

Case reports

Improving oral communication in a journalism student with Friedreich ataxia: A case report

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ABSTRACT

This case report aimed to describe and evaluate the effects of an oral communication training program on a journalism student with Friedreich ataxia. The participant, diagnosed at 23 years old, had motor and communicative symptoms, including vocal tremors and speech articulation difficulties. He participated in the Expressiveness Development Program for Oral Communication, with eight group sessions involving activities such as reading texts aloud, linked speech, and self-perception of oral communication through audiovisual resources. The study used a voice and speech self-perception questionnaire, perceptual-auditory evaluation by speech-language-hearing pathologists specialized in voice, and acoustic measures to assess the participant's oral communication. His vocal quality, speech fluency, and articulation improved after the training, indicating this program positively influenced his case. However, speech rate and pauses still require attention. Acoustic measures such as fundamental frequency of speech and spectral decline also improved. These results indicate the potential of this training program to develop the oral communication of this individual presented with Friedreich ataxia, positively impacting the professional and academic routine of a future occupational voice user.

Keywords: Friedreich Ataxia; Rare Diseases; Speech; Journalism; Radio; Voice

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INTRODUCTION

Friedreich ataxia, the most common hereditary ataxia with a global prevalence of 1 in 40,000 people¹, is a progressive and inherited neurodegenerative disease affecting multiple organs, caused by a systemic deficiency of the mitochondrial protein frataxin. It leads to disturbances in intracellular iron homeostasis and deficiencies in proteins containing iron-sulfur clusters, resulting in various clinical manifestations. The main symptoms include progressive ataxia, loss of tendon reflexes, difficulty in speech articulation, hypertrophic cardiomyopathy, diabetes, and skeletal abnormalities². Impairments in oral communication are prominent. Muscle control problems affect word articulation, resulting in imprecise and unintelligible speech and impacting quality of life. Therapies to improve communicative function should focus on phonatory stability, vocal frequency and intensity control, and methods to increase speech rate².

Currently, there are no specific treatments proven to be effective for these changes, but an early and comprehensive evaluation by specialized professionals is recommended³. It is important to highlight that research and development of specific treatments for communication changes in Friedreich ataxia are ongoing, and it is crucial to continue investigating new therapeutic approaches to improve these patients' quality of life and communication³. Therefore, this case report aimed to describe and evaluate the effects of an oral communication training program on a journalism student presented with Friedreich ataxia.

CASE PRESENTATION

This case report followed the Brazilian National Health Council guidelines, starting after approval by the Research Ethics Committee of the Hospital Português/Real Sociedade Portuguesa de Beneficência, BA, Brazil, under evaluation report number 2.780.453 and protocol CAAE 87624618.0.0000.0041, and after obtaining consent from the coordinator of the Journalism program where the participant studied. The student agreed to participate in the study by signing an informed consent form.

The participant was a 23-year-old single white male, a digital influencer, a journalism student, and a full-time intern at a university radio station. He had weekly vocal demands in situations such as meetings, presentations, classes, courses, social and cultural events, and content production for his social media. Before being

diagnosed with ataxia, he underwent speech-language-hearing therapy and attended a public speaking course to improve his oral communication skills, which he said were useful for his professional performance when speaking in public.

An experienced neurologist diagnosed it through genomic mapping recently, when the patient was 23 years old. This young man was the only member of his family diagnosed with ataxia. He reported scoliosis and underwent Global Postural Reeducation (GPR), but felt very uncomfortable due to his body imbalance, frequently tripping and bumping into objects. He experienced tremors when standing up and sitting down.

This student participated in eight 2-hour group sessions of the Expressiveness Development Program for Oral Communication⁴, together with other journalism students, moderated by speech-language-hearing professionals and students. The intervention aimed to improve oral communication in interactive groups, considering vocal psychodynamics and the relationship between form and content, sound and meaning. It included strategies such as reading aloud, linked speech with different emotions, and audiovisual materials to improve speech, communication, and vocal function⁵⁻⁸.

Data were initially collected in the first session, including questionnaires on sociodemographic data, speech and voice self-assessment, text reading recorded for later auditory-perceptual evaluation, and acoustic analysis. The first session also covered the fundamental aspects of the program. From the second to the seventh session, the program was divided into three parts: 1) dialogic exposure and auditory stimulation to develop communicative perception; 2) vocal exercises and strategies for vocal preparation; and 3) exercises and strategies for linked speech with text reading to develop oral communication. In the final session, the main training topics were reviewed, and final data were collected using the same protocols.

The study used an instrument adapted from the Self-Assessment of Voice and Speech Skills in Various Communicative Contexts questionnaire⁹, applying only two specific questions: "How do you perceive your diction (speech) when speaking in public?" and "How do you perceive the sound of your voice when speaking in public?". The response options for these two questions were: "The same as always", "Better than usual", "Worse than usual", and "Variable, according to the situation". The protocol was adapted to focus on the main difficulties reported by the participant.

The speech samples were recorded in the sound-proof radio studio where the participant worked, keeping the noise below 50 dB SPL, and using a 44,000-Hz sampling rate and a 16-bit depth, an Audio-Technica microphone, model AT2020, equipped with a Shock Mount SH-100 anti-puff filter. The participant remained seated during all recordings. He read the following informative text (in Portuguese): “Jarbas Barbosa, the new chairman of Anvisa, advocates changes in food packaging. The measure is necessary to facilitate the identification of products with high salt, sugar, or fat content. This information is essential to ensure that all consumers make an informed choice when purchasing”⁴. This text was chosen because its structure and phonetic complexity are like the material with which he usually works. The samples were edited using Audacity software, version 2.1.3, considering only the last sentence of the text for the auditory-perceptual evaluation, as it is a short sentence, suitable for this analysis¹⁰.

The judges assessed the content following a three-part auditory-perceptual evaluation protocol⁴. In Part I, the judge listened to two samples (Reading A and Reading B) and assigned scores from 0 to 10 for specific labels such as clear voice, clear diction, message credibility, and engagement with the listener. In Part II, each sample was evaluated for the grade of hoarseness, classified on a scale of 0 to 3 – like the GRBASI scale¹¹. In Part III, they analyzed vocal and speech characteristics such as frequency, intensity, speech rate, pauses, modulation, and emphasis, assigning a score from 0 to 2 for each item: 0 for “completely adequate” to the text, 1 for “partially adequate” to the text, and 2 for

“inadequate.” Similar readings were analyzed homogeneously, while different ones were analyzed separately.

The judges were analyzed for interrater and intratester agreement with other speech samples, as described in previous studies^{10,12}. The multiple kappa test was used to evaluate the internal agreement between the judges – values less than zero indicated insignificant agreement; from 0 to 0.2, weak agreement; from 0.21 to 0.4, reasonable agreement; from 0.41 to 0.6, moderate agreement; from 0.61 to 0.8, strong agreement; and from 0.81 to 1, almost perfect or perfect agreement¹³. Due to the low agreement between the judges, it was decided to consider only the judge’s judgment with the highest internal coefficient, which in this case was $k = 1$. The statistical tests were conducted using RStudio software, version 3.6.3.

Acoustic measures were obtained from text readings using the free software Praat (version 6.4.07), developed by Paul Boersma and David Weenink, from the University of Amsterdam. Various measures were extracted, including mean, median, standard deviation, minimum, and maximum fundamental frequency (f0), as well as spectral decay (long-term-average spectrum [LTAS]), cepstral peak prominence (CPP), and cepstral peak prominence-smoothed (CPPS), speech duration, articulation and utterance rate, and loudness. The speech rate was calculated by annotating the words in the TextGrid layer and dividing the total number of words by the total audio time. Pauses were identified and annotated for articulation rate, subtracting the total pause time from the total audio time. The total number of words was then divided by the effective speech time in minutes/seconds¹⁴.

Chart 1. Description of the Expressiveness Development Program for Oral Communication

Session 1: Opening – Program Bases (2 hours)	
Part I	Presenting the training and the researchers involved
	Applying the self-assessment questionnaire
Part II	Individual voice recording
Homework	Perceiving one's own and other speakers' oral communication
Session 2: Breathing (2 hours)	
Part I (lasting 40 minutes)	Participants rate their involvement in the homework assignment on a scale of 0 to 10.
	Dialogical presentation of the basic voice production mechanisms (notions of vocal production anatomy and physiology) and basic principles of interpersonal communication
Part II (lasting 20 minutes)	Discussing punctuation and breathing and performing respiratory pauses according to the logic of the text, with an example of a sentence with different meanings according to the punctuation used
	Cervical movements and shoulder rotation technique
	Large costodiaphragmatic movements during sequences of deep inspiration and expiration
Part III (lasting 20 minutes)	Exercise in marking punctuation, such as commas and periods, in printed texts without graphic symbols in which the annotation must be made according to the logic of the text, noting the difference in the duration of the pauses in the case of commas and periods.
	Reading texts aloud with brief individual feedback
Part IV (lasting 40 minutes)	Individual video recording of reading and informative text aloud – “Brazil, a country with a partially free press” – for later analysis by participants
Homework	Performing exercises and reading aloud, as proposed at the session
	Perceiving one's own other speakers' oral communication
	Observing breathing and its relationship with speech content
Session 3: Vocal warm-up (2 hours)	
Part I (lasting 60 minutes)	Participants rate their involvement in the homework assignment on a scale of 0 to 10.
	Dialoged presentation on vocal health and impressions conveyed by different vocal resources
Part II (lasting 30 minutes)	Reading aloud of informative text
	Strategy to guide the participant in the overall understanding of the text through questions to identify the structure of the text and infer the author's intention
	Reading the same text aloud and comparing readings before and after understanding the text
	Technique with cervical movements and shoulder rotation
	Large movements of the costodiaphragmatic structures during sequences of deep inspirations and expirations
	Vibrating sound technique in sustained modulated emissions and musical scales
	Yawn-sigh technique
	Glottic firmness technique
	Nasal sound technique associated with masticatory technique
Part III (lasting 30 minutes)	Reading aloud the same informative text, analyzing the situations
	First reading without discussing the text
	Second reading, after discussing and understanding the text
	Third reading, after understanding the text and warming up the voice
	Comparison between reading and brief individual feedback
	Reading aloud another informative text with brief individual feedback, scoring parameters such as frequency, intensity, speech articulation, resonance, and their relationship with the content of the text
Homework	Performing the exercises and reading aloud, as proposed at the session
	Perceiving one's own and others' oral communication
	Observing voice frequency and intensity, speech articulation and resonance, and their relationship with the speech content

Session 4: Articulation of speech sounds (2 hours)	
Part I (lasting 50 minutes)	Participants rate their involvement in homework and their oral communication during the week from 0 to 10.
	Video presentation to show examples of vocal psychodynamics, a topic already discussed in the previous session, approaching the impressions conveyed by vocal resources.
	Dialogical exhibition with audio and video examples showing people with different types of articulatory patterns
Part II (lasting 30 minutes)	Reading aloud of informative text
	Questions to guide overall understanding of the text: identifying the structure of the text and inferring the author's intention
	Technique of cervical movements and shoulder rotation associated with the technique of vibrating sounds
	Vibrating sounds technique in modulated emissions
	Nasal sound technique associated with masticatory technique
	Tongue rotation technique in the oral cavity associated with the nasal sounds technique
	Masticatory technique
Part III (lasting 40 minutes)	Over articulation technique
	Reading aloud the same informative text and comparing readings before and after the exercises, with brief individual feedback
	Reading aloud an advertising text aimed at a young audience – therefore, to be read at a fast speed, maintaining articulatory precision.
	Combination of all the skills worked on during this session: text comprehension strategies and exercises to ensure well-defined articulation.
Homework	Brief individual feedback
	Performing the exercises and reading aloud, as proposed at the session
	Perceiving one's own and others' oral communication
Session 5: Frequency and intensity modulation (2 hours)	
Part I (lasting 50 minutes)	Observing the articulation of speech sounds and their relationship with the speech content
	Participants rate their involvement in homework and their oral communication during the week from 0 to 10.
	Dialogical exhibition with audio and video examples showing people with different types of frequency and intensity modulation
Part II (lasting 30 minutes)	Audio example presentation to show the different vocal inflections according to the punctuation of the text
	Reading aloud text in which the same sentence has different meanings depending on where the comma is placed
	Technique of cervical movements and shoulder rotation associated with the technique of vibrating sounds
	Nasal sound technique associated with masticatory technique
	Basal sound technique
	Technique with blowing and high-pitched sound
Part III (lasting 40 minutes)	Vibrating sound technique in modulated emissions and musical scales
	Frequency and intensity modulation technique
	Reading special sentences (to practice different inflections) and words previously marked (to practice emphasis)
	Reading poetry aloud
Homework	Understanding how each participant uses vocal resources according to their interpretation of the text and the message they wish to convey
	Brief individual feedback
	Performing exercises and reading aloud, as proposed at the session
Homework	Perceiving one's own and other speakers' oral communication
	Observing frequency and intensity modulation and its relationship with the speech content

Session 6: Resonance (2 hours)	
Part I (lasting 20 minutes)	Participants rate their involvement in homework and their oral communication during the week from 0 to 10.
Part II (lasting 30 minutes)	Reading aloud advertising text
	Questions to guide overall understanding of the text: identifying the structure of the text and inferring the author's intention
	Reading informative text aloud before exercises
	Technique of cervical movements and shoulder rotation associated with the technique of vibrating sounds
	Fricative sounds technique: concatenated emission of voiced fricatives “vzj vzj vzj”
	Yawn-sigh technique
	Nasal sound technique associated with masticatory technique
Part III (lasting 40 minutes)	Tongue rotation technique in the oral cavity associated with the nasal sounds technique
	Reading aloud the same advertising text and comparing readings before and after exercises, with brief individual feedback
	Chanted voice technique associated with articulatory sequences and automatic speech
	Reading aloud informative text with brief individual feedback
Part IV (lasting 30 minutes)	Combining all skills worked on during this session: text comprehension strategies and exercises to ensure balanced resonance and project the voice better.
	Individual video recording of reading aloud the informative text “Brazil, a country with a partially free press”, the same text used in Session 2, for participants to analyze.
	Homework
Homework	Performing exercises and reading aloud, as proposed at the session
	Perceiving one's own and other speakers' oral communication
	Observing resonance and its relationship with the speech content
Session 7: Comparison of oral communication before and after training (2 hours)	
Part I (lasting 20 minutes)	Participants rate their involvement in homework and their oral communication during the week from 0 to 10.
Part II (lasting 10 minutes)	Dialogical exposition on verbal expressiveness in the text, drawing attention to the fact that voice and sound are always loaded with meaning, as well as reviewing all the vocal parameters worked on throughout vocal training, relating the impressions conveyed by the various voice resources
	Explaining the next activity – comparison between videos before and after training, individual comments, self-assessment, and feedback from colleagues and the speech-language-hearing pathologist
	Presenting videos of each participant, organized in pairs, recorded in Sessions 2 and 6, considered as pre- and post-training material, respectively
	Analysis of recordings
	Feedback immediately after watching each student's video
	Comments on the points that have improved and those that could improve further
Homework	Performing exercises, as proposed throughout the training, according to individual needs
	Perceiving one's own and other speakers' oral communication
Session 8: End of program (2 hours)	
Part I (lasting 20 minutes)	Participants rate their involvement in homework and their oral communication during the week from 0 to 10.
Part II (lasting 100 minutes)	Summary of the training, reviewing exercises, and reinforcing the most important points
	Applying the self-assessment questionnaire
	Individual voice recording

RESULTS

The participant's self-assessment of diction (speech) did not change after training, still being classified as "worse than usual". However, the self-assessment of the sound of the voice improved from "worse than usual" to "better than usual".

In the auditory-perceptual evaluation, the judge noted differences between the readings before and after the training. The reading score increased from 6 to 8, indicating an improvement in the quality of the reading. Moreover, the judge highlighted that diction had the most relevant change, and vocal quality progressed from "mild vocal deviation" before the training to "absence of vocal deviation" after the training. The vocal frequency and intensity in text reading changed from "partially adequate" to "adequate"; the speech rate changed from "inadequate" to "adequate"; pauses and emphasis changed from "inadequate" to "partially adequate"; and modulation remained "partially adequate" after the training.

F0 measures increased – the median changed from 210 Hz to 215 Hz; the mean f0, from 210 Hz to 220 Hz; the standard deviation, from 29 Hz to 35 Hz; the minimum f0, from 135 Hz to 142 Hz; and the maximum f0, from 269 Hz to 315 Hz. Spectral decay decreased from -19 to -14. CPP measures changed from 15.42 dB to 15 dB, and CPPs from 9.42 dB to 9.95 dB. Speech duration decreased from 7.22 seconds to 6.62 seconds. The articulation rate increased from 5.40 to 5.89 words per second, and the speech rate, from 2.35 to 2.56. There were also changes in vocal intensity, decreasing from 69.63 dB to 63.35 dB.

Lastly, the participant reported more public speaking experiences over the weeks after training, including situations such as meetings, presentations, lectures, conferences, courses, and social and cultural events. He found it easier to speak to many and few people alike and mentioned feeling less nervous than before training, experiencing nervousness only a few hours before speaking in public. However, he still feels nervous when he is unsure about the content and during presentations, lectures, meetings, classes, and public assessments. Anxiety when speaking in public caused sweating, gastrointestinal discomfort, and shortness of breath. He also reported voice tremors, vocal fatigue, and a higher-pitched voice than usual in these situations. The participant identified that he slows his speech down, switches phonemes, and becomes short of breath when speaking in public. Nevertheless,

people generally rate his communication after the training as "excellent."

DISCUSSION

This case report describes and evaluates the effects of an oral communication training program on a journalism student with Friedreich ataxia. This condition is characterized by symptoms such as progressive ataxia, loss of tendon reflexes, difficulty in speech articulation, tremors, imbalance, muscle weakness, and impaired motor coordination. These manifestations directly affect oral communication, compromising speech clarity, fluency, and coordination between breathing, articulation, and vocal production^{1,2,15-18}.

After the training, the participant reported a noticeable improvement in the quality of his voice and, most importantly, an increase in his self-confidence when communicating in public. This may be related to the reduction of specific communicative symptoms, such as vocal tremors, imprecise speech, and breathing and speech incoordination. Linked reading and vocal exercises helped improve the coordination between breathing, articulation, and vocal emission, reducing the incidence of inappropriate pauses and promoting more fluent speech in vocally healthy individuals^{10,19} and those with progressive ataxia²⁰.

Reading aloud with different emotions and vocal modulation training, as suggested in the protocol, may have contributed to minimizing vocal tremors and improving speech f0 control. Studies indicate that precise articulation and phonatory control are constant challenges in individuals with Friedreich ataxia due to difficulties with motor coordination and stability^{2,3}. The program focused on strengthening these skills, which may have positively impacted the participant's vocal quality, as suggested by changes in perceptive assessments.

A study with ClearSpeechTogether²⁰ (an intervention method aimed at improving the speech of people with progressive ataxia) combined individual sessions and group practices focused on two main strategies: "LOUD" (effective and projected use of voice) and "CLEAR" (super articulation for greater clarity), practiced individually and in groups. It showed that interventions for people with progressive ataxia can improve speech intelligibility, increase confidence, and reduce vocal effort. The findings are relevant because they show that programs integrating strategies such as reading aloud and vocal modulation training contribute to phonatory control and articulation, which are often

compromised in individuals with ataxia. The reduction in vocal effort suggests that the focus on modulation helps to stabilize vocal production, minimizing tremors and deviations in voice quality. In addition, participants reported feeling more confident and engaged, demonstrating greater control over their voice and a reduction in tremor symptoms. Reading practice with group feedback helped them internalize articulation and modulation strategies, improving performance in spontaneous and planned speech situations. Therefore, the study supports the idea that structured interventions, involving reading aloud with different emotions and vocal modulation training, can improve the quality and stability of speech in people with Friedreich ataxia.

Despite the small variations in f0 and vocal intensity (e.g., a 5 Hz increase in f0 and a 0.3 dB reduction in intensity), these results may indicate greater voice stability and better modulation control²¹. In individuals with Friedreich ataxia, inadequate vocal frequency control is associated with motor disorganization, resulting in monotonic speech and poor intelligibility^{3,16}. Thus, even small changes in these parameters can indicate progress in vocal stabilization.

The improved diction identified by the auditory-perceptual evaluation judge is especially relevant, considering that ataxic dysarthria is a common symptom in patients with Friedreich ataxia. This condition can result in slurred, hesitant speech with imprecise articulation³. The intervention program addressed these aspects through linked speech techniques, articulation exercises, and breathing practices, suggesting that the training may have contributed to clearer and more intelligible speech.

The participant reported that the anxiety to speak in public decreased during the study, which may reflect a positive effect of the training on self-perceived communication skills. Anxiety and nervousness can aggravate symptoms such as vocal tremors, shortness of breath, and muscle tension, often reported by individuals with this condition. By increasing confidence and assurance when speaking, the training may have helped to reduce vocal strain and failures associated with these emotional factors, thus improving communicative performance^{12,22,23}.

These results, although preliminary, suggest that interventions focused on developing oral communication in groups may help minimize some of the dysarthria symptoms associated with Friedreich ataxia. Furthermore, the psychodynamic approach integrating aspects of form, content, sound, and meaning may

have promoted greater vocal self-perception and control. However, as the study is a case report, it is essential to replicate this intervention in a larger sample to validate these findings and measure its impact statistically.

In addition to using validated instruments to assess changes in confidence and self-esteem, future studies should correlate communication changes with motor and emotional parameters of patients with Friedreich ataxia. Additional investigations may also explore specific techniques that influence the reduction of symptoms such as tremors and vocal failures more directly.

CONCLUSION

The training program had positive results in the participant's oral communication, improving voice self-perception, vocal quality, diction, and some acoustic measures. These results, although consistent with the literature, should be considered preliminary, due to the nature of the study.

REFERENCES

1. Williams CT, De Jesus O. Friedreich Ataxia; 2024.
2. Zhang S, Napierala M, Napierala JS. Therapeutic prospects for Friedreich's ataxia. *Trends Pharmacol Sci.* 2019;40(4):229-33. <https://doi.org/10.1016/j.tips.2019.02.001>
3. Schirizzi T, Sancesario A, Bertini E, Castelli E, Vasco G. Speech and language disorders in Friedreich ataxia: Highlights on phenomenology, assessment, and therapy. *The Cerebellum.* 2020;19(1):126-30. <https://doi.org/10.1007/s12311-019-01084-8>
4. Borrego M. Proposta de atuação fonoaudiológica para estudantes de comunicação: efeitos de dois tipos de treinamento [Thesis]. Universidade Federal de São Paulo - UNIFESP - Escola Paulista de Medicina - EPM; 2017.
5. de Jesus Batista D, Lopes LW, Almeida AA, Siqueira LTD, Ribeiro VV. What factors determine the use of volitional and non-volitional devices in vocal interventions performed by Brazilian speech-language pathologists? *J Voice.* 2023;0(0):1-19. <https://doi.org/10.1016/j.jvoice.2023.10.026>
6. Batista D de J, Duarte JM da T, Siqueira LTD, Almeida AA, Lopes LW, Ribeiro VV. Volitional and non-volitional devices used in voice therapy and training: A scoping review - Part A. *J Voice.* Published online December 2023. <https://doi.org/10.1016/j.jvoice.2023.10.027>
7. Ribeiro VV, Batista D de J, Santana ÉR, Siqueira LTD, Fabron EMG, Oliveira P. Dispositivos volitivos e não volitivos utilizados na terapia e no treinamento vocal. In: Hipólito Magalhães, Leonardo Lopes, Silvia Benevides, editors. *Intervenção fonoaudiológica em voz e funções orofaciais.* 1ed. Rio de Janeiro: Thieme Revinter; 2024, v. 1, p. 175-98.

8. Van Stan JH, Whyte J, Duffy JR, Barkmeier-Kraemer J, Doyle P, Gherson S et al. Voice therapy according to the rehabilitation treatment specification system: Expert consensus ingredients and targets. *Am J Speech Lang Pathol.* 2021;30(5):2169-201. https://doi.org/10.1044/2021_AJSLP-21-00076 PMID: 34464550.
9. Ugulino A. Autoavaliação do comportamento comunicativo ao falar em público das diferentes categorias profissionais [Dissertação]. São Paulo (SP): Universidade Federal de São Paulo - UNIFESP - Escola Paulista de Medicina - EPM; 2014.
10. Batista D de J, Conceição AS da. Auditory-perceptual effects of an oral communication training on university radio broadcasters. *Distúrb. Comun.* 2021;33(3):557-70. <https://doi.org/10.23925/2176-2724.2021v33i3p557-570>
11. Hirano M. *Clinical Examination of Voice.* Springer-Verlag; 1981.
12. Batista D de J, Conceição A dos S. Self-perception of the effects of oral communication training in public speaking situations: A study before and after intervention with announcers of a university radio. *Distúrb. Comun.* 2023;34(4). <https://doi.org/10.23925/2176-2724.2022v34i4e57797>
13. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics.* 1977;33(1):159-74.
14. Costa LMO, Martins-Reis V de O, Celeste LC. Methods of analysis speech rate: A pilot study. *Codas.* 2016;28(1):41-45 <https://doi.org/10.1590/2317-1782/20162015039> PMID: 27074188.
15. Cook A, Giunti P. Friedreich's ataxia: Clinical features, pathogenesis and management. *Br Med Bull.* 2017;124(1):19-30. <https://doi.org/10.1093/bmb/ldx034> PMID: 29053830.
16. Vogel AP, Wardrop MI, Folker JE, Synofzik M, Corben LA, Delatycki MB et al. Voice in Friedreich ataxia. *J Voice.* 2017;31(2):243.e9-243.e19. <https://doi.org/10.1016/j.jvoice.2016.04.015> PMID: 29053830.
17. Keita M, McIntyre K, Rodden LN, Schadt K, Lynch DR. Friedreich ataxia: Clinical features and new developments. *Neurodegener Dis Manag.* 2022;12(5):267-83. <https://doi.org/10.2217/nmt-2022-0011> PMID: 35766110.
18. Corben LA, Lynch D, Pandolfo M, Schulz JB, Delatycki MB. Clinical Management Guidelines Writing Group. Consensus clinical management guidelines for Friedreich ataxia. *Orphanet J Rare Dis.* 2014;9:184. <https://doi.org/10.1186/s13023-014-0184-7> PMID: 25928624.
19. Batista D de J, Conceição AS da. Effects of the Program for Developing Oral Communication Expressiveness on university radio announcers: A pre/post intervention study. *Codas.* 2025;37(2):1-12. <https://doi.org/10.1590/2317-1782/e20240122en> PMID: 39936814.
20. Lowit A, Cox J, Loucas M, Grassly J, Egan A, van Brenk F et al. ClearSpeechTogether: A rater blinded, single, controlled feasibility study of speech intervention for people with progressive ataxia. *The Cerebellum.* 2022;22(5):865-76. <https://doi.org/10.1007/s12311-022-01462-9> PMID: 36001243.
21. Farghaly SM, Andrade CRF de. Voice training program for radio presenters. *Rev. soc. bras. fonoaudiol.* 2008;13(4):316-24. <https://doi.org/10.1590/S1516-80342008000400004>
22. Picanço Marchand DL, Rodrigues Carvalho LS, de Souza Leal D, Gonçalves Câmara S, Cassol M. Fear of public speaking: The effects of a communicational improvement training on physiological parameters and the perception of communication. *Logoped Phoniatr Vocol.* 2024;49(4):197. <https://doi.org/10.1080/14015439.2024.2303633> PMID: 38225800.
23. Lira AA de M, Marchand DLP, Carvalho LSR, Cassol M. Effect of a program to improve oral communication skills on self-reported anxiety and stress. *Audiol.; Commun. Res.* 2021;26. <https://doi.org/10.1590/2317-6431-2021-2545>

Authors' contributions:

DJB: Conceptualization; Data curation; Data analysis; Writing - Original draft; Writing - Review & editing.

ASC: Conceptualization; Data curation; Data analysis; Writing - Review & editing.

Data sharing statement:

As this is a case report, all data from only study participant are already available in the manuscript.