

Pediatric Dysphonia and the Access to Voice Therapy: A Study in Speech Therapy Services Available in a Capital City in the Northeast of Brazil

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Summary: Objectives. Defining the laryngeal and vocal alterations in the pediatric group studied in private speech therapy facilities; and estimating the time period between the problem being identified by the parents and the access to the proper provided services.

Methods. A cross-sectional analytical observational research with data collected from medical records by the speech therapist of each private facility. A written form was prepared and sent to the speech therapists of the 40 existing facilities. We received 124 of them from the pediatric group being assisted in 15 of the facilities. The form included questions about gender, age, vocal complaints; general degree of dysphonia; otorhinolaryngological diagnosis of vocal fold alterations; the age that the problem was identified by the parents and the beginning of speech therapy. The larynx was examined by videonasopharyngolaryngoscopy, and voice quality by auditory-perceptual assessment.

Results. The time period between the identification of the participant's dysphonia by the parents and the start of speech therapy was considered long (3.5 years). The group showed variance in the proportion of nodule and cyst between genders. The highest prevalence of nodules occurred in boys; and the cyst in girls. Moderate general dysphonia occurred between 4 and 17 years old, average age of 7 years and 7 months, with greater distribution between 5 and 10 years of age.

Conclusions. The average time delay until the start of speech therapy was 3.5 years, more frequently in the 5–10 years group and due to nodules in boys and cysts in girls.

Key Words: Epidemiology–Voice disorders–Dysphonia–Childhood dysphonia–Otolaryngology–Speech therapy.

INTRODUCTION

During the childhood and teenage years, changes in the vocal folds are commonplace, being it unilaterally or bilaterally, independent of the biological sex of the person, and with a higher occurrence of benign alterations, such as nodules and polyps, with minimal structural alteration, mainly cysts.¹ These changes have a negative impact on the voice and the quality of life of these groups.²

It is quite evident that the voice is able to express emotions, feelings and personality traits, with the listener being able to identify personal characteristics of the speaker,³ with any variation in the voice having the chance being interpreted differently in the communication process. Dysphonia is characterized by a voice alteration that prevents its natural emission,⁴ producing a negative impact on the quality of life⁵ of the speaker, and is frequently found in children and teenagers, although there are not as much epidemiological studies in this age group.¹

The diagnosis of changes in the vocal folds and on the voice are made by endoscopy of the larynx and by the auditory-perceptual analysis as the most indicated procedures. In the pediatric population, however, there are more frequent difficulties and barriers in accessing these services, both in diagnosis and in interventional procedures.^{6,7}

It's a fact that not every child is going to be able to have access to voice therapy.⁷ In our field, there is an evident lack of access to speech therapy assessment designed for children and teenagers, which we consider relevant to understand the profile of the pediatric age group assisted by speech therapists found in the private health network, as well as identifying the presence or absence of facilitators and barriers in the process of accessing speech therapy.

Additionally, it is important to highlight that there is a belief that young people with a private health insurance and with greater financial resources can access these

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services more quickly. However, there are still not many studies performed in this network relating to the time frame between the diagnosis of dysphonia and the access and use of speech therapy in young people, reiterating the need for investigation as proposed here.

In this study, we aimed to describe the laryngeal alterations and the general degree of voice alteration, between biological sexes, in the pediatric population supported in private speech therapy facilities in the city of Aracaju, Northeast of Brazil, estimating the average time between the age that the altered voice was identified by the parents and the beginning of access and use of speech therapy services for voice therapy.

METHODS

The design of this study is cross-sectional analytical observational, with surveyed data obtained from medical records of private speech therapy facilities in Aracaju, Northeast, Brazil. Data gathering took place between August and November 2008, referring to the period from January 2007 to July 2008.

Context and scope

The study covered the group of patients of private speech therapy facilities that meet the demand of private health-care plans, consisting of children and teenagers with voice disorders. In this study, we assume that the term pediatric dysphonia covers the group of children and teenagers. The private speech therapy facilities that participated in this study are located in different neighborhoods in the city of Aracaju, capital of the State of Sergipe, in Northeast Brazil.

The city of Aracaju is the capital of the State of Sergipe, with an estimated population of 571,149 inhabitants, representing approximately 25% of the State's population, in an area of 181,857 km².⁸ It should be noted that Aracaju concentrates the vast majority of speech therapy facilities in Sergipe, drawing patients for diagnosis and treatment from all across the state.

The survey of existing locations occurred through an active search of the registered speech therapists (N = 40) in the Association of Speech Therapists of Sergipe - ASFOSE existing at the time of this study. Initially, contact was made by telephone followed by scheduling a visit to the facilities, with the goal of inviting the professionals, presenting the study proposal, and guiding them on filling out the form based on the survey of records in medical records.

Inclusion and exclusion criteria

The study included the pediatric population undergoing speech therapy for dysphonia in private facilities, regardless of age and biological sex. Subjects who had other communication and hearing disorders associated with dysphonia were excluded.

We included all eligible services for the study, excluding only services that did not meet what we were going to investigate. Seven clinical audiology facilities that did not offer speech therapy in the voice area, one facility that only provided services for adults and five facilities that did not provide services for children at the time of collection were not included. Another five facilities that only offered speech therapy for language disorders were also not included. In total, 15 services were included with their respective 15 professionals who treated children and teenagers. Twenty forms that were not fully completed or that did not have the Free and Informed Consent Form (TCLE) signed as an attachment were excluded. The terms were signed by parents, technicians responsible for the establishments and speech therapists. Patient identification was never collected and was not part of the results.

Independent and dependent variables

The selected independent variable was biological sex. The dependent variables were: age, otorhinolaryngological diagnosis of the structures of the vocal folds, general degree of voice alteration and the subject's age at the time the problem was acknowledged by the parents and when the follow-up with a speech therapist started.

Research tool

A form was used for data gathering, based on our previous studies⁹⁻¹¹ on pediatric dysphonia, containing the medical records of each child or teenager being treated.

The form had nine closed questions containing the following data: parent's account of the vocal complaint (hoarseness or other); biological sex (male, female); presence of other communication disorders (language, speech and others) and hearing disorders (present or absent); otorhinolaryngological evaluation of the vocal folds (presence or absence); description of the type of laryngeal lesion at diagnosis, general degree of voice alteration (neutral, mild, moderate or severe); and the participant's age when the problem was identified by parents/guardians (in years of age) and at the beginning of speech therapy (years). From this data, the calculation of the time between the two moments was estimated in years. The test used by the otorhinolaryngologists in this study was videonasopharyngolaryngoscopy.

This study was interested in focusing only on the classification of the general degree of voice deviation parameter, so other voice parameters, type and mode of breathing, associated behaviors, or even the qualitative analysis of the spectrograph or acoustic measurements used by speech therapists were not included.

Data gathering

The form was distributed among the speech therapists who worked in the 40 private facilities existing in the year of this study. Of these, the 15 eligible facilities, with an equal

number of professionals, returned 124 completed forms about children and teenagers assisted. Data gathering was performed by the speech therapist of each facility, at their workplace, without the presence of the researcher and only using the survey of medical records as a basis. The professionals who performed both the laryngeal and voice check-ups reported having more than 10 years of training and experience with the pediatric dysphonia group.

Data analysis

From the obtained results, the data and the possible correlations between them were statistically analyzed. In the analysis of the data, a database was initially built in the Microsoft Excel program. Categorical variables were described using absolute and relative percentage frequency and continuous variables using mean, median, minimum, maximum, standard deviation, and interquartile range. The hypothesis of independence between categorical variables was tested using Pearson's chi-square test. The significance level adopted was 5% and the software used was R Core Team 2022 (version 4.2.2).

Ethical aspects

This study began after approval by the Ethics and Research Committee involving human beings of the Department of Medicine of the Federal University of Sergipe, with form number 007.2005. The research is in line with the resolutions of the National Health Council/CNS 196/1996,¹² and later updated by 466/2012.¹³ All aspects contained in the

CNS resolutions were respected to guarantee the protection of volunteers. After guidance on the research objectives and method, both the speech therapists, the technicians of the private facilities that assisted the group, and the parents/guardians of the children who consented to participate in the research signed the TCLE and approved the spreading of its results.

RESULTS

The study included 124 children and teenagers who took part in voice therapy at private speech therapy facilities in Aracaju.

Table 1 shows the distribution according to biological sex, the selected variables, and the average estimated time to start accessing and using speech therapy care. The average estimated time for accessing and using voice therapy between the identification of the participant's condition by the parents and the start of speech therapy was 3.5 (SD \pm 3.59) years, with a median of 2 years, with the first quartile in 1 year and third quartile in 5 years with a minimum of 1 year and a maximum of 14 years.

The groups age ranged from 4 to 17 years old, with an average age of 7.7 years old, with 73 (59%) boys. As for the age range of the population, the highest proportion occurred between 5 and 10 years old, corresponding to 79 (82%) individuals. With regard to the parents' perception, 67 (54%) observed the occurrence of some voice alteration in the first 5 years of life.

TABLE 1.

Distribution of the Proportion Between the Biological Sexes of the Population Assisted in Private Speech Therapy Facilities and the Average Waiting Time to Access and Use the Private Speech Therapy Service in Aracaju, Sergipe, Northeast of Brazil

	Biological sex				Total		χ^2 (P)
	Male		Female		N	%	
	n	%	n	%			
Age range in years (N = 124)							
< 5	2	3	2	4	4	3	0.155 (0.925)
5–10	53	72	36	71	89	72	
> 10	18	25	13	25	31	25	
Age of subject when the condition was identified by parents (N = 124)							
Up to 5 years old	43	59	24	47	67	54	1.739 (0.419)
6–10 years old	24	33	21	41	45	36	
> 10 years old	6	8	6	12	12	10	
ENT diagnosis							
of vocal fold alterations (N = 67)	28	75	15	50	43	64	8.197 (0.042)*
Nodules	7	19	15	50	22	32	
Cyst	1	3	0	0	1	2	
Polyp	1	3	0	0	1	2	
No change in vocal folds							
General degree of voice alteration (N = 124)	24	33	23	44	47	38	1.905 (0.386)
Light	42	57	24	46	66	53	
Moderate	7	10	4	10	11	9	

Missings have been deleted and not replaced. χ^2 – Pearson chi-square test statistics; (P) – P-value.

* P < 0.05.

Among the studied group, only 67 individuals underwent medical evaluation and videonasopharyngolaryngoscopy. There was a statistical change between the biological sexes of the participants with alterations in the structures of the vocal folds ($P < 0.04$). The highest proportion of nodules occurred in boys when compared to girls. However, the proportion of cysts was higher in girls than in boys, with a single boy having a polyp.

When analyzing the proportion of the general degree of dysphonia in the study group of 124 subjects, the general degree of moderate vocal deviation occurred in 66 (53%) individuals.

DISCUSSION

Our study described vocal fold alterations and the general degree of voice deviation, between biological sexes, in the pediatric group assisted in private speech therapy facilities, estimating the average time between the period when the condition was identified by the parents, the beginning of the access and start of voice therapy.

Videonasopharyngolaryngoscopy revealed discrepancies in the diagnosis of vocal folds biological sexes: the prevalence of vocal fold nodules was higher in boys, and cysts in girls, but not everyone underwent the exam, with a single boy having a polyp. Two integrative reviews show epidemiological transition, in one, in Belo Horizonte (MG), southeastern Brazil, a survey of scientific articles was performed in the period between 2001 and 2016 that points out that the most prevalent vocal fold cyst is on the up-to-6 years of old and, after this age, it is the nodule.⁵ Another, in New York, studies were included with retrospective and prospective methods, cohort, cross-sectional, case-control, in the period between 2009 and 2019, which shows the vocal fold nodule as a higher prevalence in school-age children.⁶ More group studies are needed to analyze the vocal health characteristics of each study assembly in their respective regions, contexts, and aiming in identifying the barriers in accessing these services.

However, our study reveals similarities with another recent study performed in India that assessed its protocols from the period 2017–2022.¹ A group ($N = 156$) between 5 and 18 years of age evaluated with videonasopharyngolaryngoscopy and videostroboscopy was included. There was a greater distribution of nodules, polyps and cysts, regardless of age and biological sex. In Aracaju, the study group only accessed videonasopharyngolaryngoscopy, since access to videostroboscopy is restricted to a few private facilities.

Current studies have recognized that videostroboscopy should be considered the diagnostic standard in the assessment of pediatric dysphonia.¹⁴ At the same time, there is a consensus among otorhinolaryngologists that speech therapy is the primary and most effective conduct for vocal fold nodules and cysts and should, when necessary, include pharmacologic treatment and/or surgery.¹⁵ This reinforces the need for interdisciplinary work in the pediatric group.

In our study, we consider the population's lack of access to these exams and voice therapy, even in the private sector and in patients with health insurance, as another barrier to starting the process of developing communication and voice.

On the other hand, with regard to the prevalence of pediatric voice alteration, there are variations in the scarce population surveys, related to the different methodologies used. National studies show epidemiological variation between 11.4% and 87%,^{9,16–18} while international studies reveal values between 3.9% and 23.4%.^{19–22}

In this study, there was a greater distribution of the general degree of moderate voice deviation in the study group ($N = 124$), without distinction between biological sex. This differs from the study that assessed the severity of voice disorders in 71 children aged 3–9 years in the city of João Pessoa, northeast of Brazil. The incidence was 84.5% with a mild general degree.¹⁸ Another study assessed the occurrence of dysphonia among 70 children, between 6 and 10 years old, 37 girls and 33 boys, and related the data from the auditory perceptual, acoustic analysis and the child's vocal self-perception. The prevalence was 84.60% with a mild general degree.²³ We believe that this difference occurred because the general degree was less severe and, perhaps, the delay was shorter, but we cannot compare.

In this research, the average time between the voice deviation identified by parents and the access to voice therapy services was long (3.5 years). A study performed in Boston, Massachusetts, analyzed the barriers to voice therapy in a pediatric group ($N = 346$) diagnosed with nodules and muscle tension. Of these, 289 participants had private healthcare and 57 relied on the public health system. The authors identified that voice therapy is not always performed. Proximity to the therapy site, the child's advanced age and the greater general degree of voice deviation showed a greater probability of access to voice therapy; biological sex, insurance status, and quality of life questionnaire score did not affect the likelihood of accessing voice therapy. Patients may primarily consider ease of access and need for treatment when considering voice therapy.⁷

Therefore, early access to diagnosis and vocal speech therapy in a population with pediatric dysphonia can prevent or minimize its interference in social and school activities and quality of life in future life cycles.²⁴ In our study, there are barriers signs on an ascending scale in the process of accessing and using specialized services, including not having access to medical exams and the private speech therapy facility.

In this study, it was noted that most parents noticed the voice changes in the first 5 years of their children's lives, probably because this age group corresponds to the period of milestones in the development of children's communication, because of a greater social interaction at school and in the family.²⁵ The group of parents in our study showed a greater attention to the change in the voice of their children in the first 5 years of life, however, there was

a delay in accessing and using specialized services in the private network. We believe this is an important perception, regarding the beginning of the research process in the care of the voice and the quality of life of your children. Future studies may analyze the motivations and/or needs and demands of parents in identifying voice disorders in their children.

In our study, most parents noticed their child's condition in the first 5 years of life, but only seeking care much later, with any type of impediment occurring for the delay in accessing private services. We infer that each family demonstrates a different perception in identifying and valuing or not their children's voice alteration, possibly due to their beliefs, life experiences within the context and regional or socioeconomic needs that they are inserted. We believe that in the presence of a voice change, late access and the need of private services is yet another challenge to the development of social interaction and, consequently, to the quality of life and voice of the pediatric group.

A population-based study performed in São Paulo, southeast of Brazil, determined the prevalence of dysphonia in children according to parents' perception and individual speech-language pathology evaluation, with 1007 boys and 993 girls between 4 and 12 years old participated. In conclusion, the decision of the parents indicated a prevalence of dysphonia of 6.15%, and the perceptual analysis of the degree of dysphonia performed by a speech therapist was 11.4%.¹⁶ In this sense, the vocal assessment of the child pediatric population must occur in an interdisciplinary way to obtain a precise and safe diagnosis and conduct.

A voice change in childhood is also related to the quality of care and social interaction that adults offer this group, as shown by a comparative population study performed in Aracaju, Northeast of Brazil, in which individually assessed voice and laryngeal changes in 200 schoolchildren and were compared to other 400 schoolchildren, from different social strata, between 7 and 10 years old. The prevalence of dysphonia was 37% with a mild to moderate degree.⁹

Despite the relevance of the findings, the limitations of this study must be pointed out. Initially, the reduced number of subjects with a medical diagnosis of the larynx, and among those who did, only video nasopharyngolaryngoscopy was performed. The population group of this study did not have access to the videostroboscopy exam. Another limitation was working with secondary data, since there is still a shortage of studies of the group of children and teenagers assisted in private facilities for data comparison purposes. In future research, videonasopharyngolaryngoscopy and videostroboscopy may be both used as the inclusion criteria to reduce diagnostic bias.

The results support the understanding of the pediatric group with dysphonia and the waiting time for speech therapy care with its different types and levels of barriers to accessing voice therapy, as well as contributing to the strategic planning and management of private services. Therefore, the symptom of vocal alteration in the pediatric

group needs to be valued by the family, as well as access to otorhinolaryngology and speech therapy services as early as it is detected.

AUTHOR CONTRIBUTIONS

NJS study conception and design, project, data collection, analysis and data interpretation, writing and revision of the article; DMMP, ATSS, EROR, VMPB, JSD, relevant critical review of intellectual content; DFNS and IDCB data analysis and article review; RQG study advisor, design, design, analysis and data interpretation, writing, review of the article and final approval of the published version.

DECLARATION OF COMPETING INTEREST

None.

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