

Etiological Correlates of Hoarse Voice

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Abstract

Hoarse voice is a common voice disorder seen in majority of the clients. Hoarse voice is a symptom in structural and neurological voice disorder. Apart from this it is also seen in developmental voice disorder (puberphonia) and reported more in professional voice users. The present study is an attempt to find the prevalence, etiology spectrum of and pathology related to hoarse voice, based on retrospective design. Sixty eight cases file with voice disorder were reviewed to explore the etiology and pathology. The hoarse voice was prevalent more common in adult males compared to females. The pathology correlated with hoarseness were laryngitis and vocal nodules. Acoustically the fundamental frequency was reduced in 60 patients and normal intensity was seen in all the clients.

Key words: Hoarse voice, etiology, pathology

Hoarseness is a hybrid descriptor that denotes a voice with both breathy and harsh/rough qualities (Anders, 1988). Hoarseness is also described as a voice quality characterized by a rasping, grating and husky sound. Hoarseness originates from a combination of irregularity of vocal fold vibration and turbulent airflow through the glottis. (Anders, 1988, Omri, 1997). There are many varieties of hoarse quality and degrees of severity that are complicated additionally by changes of pitch and loudness.

Hoarseness is a common symptom in older individuals and may reflect a wide variety of pathologic, medical, physiologic, and/or functional causes. Hoarseness may be associated with voice breaks and diplophonia. Viral and bacterial infections can directly affect the throat and vocal cords, resulting in hoarseness. Allergies are common non-infectious processes that can result in hoarseness.

Hoarseness perceived when noise takes place of harmonic structure. The more severe hoarseness the greater the increase in aperiodic sound. This occurs due to adduction of the vocal folds during the closed phase of the vibratory cycle is incomplete and the

mass of the folds is increased in a way that results in an irregular vibratory pattern.

Hoarseness is a voice quality characterized by a rasping, grating, sometimes husky sound, frequently accompanied by voice breaks and/or diplophonia. This description is typical of the perceptual usage of this term. Several authors have described acoustic characteristics involved in hoarseness, including vowel roughness (Emanuel & Whitehead, 1979), quasi-periodicity or aperiodicity of vocal fold vibratory pattern (Lieberman, 1963) and abnormal frequency perturbation (jitter) patterns (Murry & Doherty, 1980). In addition, the hoarse voice may also be characterized as dry versus wet in which wet hoarseness is related to the presence of secretions at the vocal fold level (Moore, 1971, Boone & McFarlane, 1988, Andrews, 1995). A number of authors have concluded that hoarseness is probably the most common voice

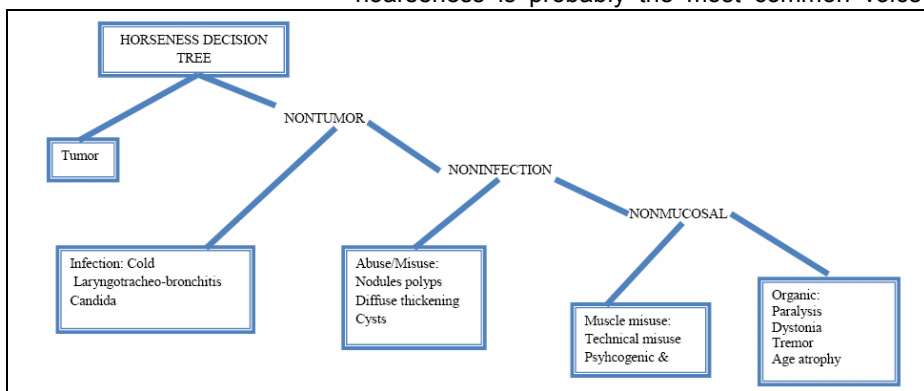


Figure 1: Etiology of hoarse voice from Murray and Rammage (1994)

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quality characteristics (Boone & McFarlane, 1988, Andrews, 1995).

Hoarseness may be permanent or transitory depending up on the laryngeal changes. Hoarseness can seen in children age from 5 to 10 years (Ellis, 1952). It is clear from the description of hoarseness that many different characteristics are involved that have been described perceptually and acoustically. Many different organic conditions affecting the vocal folds can produce perceptual quality described as hoarseness (Boone & McFarlane, 1988).

Curry (1949) reported that the incidence of hoarse voice was high below the age of 10 years and diminished considerably as children grow older. A state of mild chronic laryngitis generally accompanies the dysphonia and the folds may be swollen and show incomplete adduction in the arytenoids region. Brondnitz (1962) pointed out the hyperfunction usually involves the entire vocal mechanisms although certain areas of the vocal mechanism may show more hyperfunction sites than others. Baynes (1966) found 7.1% of children in chronic hoarseness with the highest incidence in children in first grade at the school. Seth and Guthrie (1969) conducted a study to find the prevalence of hoarse voice in West Germany. They found that prevalence was more in boys compared to girls.

Zhang and Zhao (2008) evaluated characteristics of distribution of causes of hoarseness in the Han and Uighur. The data of 933 cases of hoarseness in different ages, which included 654 cases of the Han and 279 cases of the Uighur, were analyzed with laryngofiberscope. They were divided into different age groups and were compared. The common causes of hoarseness of the Han, which occupied 90.1% of its all cases, were polyp of vocal cord (31.8%), chronic laryngitis (24.9%), vocal nodules (12.2%), carcinoma of larynx (11.2%), paralysis of vocal cord (9.9%), while that of the Uighur, which occupy 96.4% of its all cases, were chronic laryngitis (27.2%), paralysis of vocal cord (21.1%), polyp of vocal cord (19.4%), carcinoma of larynx (12.9%), laryngeal papillomatosis (7.9%), vocal nodule (7.9%). There was significant differences between them ($\chi^2=73.19$, $p < 0.01$) and significant difference between them in distribution of polyp of vocal cord, paralysis of vocal cord and laryngeal papillomatosis ($p < 0.01$). There was also significant difference among 2 to 20 years old group, 21 to 40 years old group and 41 to 60 years old age group. However, 61 to 85 years old age group was exempted. There was difference in distribution of causes of hoarseness between the Han and the Uighur, which was also different in

different ages. The main causes of hoarseness in the Han were chronic laryngitis and vocal nodule in children and teenagers, polyp of vocal cord and chronic laryngitis in youth and adult, while in the Uighur, they were chronic laryngitis and laryngeal papillomatosis in children and teenagers, chronic laryngitis, polyp of vocal cord and paralysis of vocal cord in youth and adult, In the aged, there was no statistical difference between the two nations, and the major cause was carcinoma of larynx and paralysis of vocal cord.

As discussed earlier there are only few studies on the etiology of different organic voice disorder. But not many studies have been done to find the spectrum of laryngeal pathology associated with hoarse voice. Hence the present study was aimed to (a) Find the prevalence of hoarse voice across age and gender, (b) Explore the laryngeal pathology associated with the hoarse voice and to Investigate the acoustical and perceptual aspects of hoarse voice

Method

The retrospective design was used in the present study. A total number of 68 cases files who were diagnosed as having hoarse voice were reviewed in the present study. All these clients had reported to the institute with the complaint of change in voice or difficulty in swallowing. They were evaluated by qualified professionals which consisted of Speech Language Pathologist, ENT Surgeon and Phonosurgeon. The case files with the complete voice evaluations were considered for the present study. The following table depicts the details of the case files considered for the present study

	Male	Female	Total
Children (0 – 15years)	8	2	10
Adult (15 - 50 years)	32	11	43
Geriatric (50 years above)	10	5	15
Total	50	18	68

Table 1: Details of the case files selected for the study

Statistical Analysis

Descriptive statistics was used to compile the information.

Results

The prevalence of the hoarse voice was seen more in males compared to females. Also the problem was reported to be more in adults compared to children and geriatric population. Table 1 shows the prevalence of hoarse voice across age and gender (in percentage).

	Male	Female	Total
Children (0 – 15years)	12 %	3%	13%
Adult (15 - 50 years)	47%	16%	63%
Geriatric (50 years above)	14%	7%	21 %

Table 2: Prevalence of hoarse voice across age and gender

The results indicated that the hoarse voice is seen more in adult males. This is due to the history of vocal abuse and misuse which is reported to be more in adult males. The history of vocal abuse was seen in 60 cases. The present study supports the findings of Seth and Guthrie (1969), who reported an increased incidence of hoarse voice among males. In the present study the hoarse voice was observed more in adult males. This may be due to the limited sample size selected for the present study.

- a. To explore the laryngeal pathology associated with the hoarse voice

Hoarse voice is a common term used to describe the combination of breathiness and harsh voice. To find the laryngeal pathology associated with hoarse voice, the diagnosis made by the ENT Surgeon/Phonosurgeon was compiled. The figure 2 shows the different causative factors associated with hoarse voice. Results indicated different laryngeal pathologies associated with hoarse voice. vocal nodule (20%), laryngitis (20%) and glottis chink (14.55%) were the main causes associated with the hoarse voice. The other causes were vocal cord paralysis (12.73%), GERD (7.27%), polyp (5.45%), tonsillitis (1.82%). Apart from this the other causes like bowing of the vocal folds etc (18.18 %) were also observed. The results clearly indicate that the vocal nodule and laryngitis were the predominant causes for the hoarse voice. This pathology may be due to the history of vocal abuse and misuse. The vocal abuse was present in 60 clients and was absent in eight cases.

This study supports the finding of Curry (1949), who reported the increase incidence of laryngitis among subjects with hoarse voice. But the present study does not support the finding of Zhang and Zhao (2008), who reported increase vocal polyp in their study. Muscle tension of the muscle of the larynx which cause irritation of the delicate tissue also lead to the formation of polyps. Incorrect breathing, excessive tension in the larynx imbalance between glottal resistance and air pressure in individuals who use their voices considerably can cause a chronic laryngitis and weakness or tiredness of the muscles and laryngeal joints. This condition gives rise to varying degrees of hoarseness and discomfort.

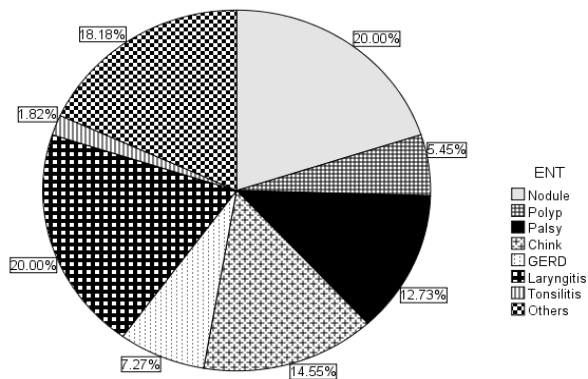


Figure 2: Laryngeal pathologies of the hoarse voice

The acoustical parameters related to fundamental frequency and intensity were also extracted from these case files. To find the perceptual correlates for the hoarse voice, the degree of hoarseness was evaluated. Degrees of hoarse voice -mild hoarse voice (10.29%), moderate hoarse voice (4.41%), severe hoarse voice (7.35%) and with other problems (13.24%) were noted. The fundamental frequency was reduced in 61 cases, leading to the low pitch associated with hoarseness. The intensity was normal in all the clients. This study supports the findings of Emanuel & Whitehead (1979), who reported vowel roughness quasi periodicity or aperiodicity of vocal fold vibratory pattern (Lieberman, 1963) and abnormal frequency perturbation patterns (Murray & Doherty, 1980)

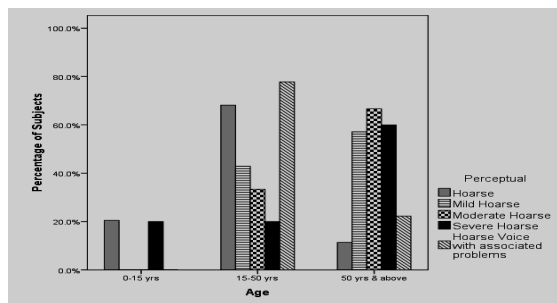


Figure 3: Details of perceptual evaluation

Conclusions

The present study is an initial attempt to explore the spectrum of causes and laryngeal pathology associated with hoarse voice. The study also highlighted the associated and perceptual feature of hoarse voice.

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