

Childhood apraxia of speech: analysis of speech-language pathologists' perception and conduct regarding the assessment process

Apraxia de fala na infância: análise da percepção e conduta dos fonoaudiólogos sobre o processo de avaliação

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ABSTRACT

Purpose: To analyze the perception and conduct of speech-language pathologists regarding the assessment process in the differential diagnosis of childhood apraxia of speech. **Methods:** This was a cross-sectional observational analytical study with data collection conducted virtually via the Google Forms platform. Initially, 100 speech-language pathologists were recruited through content sharing via WhatsApp and email. Speech-language pathologists from across Brazil who were currently treating or had previously treated children with speech and/or language disorders were included. Undergraduate students were excluded. The questionnaire contained 26 questions regarding the assessment process for suspected cases of apraxia of speech. Data collection took place from September 2023 to July 2024. **Results:** Sixty speech-language pathologists from the South, Southeast, and Northeast regions, most of whom held a specialization degree, responded to the questionnaire. The majority used standardized assessment instruments, the most frequently applied was the ABFW Child Language Test – phonology subtest and checklists for childhood apraxia of speech. They observed that apraxia of speech is accompanied by other comorbidities and that more than five sessions were necessary to confirm the diagnosis. They also observed at least three clinical markers and mentioned referrals to other professionals. There was no significant correlation between the variable number of years of professional experience and the number of sessions required to confirm the diagnosis. **Conclusion:** In the perception of the professionals participating in the study, there is difficulty in performing a differential diagnosis and insecurity regarding the conduct and methods used in the assessment process.

Keywords: Apraxias; Speech; Speech disorders; Child; Speech therapy

RESUMO

Objetivo: analisar a percepção e conduta dos fonoaudiólogos sobre o processo de avaliação no diagnóstico diferencial de apraxia de fala na infância. **Métodos:** estudo analítico observacional transversal com coleta de dados realizada virtualmente pela plataforma *Google Forms*. Inicialmente, foram recrutados 100 fonoaudiólogos, por meio do compartilhamento do conteúdo via *WhatsApp* e *e-mails*. Foram incluídos fonoaudiólogos de todo o Brasil que atendiam ou já haviam atendido crianças com alteração de fala e/ou linguagem. Estudantes de graduação foram excluídos. O questionário continha 26 perguntas sobre o processo avaliativo dos casos suspeitos de apraxia de fala. A coleta ocorreu no período de setembro de 2023 a julho de 2024. **Resultados:** sessenta fonoaudiólogos das regiões Sul, Sudeste e Nordeste, a maioria com especialização, responderam ao questionário. Grande parte utilizava instrumentos padronizados de avaliação, sendo os mais aplicados o Teste de Linguagem Infantil ABFW - prova de fonologia e *checklists* para apraxia de fala na infância. Observaram que a apraxia de fala vem acompanhada de outras comorbidades e que eram necessárias mais de cinco sessões para confirmar o diagnóstico. Observaram também pelo menos três marcadores clínicos e mencionaram o encaminhamento para outros profissionais. Não houve correlação significativa entre a variável quantidade de aperfeiçoamentos e número de sessões para confirmar o diagnóstico. **Conclusão:** na percepção dos profissionais participantes do estudo, existe dificuldade em realizar o diagnóstico diferencial e insegurança em relação à conduta e aos métodos utilizados no processo de avaliação.

Palavras-chave: Apraxias; Fala; Distúrbios da fala; Criança; Fonoaudiologia

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INTRODUCTION

Speech sound disorder (SSD) is a broad term referring to any difficulty with the perception, motor production, or phonological representation of speech sounds and segments^(1,2). The classification system for speech disorders developed by authors^(1,3) divides these disorders into Speech Delay, Speech Errors, and Motor Speech Disorders (MSD). The latter includes four subtypes: Childhood Apraxia of Speech (CAS), Speech Motor Delay (SMD), Childhood Dysarthria, and the combination of CAS and Childhood Dysarthria (CD).

Individuals with SSD may be idiopathic, i.e., without known developmental impairments or with an association with complex neurodevelopmental disorders, such as cognitive, structural, sensory and/or motor alterations^(1,4).

Among cases of idiopathic speech disorders, approximately 17.8% have a motor origin⁽¹⁾. Of these, CAS is the least frequent alteration (2.4%), followed by Childhood Dysarthria (3.4%) and SMD (12%)⁽¹⁾. Among children with complex neurodevelopmental disorders, almost half (47.7%) present some motor speech disorder. Yet, CAS is the least frequent alteration (4.3%), followed by CAS and Childhood Dysarthria concomitantly (4.9%), Childhood Dysarthria (13.3%) and SMD (25.1%)⁽¹⁾.

According to the American Speech-Language-Hearing Association (ASHA)⁽⁵⁾, CAS is defined as a neurological speech disorder in which consistency and precision of movements are impaired in the absence of neuromuscular changes. This disorder affects the planning and programming of the sequential articulatory gestures, resulting in errors in speech sound production and prosody⁽⁵⁾. Its main diagnostic marker is the pause that occurs at an inappropriate linguistic point during speech⁽⁶⁾.

Clinically, CAS manifests as inconsistent consonant and vowel errors in repeated productions, inadequate coarticulation between sounds and syllables, altered prosody, especially in lexical and/or phrasal stress, and increased errors in larger units of speech^(5,7). Difficulties in imitating words and phrases and the predominant use of simple syllabic structures are also frequent⁽⁵⁾.

Recent studies point to CAS's genetic basis, suggesting that some signs may be evident from a very early age, manifesting as early as the pre-linguistic period, at the beginning of speech development⁽⁷⁻⁹⁾. However, the lack of consensus on diagnostic criteria^(10,11) has led to disagreements among speech-language pathologists regarding the methods used for assessment. Additionally, the scarcity of translated and transculturally adapted instruments for Brazilian Portuguese⁽¹²⁾ represents a challenge.

The literature indicates that diagnostic criteria are often subjective^(11,12) and the described characteristics are diverse. CAS is a dynamic disorder and the signs have diverse degrees of severity and can vary over time⁽¹²⁾.

Thus, one of the great challenges for speech-language pathologists is to perform the differential diagnosis of individuals with SSD, correctly identifying its manifestations⁽¹²⁾. This complexity can lead to diagnostic errors, confusing CAS with other disorders, or inadequate interventions, without following the principles of motor learning may take place, prolonging therapy time⁽¹³⁾.

Recently, research has sought to define sensitive clinical markers to differentiate CAS from other clinical conditions such as speech delays and phonological disorders^(3,6). However, signs may differ between inter- and intra-individual at different periods over time⁽⁵⁾, which maximizes the difficulties in defining clinical markers.

Given this context, the objective of this study was to analyze the perception and conduct of speech-language pathologists regarding the assessment process in the differential diagnosis of childhood apraxia of speech.

METHODS

This analytical, observational, cross-sectional study was approved by the Research Ethics Committee of the State University of Health Sciences of Alagoas – CEP/UNCISAL, under number 6.127.723.

The sampling was by convenience and speech-language pathologists from the five Brazilian regions were invited to participate in the study, regardless of sex. The sample size was calculated for a finite population where Z = reduced variable (1.96 for 95% confidence), α = type I error (0.05), N = population size (52,518 speech-language pathologists in January 2023, according to the website of the Federal Council of Speech-Language Pathology), standard deviation = 5.8, tolerable error = 1.5, using the formula:

$$n = \frac{Z^2 \cdot \sigma^2 \cdot N}{E^2 (N-1) + (Z^2 \cdot \sigma^2)} \quad (1)$$

Thus, the sample size calculation indicated 60 participants and was performed for inferential statistical analysis. Participants were recruited through invitations, via WhatsApp and emails to groups and universities from various Brazilian regions, with a brief explanation of the research. The Informed Consent Form (ICF) and a request to complete the structured online questionnaire (Appendix 1) were also used. Developed by the authors and made available through the Google Forms platform, the forms were sent along with the invitation.

The study included speech-language pathologists who treated children with speech and/or language disorders as inclusion criteria, and undergraduate students as exclusion criteria.

The questionnaire was developed by the authors based on a literature review on CAS. No previously validated instrument was identified that specifically investigated the perception and conduct of speech-language pathologists in the process of CAS differential assessment and diagnosis, especially in the Brazilian context.

Therefore, the construction of a specific instrument with 26 questions (Q), nine open-ended and 17 multiple-choice was organized into two blocks. The first block consists of the sociodemographic and professional characterization of the participants, with questions such as sex, age and region of the country they reside, years of education, predominant area of work and level of education.

The second section contains specific aspects of clinical practice related to CAS to understand the degree of difficulty during the assessment of children suspected of having CAS, the most evident manifestations, the frequency with which the professional receives these children for assessment, whether they have specific training in CAS, the referrals made, the correlation of CAS with other neurodevelopmental disorders, the ideal number of clinical markers to make a diagnosis, whether there is difficulty in concluding the diagnosis, and whether the length of training favors the assessment process and therapeutic conduct.

Six multiple-choice questions used a Likert scale. (Q11, Q12, Q14, Q16, Q24, Q26), whose values range from 1 to 5, where 1 would be “never” and 5 would be “very frequently”.

Statistical analysis was performed using the application Statistical Package for the Social Sciences (SPSS) version 25.0. The data were described using tables and graphs, presenting means, standard deviations, and frequencies.

Non-numerical variables were analyzed only descriptively, based on absolute frequencies and percentages. Subsequently, Excel Office version 2024 was used to graphically represent the non-numerical variables and the responses to the open-ended questions, expressed as percentages in the graphs. The Likert scale scoring, as well as the analysis of the open-ended and multiple-choice questions, followed the same parameter, whose principle was guided by the frequency of responses.

The numerical variables corresponding to questions Q4, Q19, and Q21 were subjected to an assessment of adherence to a normal distribution using the Kolmogorov-Smirnov test. Spearman’s correlation test was used to analyze the association between the following variables: training time and approximate time to complete the CAS diagnosis; approximate time to complete the CAS diagnosis and number of training courses completed; training time and number of training courses completed. Values were considered significant for $p < 0.05$, and the admitted alpha was 0.1.

RESULTS

The results of this study, obtained from the responses of the 60 participants, were organized and tabulated according to the adopted methodology. They are presented in graphs along with a description of the data. Table 1 presents the general information of the participants.

Among the areas of speech-language pathology practice, the following predominated: Language (57–95.0%) and Speech (40–66.7%). Other areas of speech-language pathology were also mentioned, such as: Orofacial motor skills (26–44.3%), Fluency (14–23.3%), Voice (9–15.0%), Educational speech-language pathology (8–13.3%), Neurofunctional speech-language pathology (8–13.3%), Audiology (6–10.0%), Gerontology (6–10.0%), Public health (4–6.7%), and Occupational speech-language pathology (2–3.3%).

Regarding the most commonly used assessment instruments in clinical practice for differential diagnosis of CAS, the following stood out: Child Language Test (ABFW) - phonology subtest⁽¹⁴⁾ (13 – 21.6%), Checklists for childhood apraxia of speech⁽¹⁵⁾ (10 – 16.6%), Red Flags for MSD⁽¹⁶⁾ (8 – 13.3%), Language Development Assessment (ADL-2)⁽¹⁷⁾ (5 – 8.3%), System Analysis Observation (SAO)⁽¹⁸⁾ (5 – 8.3%), Behavioral Observation Protocol (PROC)⁽¹⁹⁾ (4 – 6.7%) and Diadochokinetic Test⁽²⁰⁾ (4 – 6.7%). Twenty-nine participants (48.3%) did not respond the question on assessment instruments.

Other assessment parameters, such as speech inconsistency (4 – 6.7%), articulatory, buccofacial, and orofacial praxes (4 – 6.7%)⁽²¹⁾, Assessment Protocol for Verbal and Non-Verbal Apraxia of Speech⁽²²⁾ (3 – 5%), Orofacial Myofunctional Evaluation with Scores (OMES)⁽²³⁾ (2 – 3.3%), Orofacial Myofunctional Evaluation (MBGR)⁽²⁴⁾ (2 – 3.3%) and Assessment of Oral and Verbal Praxes⁽²⁵⁾ (1 – 1.6%), were also mentioned.

According to the research participants, the most evident manifestations of CAS in clinical practice were: impairment

Table 1. General information on the participants (n=60)

Variables	Total (n)	%
Sex		
Female	55	91.7
Male	5	8.3
Level of education		
Graduation	24	40.0
Specialization	28	46.7
Master’s degree	4	6.7
Doctorate	2	3.3
Postdoctoral studies	1	1.7
Region of residence		
Northeast	54	90.0
South	4	6.7
Southeast	2	3.3
Speech therapy clinic time		
More than 20 years	4	6.7
Between 10 and 20 years	11	18.3
Between 5 and 10 years	12	20.0
Less than 5 years	33	55.0
Predominant employment relationship		
Private sector	46	76.7
Public sector	12	20.0
I do not wish to respond.	2	3.3
Type of assistance provided		
Outpatient care	56	93.3
Home care	4	6.7
Pedagogical assistance	3	5.0
Hospital care	2	3.3
Intensive care unit assistance	2	3.3
I do not wish to respond.	2	3.3

Subtitle: n = number; % = percentage;

Source: Authors, 2024

in expressive skills compared to receptive skills, speech unintelligibility, reduced mobility of the speech articulators, limited consonant inventory, increased vowel production error, decreased speech performance as utterance length increases, and sound omissions and substitutions.

The interface between speech therapy and other health specialties proved to be relevant, considering that 38 participants (63.33%) responded they made referrals to other professionals.

The following referrals were cited: occupational therapists (25 - 41.6%), audiologists (3 - 5%), pediatric neurologists (12 - 20%), psychologists (10 - 16.6%), otolaryngologists (7 - 11.6%), pediatric dentists (2 - 3.3%), and educational psychologists (2 - 3.3%). Twenty-two participants (36.6%) did not respond.

Table 2 presents the professional development courses completed by the participants. Data analysis showed that some participants completed more than one professional development course.

Table 3 presents the disorders observed in clinical practice, in general, and which the participants considered as associated with CAS.

Table 2. Courses focusing on childhood apraxia of speech undertaken by the participants

Improvement	Total	%
SSD Courses	29	48.3
PROMPT	22	36.7
Principles of motor learning	15	25.0
DTTC	14	23.3
ReST	10	16.7
Multigestures	4	6.7
SpeechEz	2	3.3
Courses in CAS	2	3.3
Plushand	1	1.6
The finger method	1	1.6
None	2	3.3
I do not wish to respond.	14	23.3

Subtitle: SSD = Speech Sound Disorders; PROMPT = Prompts for Restructuring Oral Muscular Phonetic Target; DTTC = Dynamic Temporal and Tactile Cueing; ReST = Rapid Syllable Transition Training; SpeechEz = ; Plushand = ; CAS = Childhood Apraxia of Speech; n = number; % = percentage; **Source:** Authors, 2024

Table 3. Disorders commonly associated with childhood apraxia of speech

Disorders	Total	%
ASD	29	48.3
ADHD	8	13.3
Trisomy 21	6	10
CAPD	1	1.6
DLD	1	1.6
ODD	1	1.6
Learning disorder	1	1.6
Sensory disorder	1	1.6
I do not wish to respond.	21	35

Subtitle: ASD = Autism Spectrum Disorder; ADHD = Attention Deficit Hyperactivity Disorder; CAPD = Central Auditory Processing Disorder; DLD = Developmental Language Disorder; ODD = Oppositional Defiant Disorder; % = percentage; **Source:** Authors, 2024

Figures 1, 2, and 3 present the clinical markers, the number of sessions the participants considered ideal to confirm the diagnosis of CAS, and whether they had undergone complementary examinations.

The Likert frequency scale quantitatively showed that 80% of the speech-language pathologists who responded to the questionnaire reported that they frequently treated or had treated children with MSD, and only 5% stated that they had never treated patients with this disorder. To perform the differential diagnosis of CAS in clinical practice, 92% of participants reported they frequently experience difficulties, and 80% stated that their training time and experience in the field of speech and language contributed to more precise assessments.

Analysis using Spearman’s correlation test indicated no statistically significant correlation between professional training time and the approximate time required to complete the CAS diagnosis, neither between the number of training courses completed and the approximate time to complete the CAS diagnosis ($p = 0.814$ and $p = 0.725$, respectively).

A moderate correlation was found between training time and the number of professional development courses completed,

according to Spearman’s correlation test, indicating that longer training times were associated with a higher number of professional development courses ($p = 0.511$; $p < 0.001$).

DISCUSSION

The results showed that assessments to investigate a possible case of CAS may be a gap in the field of speech-language pathology due to its complex etiology and the lack of sufficiently sensitive markers to outline this disorder. Participants’ responses varied significantly, suggesting differences in assessment and diagnostic procedures. The literature highlights that confirming the CAS diagnosis is complex and involves a series of specific steps to differentiate it from other speech-language disorders⁽²⁵⁾.

It was observed that a significant portion of the participants in this study required more than five sessions to complete the diagnosis of CAS, and nearly half preferred not to respond to this question, suggesting gaps in this aspect. This difficulty may be related to the overlap of characteristics with other disorders and the absence of precise biological markers⁽¹⁰⁾.

The diagnosis of CAS requires at least three characteristics: inconsistency between words and syllables, lengthened and disrupted coarticulatory transitions, and inappropriate prosody^(5,11). In the present study, the most prevalent initial signs that caught the professionals’ attention were: inconsistent speech errors, coarticulatory breaks, prosodic alterations, undifferentiated babbling, and articulatory groping, which confirms findings in the literature^(5,26).

The speech-language pathologists interviewed in this study frequently referred their patients with suspected CAS to other professionals and requested complementary tests, which favor more accurate diagnoses. Given the lack of available validated instruments translated into Brazilian Portuguese, participants reported using a variety of tests to fill this gap. For a more precise diagnosis, the combined application of assessments that integrate motor, articulatory, segmental, and suprasegmental aspects is recommended⁽²⁷⁾, which contributes to a more detailed understanding of the child’s speech performance and guides more effective interventions⁽¹²⁾.

Another important factor was the specialized courses taken. The professionals followed current treatment lines with scientific evidence, such as Prompts for Restructuring Oral Muscular Phonetic Target (PROMPT)⁽¹⁸⁾, Dynamic Temporal and Tactile Cueing (DTTC)⁽²⁸⁾ and Rapid Syllable Transition Treatment (ReST)⁽²⁹⁾. These therapies, supported by motor learning principles, demonstrate effectiveness in articulatory accuracy and generalization of gains⁽³⁰⁾.

The correlation between professional training time, clinical experience and the number of CAS diagnoses showed that, although there is consensus that years of clinical experience and the level of specialization in a given area provide the professional with more confidence and greater assertiveness in therapeutic conduct, this does not translate into greater diagnostic accuracy, especially in disorders of a complex nature such as CAS⁽⁶⁾.

The variables training time and number of professional development courses completed showed a significant correlation. This data reveals that speech-language pathologists sought specialization as they gained more years of experience, a natural path followed by most professionals.

Number of clinical markers considered ideal to confirm CAS Diagnosis

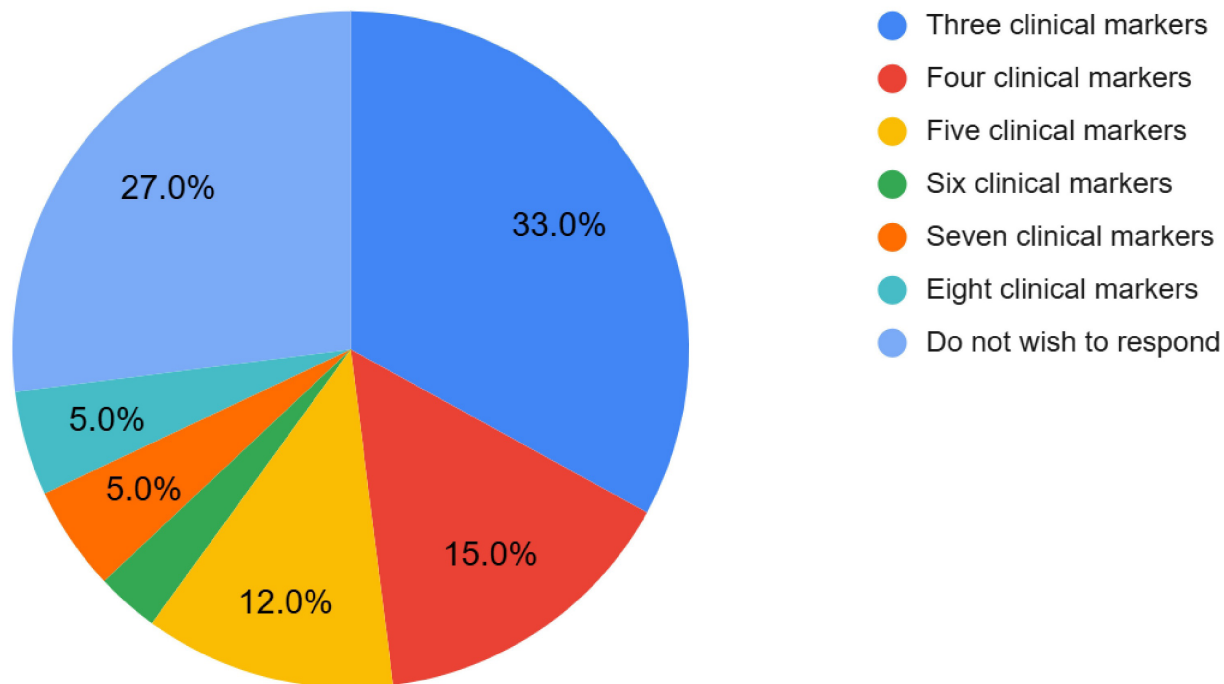


Figure 1. Data regarding clinical markers to confirm the diagnosis of childhood apraxia of speech
Subtitle: CAS = Childhood Apraxia of Speech; % = percentage. Source: Authors, 2024

Approximate time to confirm CAS diagnosis

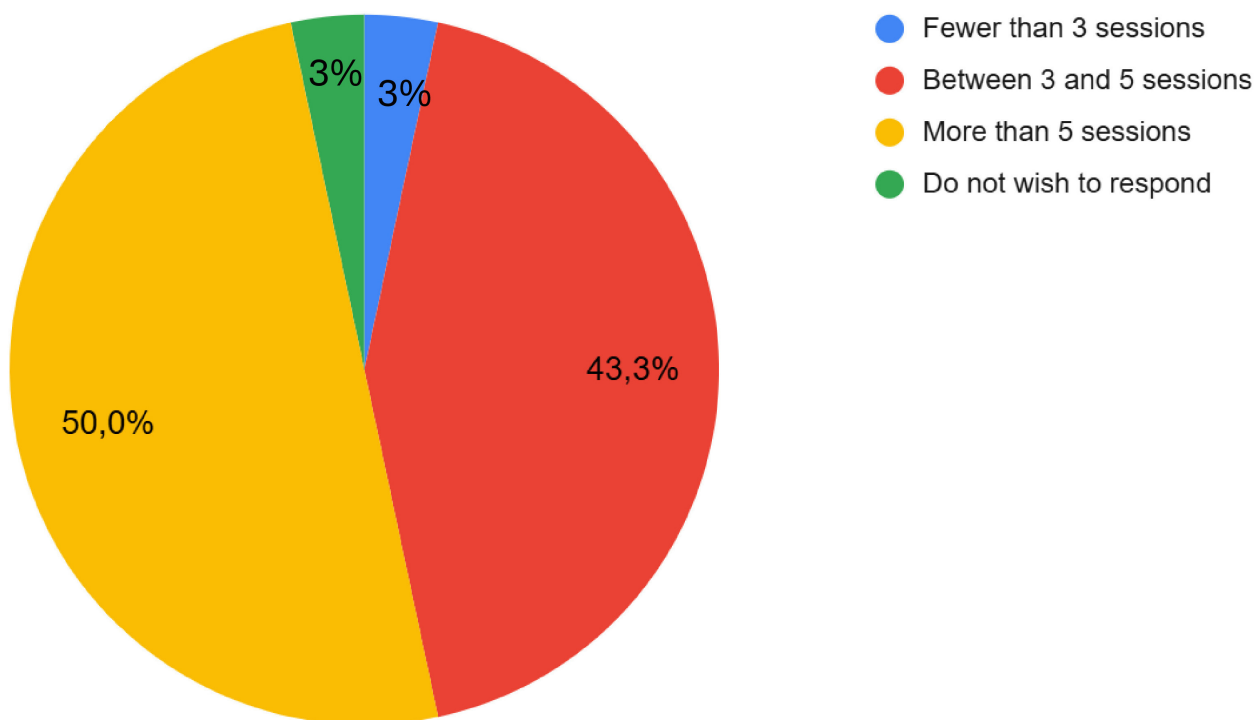


Figure 2. Data regarding the time to confirm childhood apraxia of speech diagnosis
Subtitle: CAS = Childhood Apraxia of Speech; % = percentage. Source: Authors, 2024

Perform additional examinations in suspected cases of CAS to guide assessments

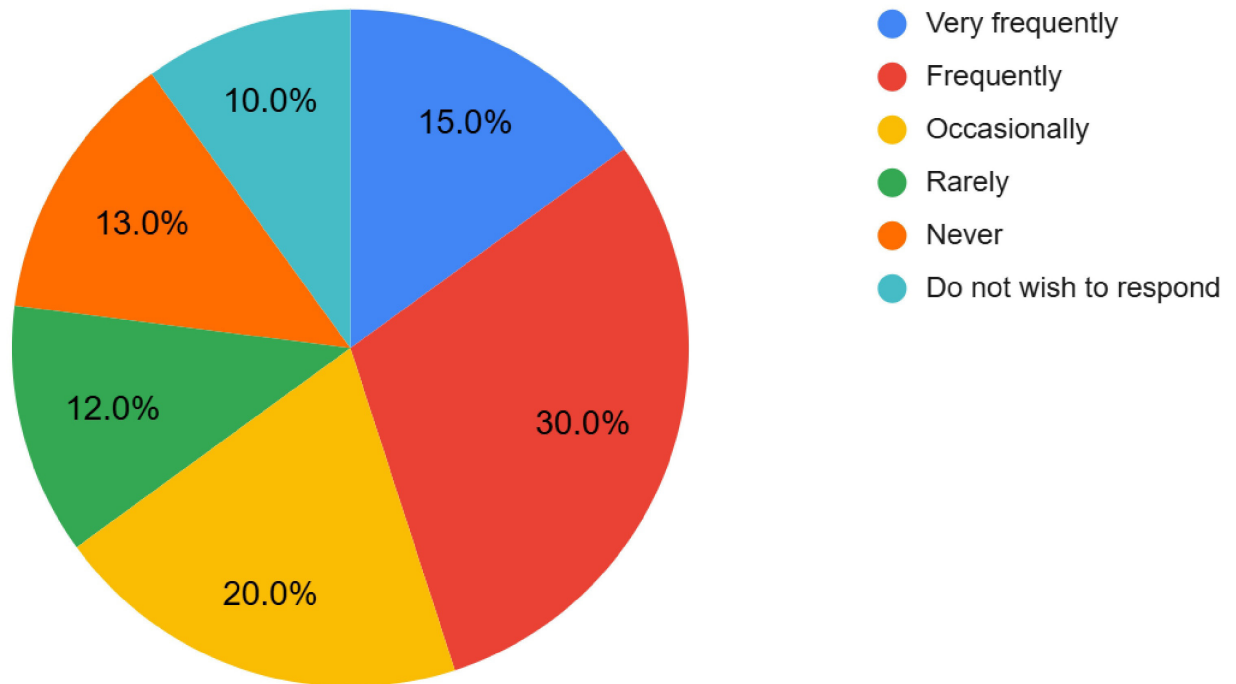


Figure 3. Additional tests
 Subtitle: CAS = Childhood Apraxia of Speech; % = percentage. Source: Authors, 2024

A striking finding was the low frequency of referrals for audiological assessment. Hearing plays a crucial role in language acquisition, and hearing deficits can negatively impact this process. This highlights that such an assessment is essential for children with speech and language disorders, as it allows for the identification of potential hearing loss that may contribute to the clinical presentation⁽³⁰⁾.

It is noteworthy that the study showed low participation from professionals with more clinical experience, and a small contribution from speech-language pathologists from the North, Midwest, Southeast, and South regions of the country, although contact had been established. A broader and more diverse sample is essential to generate dialogue among professionals and promote discussions about issues in diagnosis.

The results highlighted advances and challenges in CAS assessment practices. The absence of standardized instruments and consistent diagnostic markers reinforces the need for future research to develop more precise assessment and diagnostic methods, as well as clearer clinical guidelines applicable to the Brazilian context.

CONCLUSION

The findings showed that, although professionals demonstrate knowledge of the main clinical markers and adopt evidence-based practices, there remains heterogeneity in the procedures utilized and uncertainty regarding diagnostic confirmation.

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Appendix 1. Data collection instrument: Structured questionnaire developed by the authors for this research. This section will present questions related to sociodemographic and professional information

- 1. Are you registered with the Federal Council of Speech-Language Pathology?** Yes
 No
- 2. Date of birth** //
- 3. Sex** Feminine Masculine I do not wish to answer .
- 4. Year of graduation in speech therapy (If you do not wish to respond, leave the space blank)**
- 5. How long have you been at the speech therapy clinic?** Less than five years Between five and ten years Between ten and twenty years
 More than twenty years I do not wish to respond.
- 6. Level of education** Graduation Specialization - duration exceeding 360 hours Residence
 Master's degree Doctorate Postdoctoral studies
- 7. What region do you work in?** North – Acre, Amazonas, Tocantins, Pará, Rondônia, Roraima
 Northeast - Alagoas, Bahia, Ceará, Maranhão, Paraíba, Pernambuco, Piauí, Rio Grande do Norte, Sergipe
 Central-West - Goiás, Mato Grosso, Mato Grosso do Sul, Federal District
 Southeast - Espírito Santo, Rio de Janeiro, São Paulo, Minas Gerais
 South - Paraná, Santa Catarina, Rio Grande do Sul
 I do not wish to respond
- 8. Predominant employment relationship** Private sector
 Public sector
 I do not wish to respond.
- 9. What type(s) of assistance do you provide? (Consider the highest weekly workload)** Outpatient care – Outpatient clinics or offices/clinics
 Hospital care - Infirmary or Inpatient
 Assistance in intensive care - Intensive Care Unit
 Home care
 Assistance provided in a pedagogical environment - Schools or Universities
 I do not wish to respond.
- 10. Select your area(s) of expertise.** Dysphagia
 Language
 Orofacial motor skills
 Fluency
 Public health
 Voice
 Audiology
 Occupational Speech Therapy
 Neurofunctional Speech Therapy
 Educational speech therapy
 Gerontology
 Speech
 I do not wish to respond

Specific questions

This section will address specific questions about speech-language pathology practice in the area of language/speech, especially regarding suspected cases of Childhood Apraxia of Speech.

1. Do you work with, or have you worked with children with motor speech disorders? Very frequently

- Often
 Occasionally
 Rarely
 Never
 I do not wish to respond.

2. In your clinical practice, are there difficulties in making a differential diagnosis of these disorders? Very frequently

- Often
 Occasionally
 Rarely
 Never
 I do not wish to respond.

3. What is the first sign that draws your attention to a possible diagnosis of childhood apraxia of speech? (If you do not wish to answer, leave the space blank)

Subtitle: CAS = Childhood Apraxia of Speech

Appendix 1. Continued...

- 4. Is it common for you to receive patients with suspected CAS for assessment?** () Very frequently
 Often
 Occasionally
 Rarely
 Never
 I do not wish to respond.
- 5. Which manifestations are most evident in patients with suspected CAS during assessments? (Leave the space blank if you do not wish to respond)**
- 6. Do you perform additional tests when CAS is suspected?** () Very frequently
 Often
 Occasionally
 Rarely
 Never
 I do not wish to respond.
- 7. If the previous answer is yes, what additional tests are requested? (If you do not wish to respond, leave the space blank)**
- 8. Do you refer these patients to other professionals? If so, usually which ones? (If you do not wish to respond, leave the space blank)**
- 9. What professional development/course(s) focused on CAS have you already completed?** () Prompt
 SpeechEz
 Principles of motor learning
 Speech sound disorders
 DTTC
 ReST
 I do not wish to respond
 Other
- 10. Which instrument(s)/protocol(s) do you most commonly use in the assessment of children suspected of having apraxia of speech? (If you do not wish to respond, leave the space blank)**
- 11. Approximately how long does it take you to conclude a CAS diagnosis?** () Less than three sessions
 Between three and five sessions
 More than five sessions
 I do not wish to respond.
- 12. How many clinical markers do you consider ideal to confirm a CAS diagnosis?** () Three markers
 Four markers
 Five markers
 Six markers
 Seven markers
 Eight or more markers
 I do not wish to respond.
- 13. What markers do you consider when diagnosing CAS, and based on what evidence do you consider them ideal for diagnosing CAS? (If you do not wish to respond, leave the space blank)**
- 14. Considering the CAS cases you have assessed, were they usually accompanied by another disorder?** () Very frequently
 Often
 Occasionally
 Rarely
 Never
 I do not wish to respond.
- 15. If the previous answer is yes, list which disorders associated with CAS are most frequently observed in your clinical practice? (If you do not wish to respond, leave the space blank)**
- 16. Does your training and experience in the field of language/speech contribute to your improved perception and accuracy in assessing suspected cases of CAS?** () Very frequently
 Often
 Occasionally
 Rarely
 Never
 I do not wish to respond.

Subtitle: CAS = Childhood Apraxia of Speech