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Voice changes in Children with Attention Deficit Hyperactivity Disorder (ADHD)

Zienab Khalaf[1], Effat Ahmed Zaky[2], Fatma Wafik Shahin[3], Shaimaa Osman Abdelhamid[4], Marowa Abd El Wahab[5]

[1,2,3,4,5]Phoniatrics unit, ENT Department, Faculty of Medicine, Minia University, Minya, Egypt

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ABSTRACT
Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by symptoms of inattention, hyperactivity, and impulsivity, which can affect children's behavior, learning, and social interactions. Dysphonia in ADHD refers to a persistent alteration in voice production often linked to vocal misuse, overuse, or other environmental and physical factors. Children with ADHD may be at an increased risk for developing voice changes due to various ADHD-related factors (e.g., impulsivity, difficulty with self-regulation, excessive talking, or hyperactivity affecting vocal folds).

Keywords: ADHD , voice changes, vocal folds

INTRODUCTION

Attention-deficit/hyperactivity disorder (ADHD) is the most common psychiatric disorderamong children, with an estimated prevalence between of 6.7 and 7.8 %[1]. It is characterized by developmentally inappropriate levels of inattention, hyperactivity, and impulsivity, with onset before the age of 12 years[2].

Boys are more likely to receive thediagnosis than girls, with ratios varying from 2:1 to 9:1[3]. The symptoms of ADHD may lead to behavioral, social, and academic difficulties in school and daily life. It is oftencomorbid with other psychiatric conditions including oppositional and conduct disorders,anxiety, and depressive disorders[4].

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), one of the diagnostic criteria of ADHD is 'talking excessively'[5].

Children with ADHD tend to talk loudly and incessantly, to interrupt conversation of others, to answer the questions before completed, and not be able to play silently and due to their tantrums and impulsive behaviors they may often scream, yell, and shout. Due to these behaviors, children with ADHD may abuse their voice more often than their peers[6].

Dysphoniais caused by voice abuse and misuse, as well as improper breathing during phonation and excessive tonus of the neck muscles[7].

Voice abuse refer to any action or circumstance that stresses or harms the vocal folds. This could involve loud speech, cleaning the throat frequently, coughing, breathing irritants, smoking, yelling, or screaming[8].Voice misuse refer to inappropriate voice use, such as speaking too loudly or with abnormally high or low pitch[9].

Persistent dysphonia can cause edematous lesions and soft nodules on the vocal folds, which may eventually lead to fibrosis and the formation of hard vocal fold nodules [7]. The development of vocal fold nodules has been linked to "phonotraumatic" activities such as yelling, screaming, and speaking loudly for long periods of time, all of which have been linked to histological changes edema, hyalinization, and fibrosis[10]. These behaviors are the result of a mix of anatomical, physiological, social, emotional, or environmental factors, and they can be seen as forms of interaction, aggression, impulsivity, leadership, or a desire to fit in with a group[11].

Prevalence of Dysphonia in Children with ADHD

The childhood dysphonia is reported by various researchers to have a wide range of incidence that range from 4.4% to 38%, but the researchers agreed that the peak age for emergence of childhood dysphonia is between 5 and 10 years[12].

Dysphonia may result from inappropriate vocal behavior or an imbalance of anatomical, physiological, social, emotional and/or environmental factors. The predisposing and aggravating factors for dysphonia were grouped into five categories: Inadequate vocal habits, physical and psychological factors, personality structure, phonic inadequacy and allergic factors[13].

Factors Contributing to Dysphoniain Children with ADHD

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), one of the diagnostic criteria of ADHD is 'talking excessively'[14]. Children with ADHD tend to talk loudly and incessantly, to interrupt conversation of others, to answer the questions before completed, and not be able to play silently and due to their tantrums and impulsive behaviors they may often scream, yell, and shout. Due to these behaviors, children with ADHD may abuse their voice more often than their peers[6].

Voice Characteristics in ADHD Children

Previous findings reported that children with ADHD were at risk fordeveloping voice disorder as almost half of the participants with ADHD were breathier,louder,and hoarser than control peers[15].

It has been reported that children with ADHD presented with increased loudness were morehoarse and breathy than their control peers. Phonotraumatic behaviors may lead to concentrated swelling or submucosal bleeding; changing the size, weight, the range of motion and elasticity of the vocal folds, or the subsequent emergence of functional voice disorders[16]. Conversely, in attentive an dorhyperactive/ impulsive behaviors most commonly associated with ADHD were higher in children withVFN[15].

CONCLUSION

ADHD may be an associated risk factor in the development of voice changes.Early identification and assessment of vocal characteristics in children with ADHD is necessary.

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