

# Vocal Hyperfunction in Parents of Children With Attention Deficit Hyperactivity Disorder

\*Garcia-Real Teresa and †Tomás M. Díaz-Román, \*A Coruña, †Lugo, Spain

**Summary: Objective.** The objective of this study was to evaluate the presence of habits and symptoms of vocal hyperfunction in the parents of children with attention deficit hyperactivity disorder (ADHD).

**Methods.** Parents of 24 children with ADHD and 30 children of a control group completed a specific questionnaire to detect the hyperfunctional use of the voice (excessive talking, excessive loudness, talking too fast, and shouting), hoarseness, vocal fatigue, mental and physical fatigue, and the degree of parental concern for the vocal health of their child.

**Results.** Parents of children with ADHD spoke more often, faster, and stronger than the parents of the control group; in addition, they also used a louder volume than they usually used when they spoke to their children. The parents manifested more vocal, mental, and physical fatigue than the parents of the control group. There was a significant correlation between the “concern” for the vocal health of their children with respect to vocal symptoms of the children, the habits of vocal hyperfunctioning, and the symptoms suffered by the parents.

**Conclusions.** These results suggest that the parents of children with ADHD change their vocal attitude when communicating with their children. Most likely, the increased concern of parents with ADHD children and their respective level of stress lead to hyperfunctional vocal usage. This subsequently leads to symptoms of vocal, physical, and mental fatigue at the end of the day.

**Key Words:** Attention deficit hyperactivity disorder–Parents–Vocal hyperfunction–Stress.

## INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is one of the most common disorders of neurodevelopment in childhood.<sup>1</sup> It has an estimated prevalence of up to 5% in children and 2.5% in adults, according to the *Diagnostic and Statistical Manual and Mental Disorders, fifth ed.; DSM-5*.<sup>2</sup>

Difficulties in paying attention to detail and organization of tasks, excessive talking, and restlessness are frequent characteristics of ADHD; these symptoms may lead to social problems in school and in the work setting.<sup>2</sup> Additionally, other problems may coexist with ADHD, including conduct problems and emotional problems (such as anxiety, depression, and oppositional defiant disorder).<sup>3</sup> These issues may affect both the child’s well-being and social interactions, including interactions with the people with whom the child lives.<sup>4</sup>

Usually, the parents are the people who interact most closely with these children. Caring for these children leads to a high stress level because the children’s demands may exceed the parents’ capacity to accommodate these demands.<sup>5</sup> Stress arises more readily in the parents if their children exhibit disobedience or hostile and negative behavior.<sup>6,7</sup> Increased levels of impulsivity in these children may elicit a more authoritarian attitude in the parents to maintain the child’s attention and maintain discipline.<sup>8</sup>

The voice is an important instrument in parent-child communication. Stress, which parents of ADHD children experience,

has a negative influence on the voice<sup>9,10</sup>; this is because phonation not only depends on the state and function of the larynx but also relies on the physical and mental state.<sup>11,12</sup>

One mechanism by which stress deteriorates the voice is vocal hyperfunction.<sup>13</sup> Vocal hyperfunction is characterized by abuse and misuse of the vocal mechanism, secondary to excessive tension in the intralaryngeal and/or extralaryngeal musculature.<sup>14</sup> Stress produces tension, elevates the position of the larynx, and affects glottal vibration.<sup>15</sup>

Excessive loudness produces vocal hyperfunction. Additionally, prolonged periods of excessive loudness can irritate or cause inflammation in the mucous layer of the vocal folds and alter its mass and stiffness.<sup>8</sup> This habitual irritation is often responsible for the appearance of hoarseness, cough, or breaks in the voice<sup>8</sup> and may trigger benign organic pathologies (such as nodules, diffuse erythema, edema, and polyps) due to its traumatic effect on the vocal folds.<sup>16</sup>

When excessive loudness is associated with excessive talking, vocal fatigue often appears at the end of the workday.<sup>17</sup> In this situation, the speaker may also be limited in his ability to increase the intensity in his voice because vocal fatigue weakens the vocal sound.<sup>8</sup> This situation is only compounded if excessive talking is performed in a stressful situation; thus, the muscular tension generated in the vocal tract can increase both general and mental fatigue.<sup>18,19</sup>

Another mechanism through which stress deteriorates the voice is the dehydration of the laryngeal mucous, secondary to decreased secretions of the submucosal glands located in the larynx and the trachea.<sup>20,21</sup> This dehydration slows the vibration of the mucosal wave when generating sound and increases the level of phonatory pressure, which produces a sensation of vocal force during phonation.<sup>22</sup>

Stress and other psychological factors, such as anxiety or depression, produce muscular tension, which affect the voice<sup>10,23,24</sup>; notably, this occurs in the well-known muscle

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From the \*Department of Philosophy and Research Method in Education, Faculty of Education Science, University of La Coruña, A Coruña, Spain; and the †Department of Radiology, Lucus Augusti Hospital, Lugo, Spain.

Address correspondence and reprint requests to Garcia-Real Teresa, Department of Philosophy and Research Method in Education, Faculty of Education Science, University of Coruña, Campus Elviña, 15071 A Coruña, Spain. E-mail: [teresa.greal@udc.es](mailto:teresa.greal@udc.es)

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tension disorder (MTD).<sup>25</sup> Parents of children with ADHD experience many negative emotions as a result of the conduct of their children.<sup>26</sup> In this situation, there is a predominate amount of time dedicated to supervising daily activities, such as eating, playing, doing homework, and so forth. As such, parents have little free time to improve their relationship with their children.<sup>27–29</sup>

Several of the effects of ADHD in the voices of these children have been studied.<sup>30,31</sup> However, there are few studies on the vocal characteristics of parents of children with ADHD. The objective of the present study was to evaluate the presence of vocal hyperfunction through the detection of misuse and abuse of the voice. In addition, we aimed to detect several symptoms related to vocal hyperfunction (such as hoarseness and vocal fatigue) and symptoms related to stress (such as physical and mental fatigue) in the parents of children diagnosed with ADHD.

## METHODS

In the present study, 54 children—36 boys and 18 girls—were divided into two groups: an ADHD group and a control group. The ADHD group was comprised of 24 participants: 21 boys and 3 girls. The control group included 30 cases comprised of 15 boys and 15 girls.

In the ADHD group, there were 2 cases with a diagnosis of hyperactivity (8.30%), 2 cases with attention deficit (8.30%), and 20 cases with a combined subtype (83.30%); there was an average evolution time of the disorder of 4 years and 3 months (standard deviation [SD] = 3.68). With regard to the clinical course, the parents considered that it was good in 12 cases (50.00%), regular in 9 cases (37.50%), and poor in 3 cases (12.50%). Regarding treatment, patients received pharmacologic treatment in 87.50% of cases, psychological treatment in 66.66% of cases, and speech therapy in 20.83% of the cases. Only 8.33% did not receive any form of treatment at any time during the study.

Individual parents of each child from both groups were interviewed to obtain information regarding their children and themselves. Questions were directed toward their vocal habits and the possibility of symptoms in relation to their vocal behaviors. General characteristics of both groups are summarized in Table 1. No substantial differences were found between the two groups.

The ADHD group was recruited from the association of ADHD of the cities of A Coruña and Vigo (Spain), whereas the control group participants were recruited from two public schools in the city of A Coruña.

Participation in the study was voluntary, and informed consent was obtained from parents of all the participants. Inclusion criteria for the ADHD group consisted of receiving a diagnosis of ADHD from a specialist, according to the DSM-IV-TR criteria (no >7 years old and no medical problems which affect hearing, neurological control, or cognition).

This study was approved by the “Committee of Ethics” of the University of A Coruña (code CE41/2012).

**TABLE 1.**  
General Characteristics Present in Children and Parents of the ADHD and Control Groups

Demographic Characteristics	ADHD	Control Group	P Value
Children age (y)			
Mean (range)	10.51 (7–14)	10.36 (8–15)	0.56
Parents age (y)			
Mean (range)	41.00 (36–47)	42.13 (28–53)	0.49
Number of children			
Mean	2.00	1.72	0.25
Living with both parents (%)*	92.30	75.90	0.22
Unemployed parents (%)†	15.40	3.40	0.17

\* The percentage living with both parents refers to marital status married.

† Unemployed parents means when at least one of the parents have lost their jobs at the time of study.

## Questionnaire

In this study, a questionnaire was used to ascertain certain behaviors, vocal hyperfunction symptoms, and symptoms related to the stress of the parents of children with ADHD and that of the control group. The questionnaire has not yet been validated but was part of a medical interview performed by a phoniatrician.

The questionnaire had various parts and sections:

(1) Hyperfunctional vocal use in parents: “excessive talking,” “excessive loudness,” “talking too fast,” and “shouting.” These vocal behaviors were identified according to two forms, with the goal of obtaining information about the vocal use of the parents in two different ways: (1) when the parents use their “usual voice”—that which they themselves considered to be the personal style of their vocal habits and (2) when they use the “voice to speak to their children.” We asked the parents if they considered it necessary to speak more when they spoke to their children, “excessive talking,” faster “talking too fast,” stronger “excessive loudness,” or to shout in anger “shouting.”

(2) Vocal symptoms in parents. Parents were questioned regarding several symptoms related to vocal hyperfunction (“hoarseness,” “vocal fatigue”) and two symptoms related to stress which can affect the production of the voice, such as “physical fatigue” and “mental fatigue,” which the parents perceive at the end of the day.

Both the behaviors as well as the previous vocal symptoms were collected and converted to a value scale, with five possible responses, according to the estimated frequency by parents; 0 was the minimum, and 4 was the maximum.

(3) Concern for the voice of the child, on a scale of 0–4.

(4) Vocal symptoms of the children perceived by the parents and setting in which these symptoms worsened. The total calculation of responses regarding various alterations that could be easily perceived by the parents was performed. Observed factors included “hoarseness,” “neck tension/muscular tension of the neck,” “breathlessness” during phonation, and whether the parents observed noisy inspiration during pauses in the spontaneous speech of their children. This variable had a

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