presence of CDs and treatment characteristics and outcomes can be questioned. For instance, in [Blood et al. \(2003\)](#), participating clinicians were explicitly instructed to report only medically confirmed diagnoses and to exclude any suspected diagnoses. The rationale was that the researchers were not interested in “speculation, “good clinical hunches”, or “intuitive guesses” (appendix B, [Blood et al. 2003](#)). In the present study, concerns were raised that excluding suspected CDs could lead to overlooking factors that might impact treatment characteristics and outcomes. Indeed, given the long waiting times for neuropsychological assessments in the province of Québec, Canada, many children may never receive an official diagnosis yet may still suffer the consequences of the disorder. An example of such a disorder is ADHD, which accounted for more than half of the suspected CDs in the charts and was reported (either confirmed or suspected) in 27.6 % of the children. Previous studies, such as [Druker et al. \(2019\)](#), have used non-official diagnoses to explore the relationship between CDs and treatment characteristics and outcomes in CWS. In [Druker et al. \(2019\)](#), the authors used parent-reported symptoms of ADHD to constitute a group of CWS with elevated ADHD symptoms (50 % of the studied caseload) but did not explore any other concomitant disorder. Therefore, it was considered important to account for all relevant factors. By including both diagnosed and suspected CDs, this study aimed to capture a comprehensive understanding of the children’s clinical profiles and provide a thorough assessment of treatment characteristics and outcomes.

4.2. Impact of concomitant disorders on treatment characteristics and outcomes with the Lidcombe Program

In this study, CWS with CDs had higher pretreatment SR scores (both 4.5 for the CD and SCD groups) compared to the NCD group (3.0), although this difference did not reach statistical significance ($p = .092$). Additionally, the three groups did not significantly differ in any other sociodemographic or stuttering-specific variables collected. This suggests that the observed trend of higher pretreatment severity in the CD and SCD groups cannot be explained by the variables studied, raising questions about potential underlying factors contributing to this pattern. CWS, as a group, are generally associated with poorer executive function, including deficits in short-term memory, inhibition, and cognitive flexibility ([Anderson & Ofoe, 2019](#)). Similar observations have been made in children with ADHD ([Yap et al., 2021](#)) and children with LD ([Tomas & Vissers, 2019](#)). These cognitive challenges can make it more difficult for children to regulate their speech production, which may lead to more frequent occurrences of stuttering behaviors such as blocks, repetitions, and prolongations ([Jones et al., 2017](#)). When these conditions coexist with stuttering, they may contribute to a higher SR score, as the severity of stuttering is often measured by the frequency and intensity of these behaviors. Other hypotheses should also be explored. For instance, a CD might lead to higher mental workload for the caregivers ([Theule et al., 2013](#)), causing them to delay care seeking for stuttering until functional impacts become more significant, as reflected by a higher SR score. To the authors’ knowledge, no studies have examined the reasons and contexts in which parents seek speech-language consultation for their child’s stuttering. This gap in the literature limits the ability to address this question effectively.

Furthermore, CWS with CDs also completed treatment with a significantly higher SR score compared to those without CDs (NCD: 0.7, CD: 2.2, SCD: 2.4; $p = .036$). As other treatment characteristics and outcomes were similar between both groups, the only collected variable that may provide insights into this difference is the presence of CDs. Regarding attention difficulties, [Druker et al. \(2019\)](#) found that CWS with attention difficulties required 25 % more treatment sessions to achieve fluency compared to CWS without attention difficulties. Regarding language difficulties, no studies have examined the effects of language difficulties on treatment characteristics and outcomes. However, [Trajkovski et al. \(2019\)](#) hypothesized that concomitant speech and language disorders could be associated with reduced treatment response because deficits in language comprehension could impair the understanding of parental verbal contingencies. This suggests that if clinicians and parents had persisted in the treatment, CWS with ADHD and other CDs might have achieved better fluency outcomes.

It was also found that the caseload was quite heterogeneous for several reasons. First, the treatment provided to the children in the study was not identical throughout the group. While some children underwent the LP as their initial and sole form of treatment, others had previously received treatment services for stuttering elsewhere before receiving treatment at the present clinic. Additionally, some children received the LP in combination with complementary approaches such as the *Palin PCI Approach* ([Kelman & Nicholas, 2017](#)), *Avoidance Reduction Treatment for Stuttering* ([Sisskin, 2018](#)) or *Fluency Rules Treatment Program* ([Runyan & Runyan, 1986](#)). It is worth noting that all children who received an adaptation of the LP ($n = 9$) were in the CD and SCD groups. According to clinicians participating in this study, the decision to combine the LP with another treatment was based on the “individual profile” of the child, with the aim of enhancing treatment effectiveness. Factors considered in their decisions included presence of CDs and adverse parental interaction patterns (e.g., fast speech rates and limited turn-taking in conversations). It can be hypothesized that the clinicians’ choice to administer another treatment in combination with the LP may have helped the groups of children with CDs to obtain reductions in

stuttering severity similar to those observed in the NCD group. Second, given that the city in which the centre is located is highly multilingual (Statistique Canada, 2017), it was deemed important to consider the number of languages spoken by the children. It was found that 48.9 % of the CWS were bilingual, and 10.6 % were trilingual. Examining the current literature, however, it appears that the LP is an effective treatment for stuttering in bilingual CWS (Choo & Smith, 2020; Shenker, 2011; Subasi et al., 2022). Nevertheless, given the absence of studies on multilingual CWS that include and analyze the interaction of CDs and multilingualism, it cannot be excluded that the combination of an additional disorder in a multilingual context might impact the CWS's ability to fully benefit from the LP. The interaction between CDs and the number of spoken languages was not explored in this study due to the small sample size but could be explored in future studies.

Drop-out rates for the LP demonstrate significant variability across reported clinical trials, ranging from 7 % to 33 % (Park et al., 2021), and as high as 57 % in a student-led clinic (McCulloch et al., 2017). In this study, 44.4 % of CWS without CDs, 42.9 % of those with a diagnosed CD and 50.0 % of CWS with a suspected CD had not met the discharge criteria at the time they were lost to follow up. Previous studies have observed that a significant decrease in stuttering can lead families to prematurely terminate the treatment (Guitar et al., 2015; Rousseau et al., 2007; Trajkovski et al., 2011). In O'Brian et al. (2013), some children were withdrawn from treatment by their parents because they were "doing well enough". However, secondary analyses show that the mean post treatment SR score of the NDC group lost to follow up was 1 (SD=0), which indicates an extremely mild stuttering. On the other hand, the post treatment SR score of the CD group lost to follow up was 3.5 (SD=1.9) and 4.0 (1.2) for the SCD group. Both CD and SCD presented with significantly higher SR scores than the NCD children lost to follow up. This difference implies that the underlying reasons for dropping out from the LP might be different for the NCD than the CD and SCD groups. The collaborating clinicians, including co-author JB, suggested it might be possible that some parents of children with CDs may have discontinued the treatment after achieving a satisfactory level of fluency and felt a need to focus on other needs related to the CDs. The LP demands a substantial time commitment from the parent, which may pose a challenge in successfully completing the treatment (Goodhue et al., 2010). The same mechanisms that could explain delayed care seeking in caregivers of CWS with CDs, such as heightened mental and workload, could explain early retraction from an ongoing treatment. Indeed, for parents of children with neurodevelopmental disorders, there is a direct correlation between the burden levels and the weekly hours of rehabilitation (Purpura et al., 2021). Given these hypotheses, more research is needed to better understand the reasons for dropping out of treatment. A better understanding of child and parental expectations and the need for support could provide valuable information and encourage persistence in treatment until benchmarks are met.

4.3. Additional points of clinical consideration

4.3.1. The use of a standardized data collection protocol for the assessment of stuttering

During this study, it was observed that the rehabilitation centre with which the researchers partnered did not have a standardized data collection template. SLPs recorded what they deemed important for their clinical reasoning. Improved documentation practices are recommended to standardize, homogenize, and enhance the completeness of data available in rehabilitation centres. In their article, Brundage et al. (2021) propose guidelines for the assessment of individuals who stutter, which could serve as a foundation for developing a standardized data collection template during speech-language pathology assessments of CWS. Additionally, efforts at the national and provincial levels are necessary to propose best practices for handling sensitive data, such as individuals' ethnic or racial backgrounds, to document and address potential systemic injustices related to racial identity. In Canada, data regarding ethnicity is not usually collected in medical records due to privacy concerns. This unfortunately prevents a comprehensive understanding of racial factors on a variety of important issues related to the health system (Sheikh et al., 2023).

4.3.2. Which other CDs are important to consider

In this study, all CDs reported by SLPs fall within the scope of speech-language pathology or are typically associated with related fields (e.g., neuropsychology). It is important to note that screening for many other CDs, such as sleep problems, is not a common practice among SLPs (Bonuck et al., 2021). In this context, expanding the scope of what SLPs might consider crucial for treatment progress poses a challenge. In their study on the development of a phenome risk classifier, Pruett et al. (2021) found the following categories of CDs as being associated with stuttering: Childhood onset fluency disorder, Pervasive development disorders and adult onset fluency disorder, Hearing loss, Sleep disorders, Atopic triad, Diagnostic testing and infections, Neurological deficits and Weight Control. Future prospective studies could investigate frequently occurring CDs in CWS to determine their impact on speech treatment. Such research could enhance the clinical reasoning of SLPs and contribute to the development of effective screening practices in the field of speech-language pathology.

4.3.3. Reasons to not start treatment for stuttering

Upon data collection, a total of 57 charts were excluded because the families declined to initiate stuttering treatment. No information is available in the charts, but several hypotheses may explain why some children did not receive treatment. For example, the average waiting time for stuttering therapy at this center is approximately one year, so stuttering may have resolved spontaneously while the child was on the waiting list. Additionally, some families might have sought private consultations and no longer required the treatment by the time their turn came. Another possibility is that, for families with a CWS with CDs, parents might decline speech therapy for stuttering due to the CDs' significant impact on the child's life, leading them to prioritize treatment for the CDs over stuttering.

4.4. Strengths and limitations

From a clinical practice perspective, the results of this study are valuable for several reasons. First, the findings indicated that CWS with CDs had higher levels of SR scores after treatment. Clinicians should take note of this and provide additional education to parents of children with CDs or suspected CDs regarding the potential for a longer duration of treatment. This can help increase parental motivation to continue treatment and manage expectations accordingly. Second, it is important to address the high drop-out rates observed in the sample. Clinicians working with CWS with CDs or who suspect the presence of CDs should actively discuss the reasons why parents choose to enroll their child in treatment and ensure clear communication regarding expected treatment characteristics and outcomes. By fostering open and transparent discussions, clinicians can help parents make informed decisions and maintain engagement throughout the treatment process.

Some limitations need to be considered in this study, including its retrospective design and the fact that it was conducted in a single rehabilitation center. It is important to note that retrospective chart studies cannot establish causality between variables, but they can nevertheless inform hypotheses to guide future research. Retrospective studies also imply that the data were not originally coded for research purposes by clinicians, which can result in issues such as missing data (Talari & Goyal, 2020). Although charts with excessive missing data were excluded, some of the included charts still had incomplete information. For example, the charts were missing systematic information related to additional treatments the children with CDs or suspected CDs had received or were receiving. This limits understanding of how the absence and presence of additional treatments (concurrent or sequential) affect the outcomes of the LP. Additionally, a larger sample size would be beneficial since many of the cases encountered were unique and interactions of variables could not be explored. As the data were collected from the caseload of SLPs, establishing inter-judge agreement on the severity of children's stuttering and their progress throughout the treatment was not possible. In cases where a child discontinued treatment without meeting discharge criteria, there often was not a final assessment session, and reliance had to be placed on data from the last available session. While this is not ideal, it was the best option given the circumstances. Also, information regarding the level of severity of each child's CDs was not obtainable. Further, in terms of the inclusion and exclusion criteria, CWS up to seven years old were included, although most trials focusing on the LP primarily target preschool-aged children (Brignell et al., 2021). Considering the long waiting lists for SLP treatment in the province of Québec, Canada, the chosen age range was deemed to align with current clinical practices, as discussed with the clinical team.

4.5. Future directions

Despite numerous studies demonstrating the LP's effectiveness in reducing stuttering severity in young children (Brignell et al., 2021), these studies may not accurately represent the typical caseload of SLPs working with CWS. This discrepancy arises because CWS with CDs are often excluded from effectiveness studies, whereas prevalence studies indicate that they constitute a significant portion of the CWS population. To enhance problem-solving within clinical settings for clinicians using the LP, it is critical that data resulting from research is applicable to their clinical reality (Hayhow, 2011), thus future prospective clinical studies should not refrain from including CWS with CDs, but rather focus on measuring the interaction between the presence of CDs and other variables to better understand the dynamics of stuttering treatment in this population. Additionally, future studies could consider other clinical populations present in rehabilitation centres that provide services for CWS. This approach would allow for a comparison group and explore whether CWS have more concomitant disorders than other clinical populations. As noted earlier, it is important to recognize that the SLPs involved in this study documented only CDs within their scope of practice or related fields. Therefore, it cannot definitively be concluded that the children in the sample did not have other CDs outside of those typically identified by SLPs. This limitation highlights the need for future studies to explore a broader range of potential comorbidities that could affect treatment outcomes. Finally, another future direction could be to examine the optimal way to provide services for the various disorders present in CWS. When treating CWS with CDs within their scope of practice, SLPs have several options. They may choose to treat both disorders concurrently (treating both disorders separately within the same therapy session), sequentially (treating one disorder followed by the other), cyclically (treating each disorder separately for specific periods in a cycle) or using a blended approach (treating both disorders simultaneously within the therapy program) (Arndt & Healey, 2001; Ratner, 1995). This type of study would be crucial in determining the optimal service delivery of SLP treatments for stuttering and CDs.

5. Conclusion

The presence of CDs in CWS is a common occurrence in clinical practice. This study revealed that, when administering the LP, SLPs considered CDs within their scope of practice and noted that CWS with CDs and suspected CDs had higher SR scores after treatment compared to their peers without CDs. It is important to acknowledge the significant limitations of the study, including its design and confounding variables, which complicate data interpretation. However, despite these challenges, this study advances the understanding of the treatment trajectory for CWS with CDs. The findings underscore the need for further research to better understand how CDs and suspected CDs influence treatment characteristics and outcomes.

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CRediT authorship contribution statement

Kengne Talla Pascaline: Writing – review & editing, Methodology, Investigation, Funding acquisition. **Finlay Sébastien:** Writing – review & editing, Writing – original draft, Visualization, Project administration, Investigation, Formal analysis, Data curation. **Braën Julie:** Writing – review & editing, Investigation, Funding acquisition, Conceptualization. **Fortin Mailie:** Writing – review & editing, Investigation. **Verduyck Ingrid:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Funding acquisition, Conceptualization. **Levesque Laurie:** Writing – review & editing, Investigation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data Availability

Data will be made available on request.

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