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Etiological spectrum for dysphonia in a rural Indian treatment seeking population

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ABSTRACT

Background: Aim of the study was to identify and analyse the etiological factors for dysphonia in a rural treatment seeking population in South India.

Methods: 100 consenting patients presenting to the Department of Otorhinolaryngology in our rural hospital with change in voice for more than 4 weeks and undergoing detailed clinical evaluation including videolaryngoscopic examination and other relevant investigations to arrive at a definitive diagnosis, were included in a cross sectional descriptive clinical study. Descriptive and inferential statistical analysis was performed.

Results: Organic/structural and functional dysphonia constituted 87% and 13% of cases respectively. The commonest causes for dysphonia were laryngopharyngeal reflux disease (LPRD) (35%), laryngeal/hypopharyngeal malignancies (16%) and vocal palsy/paresis (12%). The mean age of the study patients was 38.71±5.82 years. Majority (65%) were aged 21–50 years. Vocal palsy was identified in children aged 1–10 years (1%), and muscle tension dysphonia in those aged 11–20 years (2%). In individuals aged 21–50 years, LPRD (28%), functional dysphonia (9%), vocal nodules (8%) and vocal palsy (7%) were the most common causes. Laryngeal/hypopharyngeal malignancy (14%) was the commonest etiology identified in individuals aged ≥51 years. Male:female ratio was 1.1:1. The most frequently observed cause for dysphonia was laryngeal/hypopharyngeal malignancy (15%) in males, and LPRD (22%) in females.

Conclusions: With its vast etiology, dysphonia is often just the "tip of the iceberg" for a much greater underlying disease process. This study serves as an insight into the possible differential diagnosis based on age, gender and geographic location of patients. As observed, the most common causes for dysphonia are LPRD and laryngeal/hypopharyngeal malignancies; both of which are amenable to prevention by lifestyle modification, early detection by appropriate clinical and investigative measures, and suitable treatment. Early and correct identification of the cause for dysphonia, enables early management, thereby reducing its associated morbidity and mortality.

Keywords: Dysphonia, Hoarseness, Laryngeal diseases, Diagnosis, Laryngoscopy, Rural population, Cross sectional descriptive study

INTRODUCTION

Voice is an important tool for communication. Any disturbance in voice quantity has great impact on an individual's personal and social life. Voice disorders are defined as any time the voice does not work, perform, or sound as it normally should, or interferes with

communication and quality of life.^{2,3} Voice disorders are among the most common speech and language disorders, afflicting approximately 6% of children under 14 years of age, and 3–9% of the adult population.⁴ Overall incidence of hoarseness in studies in India ranges from 0.51–0.7%.⁵⁻⁷ Hoarseness of voice is one of the commonest symptoms in an otolaryngology outpatient clinic. It is described as

change in normal voice quality. It may indicate breathiness, roughness, voice breaks, or abnormal changes in pitch. Dysphonia is used to describe any abnormal voice quality.⁵

Hoarseness of voice is a symptom with a very diverse etiology. 1,4,8 It is often the first and only signal of serious local or systemic disease. It may be caused by any pathology of the vocal cord or because of abnormal vocal cord movement. It can be divided into acute or chronic. Acute onset is more common and mainly caused by inflammation like acute laryngitis; other causes include viral infection, smoking, vocal abuse, laryngeal trauma or thyroid surgery. Chronic onset is mainly caused by vocal cord nodule, polyp, laryngeal papillomatosis, tumor of vocal cord, functional dysphonia, smoking, vocal abuse, laryngopharyngeal reflux disease, post nasal drip, vocal abuse, neoplasm of thyroid/esophagus/lung, chronic granulomatous disease like tuberculosis or systemic disease like diabetes mellitus.^{7,8} Hoarseness of long duration may thus imply serious underlying disease, and should not be ignored. 1,5

Most epidemiologic studies in the field of dysphonia have addressed the prevalence of this condition within specific age or occupational groups, but few have investigated the causes of this disorder. Available etiological data varies in different geographical locations and from one center to another, necessitating careful and thorough evaluation of every case to know the diagnosis and underlying pathology, so that early and prompt management can be initiated. 70% of India's population resides in rural areas. Further, 70% of patients presenting with dysphonia belong to these rural areas and only 30% are from urban areas, with a rural to urban ratio of 2.3:1. This study was therefore undertaken to identify and analyse the various etiological factors in the causation of dysphonia in a rural treatment seeking population in South Karnataka, India.

METHODS

In accordance with ethical standards, 100 individuals of any age and both sexes, presenting to the Department of Otorhinolaryngology in our rural hospital in south Karnataka from July 2017 to June 2018, with change in voice for more than 4 weeks and undergoing detailed including videolaryngoscopic clinical evaluation examination and other relevant investigations to arrive at a definitive diagnosis, were included in a cross sectional descriptive clinical study. Excluded from the study were those with voice disorders other than hoarseness such as rhinolalia aperta/clausa, articulation disorders, central nervous or respiratory system disorders, or incomplete diagnostic workup.

Diagnosis was made based on prevailing standard diagnostic criteria/guidelines. Descriptive and inferential statistical analysis was conducted. Percentage analysis was performed. Results on continuous measurements are presented as mean±standard deviation. Microsoft word and Excel were used to generate graphs, tables etc.

RESULTS

Organic/structural vocal pathology was identified in 87% of cases, while functional causes constituted 13% of cases. The most common organic causes for dysphonia were laryngopharyngeal reflux disease (LPRD) (35%), followed by laryngeal/hypopharyngeal malignancies (16%) and vocal palsy/paresis (12%). Other structural vocal cord abnormalities identified were vocal nodules (9%), vocal polyp (2%), vocal cyst (1%), Reinke's oedema (5%) and laryngitis from causes other than reflux (7%). Muscle tension dysphonia (6%), puberphonia (2%), spasmodic dysphonia (2%) and nonspecific dysphonia (3%) accounted for the remaining causes for dysphonia without a vocal cord lesion i.e. functional causes (Figure 1).

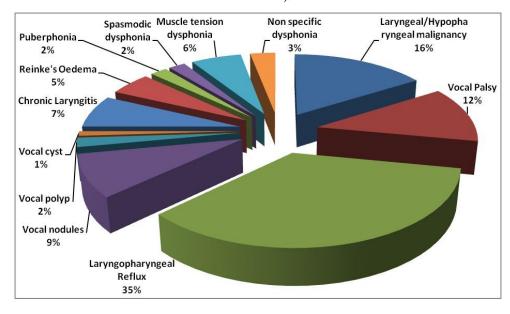


Figure 1: Frequency of etiological factors for dysphonia.

Table 1: Age distribution of etiological factors for dysphonia.

Etiology	Age (in years)								
	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	>80
Laryngopharyngeal reflux	-	-	7	9	12	2	4	1	-
Chronic laryngitis (excluding reflux laryngitis)	-	-	2	5	-	-	-	-	-
Vocal nodules	-	-	1	5	2	1	-	-	-
Vocal polyp	-	-	1	-	-	1	-	-	-
Vocal cyst	-	-	-	-	1	-	-	-	-
Reinke's oedema	-	-	1	1	1	1	-	1	-
Malignancy larynx/hypopharynx	-	-	-	1	1	4	5	3	2
Vocal palsy (excluding malignancy larynx/ hypopharynx)	1	-	2	3	1	3	2	-	-
Puberphonia	-	-	2	-	-	-	-	-	-
Spasmodic dysphonia	-	-	-	2	-	-	-	-	-
Muscle tension dysphonia	-	2	2	1	1	-	-	-	-
Nonspecific dysphonia	-	-	1	-	-	-	1	-	1
Total (%)	1	2	19	27	19	12	12	5	3

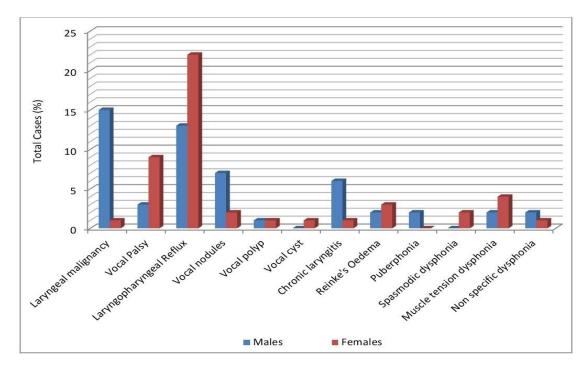


Figure 2: Gender distribution of etiological factors for dysphonia.

The mean age of patients was 38.71±5.82 years and ranged from 6–82 years, with 3% aged under 20 years, 65% between 21–50 years and 32% above 50 years of age. Analysis of age distribution of etiological factors identified vocal palsy in individuals aged 1–10 years (1%), and muscle tension dysphonia in those aged 11–20years (2%) as the only causes for dysphonia in these respective age groups. In individuals aged 21–50 years, LPRD (28%) was the commonest etiology observed, followed by vocal nodules (8%) and vocal palsy (7%). Laryngeal/hypopharyngeal malignancies (14%) followed by LPRD (7%) were the commonest etiologies identified with advancing age i.e. ≥51 years. Functional disorders

were observed frequently in individuals aged 11-50years (11%), with the highest prevalence among those aged 21-30years(5%),declining with advancing age above 50years (2%) (Table 1).

53 males and 47 females met the inclusion criteria with a male: female ratio of 1.1:1. Overall, organic and functional disorders showed a nearly equal sex ratio i.e. 47 males and 40 females had organic disorders (1.1:1), while 6 males and 7 females had functional disorders (1:1.1). Among males, laryngeal/hypopharyngeal malignancies (15%) were the commonest, followed by LPRD (13%) and vocal nodules (7%). Among women,

LPRD (22%) and vocal palsy (9%) were observed in a higher frequency. Functional disorders were observed almost equally in both sexes (Figure 2).

DISCUSSION

Hoarseness persisting for more than three weeks must be investigated and a firm diagnosis made. Since dysphonia and hoarseness are visible as the early symptoms of many disorders, appropriate treatment of disease requires accurate diagnosis of the underlying cause. Evaluation of the dysphonic patient begins with a complete understanding of laryngeal anatomy and physiology of voice production. A thorough history must be taken regarding the quality of dysphonia, alarming symptoms and confounding factors. Complete head and neck examination culminates in detailed visualization of the pharynx and larynx, especially the vocal folds. 10 Although the location of these structures often inhibits direct observation, simple techniques can be used in clinical practice for their evaluation, among which continuous light videolaryngoscopy is a noninvasive and anesthesia-free approach. In comparison with indirect laryngoscopy, this method is easier and of greater accuracy, and can therefore be used for the diagnosis of a wide range of diseases, including acute, chronic, benign and malignant disorders.⁴ It was thus used in our study. Stroboscopy or high speed digital imaging is required to fully evaluate the viscoelastic properties of the vocal fold cover body structure and function, but could not be performed in our study due to nonavailability. 10 Patients with persistent dysphonia despite normal or equivocal indirect laryngoscopic findings and patients with vocal fold paralysis and/or bowing seem to be better evaluated with stroboscopy.8 Finally, evaluation leads to biopsy of any concerning lesions, as was practiced in our study. 10

Followed in our study is the best known etiological classification of hoarseness introduced by Perello, which divides voice disorders in two broad categories i.e. organic and functional voice disorders. Voice disorders caused by organic lesions are associated with problems resulting from structural changes of the vocalization system and include malformations, trauma, inflammation, infection, localised vocal paresis/palsy and neoplasms. Functional dysphonia, which is classified into aphonia or psychogenic dysphonia, hyperfunctional dysphonia and hypofunctional dysphonia, is the other class of dysphonia in which no significant organic changes affect the voice producing structure.

In our study, organic/structural vocal pathology was identified in 87% of cases, while functional causes constituted 13% of cases, concurring with Kiakojoury et al whose study identified organic dysphonia in 85.78%, while functional and neurologic dysphonia was observed in 8.6% and 5.6% of patients respectively. However, Lopez et al found a higher prevalence of functional disorders. The measures used for laryngeal

examination may be the reason behind such a difference since the use of continuous light videolaryngoscopy, as used in our study, is suitable for the detection of organic lesions rather than functional lesions, which are better diagnosed using strobe light stroboscopy.4 In our study, the most common cause for dysphonia was laryngitis (42%), comprising reflux and non-reflux laryngitis (35% and 7% respectively). This concurred with Indian population studies by Rao et al in which laryngitis (36%) was the most common cause for dysphonia, and Sindhu et al, Munjal et al and Pal et al who identified laryngitis in 7%, 10.3% and 17% of cases respectively. 5,6,8,13 Similarly, vocal palsy (excluding laryngeal/ hypopharyngeal malignancies) accounted for 12% of cases, concurring with studies by Sindhu et al and Munjal et al (10% and 7.1% respectively), but differing from Pal et al who identified this as the most common cause for dysphonia (33%) in their study.^{6,8,13} Laryngeal/ hypopharyngeal malignancies comprised 16% of cases in our study, as seen by Pal et al (15%) and Rao et al (13%), but significantly less than in the study by Sindhu et al (56%). 5,6,8 Benign vocal fold lesions comprised 17% of cases in our study and included vocal nodules(9%),vocal polyp (2%), vocal cyst (1%) and Reinke's oedema (5%). Vocal nodules showed a similar prevalence in a study by Baniara et al (11.9%), but a higher prevalence in studies by Munjal et al (20%) and Rao et al (24%) whose study also showed a higher prevalence of vocal polyps (8%). 5,7,13 Muscle tension dysphonia (6%), puberphonia (2%), spasmodic dysphonia (2%) and nonspecific dysphonia(3%) accounted for functional dysphonia in our study. Pal et al identified spasmodic dysphonia (4%), puberphonia (3%), functional aphonia (2%), and ventricular dysphonia (1%) in their study.⁸ As was seen in our study, a higher distribution of laryngitis, neoplasms and puberphonia in rural areas has been observed.⁵

In our study, the mean age was 38.71 ± 5.82 years, concurring with a study by Kiakojoury et al.⁴ Majority of our cases were identified in the 4th decade i.e. 31–40 years (27%), as seen in studies by Baitha et al and Banjara et al who found majority of patients (28.18% and 22.31% respectively) in this age group.^{7,14} In our study,65% were aged between 21–50 years. Similarly, Rao et al observed 68% of cases between 21–50 years, with 34% belonging to the 4th decade.⁵

Voice disorders affect adults and children and have different causes in different age groups. In a study by Martins et al in children 1-18 years old, vocal nodules (59.3%), cysts (10.3%) and acute laryngitis (6.8%) prevailed; in adults 19-60 years old, functional dysphonia (20.5%), acid laryngitis (12.5%) and vocal polyps (12%) predominated and in patients ≥60 years, presbyphonia (26.5%), functional dysphonia (17.6%) and Reinke's oedema (14%) predominated. Silverman et al observed that 6–23% of school-age children suffered from hoarseness, and the presence of vocal nodules was reported in most cases 16. In contrast however, in our study, vocal palsy in individuals aged 1–10 years (1%),

and muscle tension dysphonia in those aged 11-20years (2%) were the only causes for dysphonia identified in this age group. In individuals aged 21–50 years, LPRD (28%), functional dysphonia (9%), vocal nodules (8%) and vocal palsy (7%) were the common etiologies observed. As seen in our study, Kambic et al identified the age group of 30-40 years in whom maximum incidence of benign laryngeal lesions was observed.¹⁷ This could be explained by the fact that coupled with their occupational exposure, this age group is more prone to vocal abuse. In our study, laryngeal/hypopharyngeal malignancies (14%) followed by LPRD (7%) were the commonest etiologies identified with advancing age i.e. ≥51 years, concurring with Pal et al who identified laryngeal malignancies in 15% of cases in this age group⁸. In the Indian subcontinent, upper aerodigestive tract malignancy is more common, but carcinoma larynx is rare under the age of 30 years, being common in the 5th and 6th decades of life, as observed in our study¹.

Male:female ratio in our study was 1.1:1, with a male predominance as observed in many other studies, but in contrast to a study by Martins et al which showed a female predominance. 5-7,14,15 A nearly equal male:female ratio of 1.1:1 and 1:1.1 was observed for organic and functional dysphonia respectively in our study. However, Lopez et al observed a three times higher prevalence of organic lesions among women, but functional voice disorders were twice as common among men. The prevalence of chronic laryngitis in their study was three times higher in men than women.¹² In our study, LPRD showed a female predominance (male:female=1:1.7) while other causes for chronic larvngitis were seen more commonly in males (male:female=6:1). The distinct male preponderance in all age groups could be explained by the fact that in our country, by and large, the attendance of males in the outpatient department of hospitals for vocal complaints is greater than their female counterparts in proportion to the population. Females, due to restrictions, present less frequently to hospitals with similar complaints, which are not perceived as life threatening.9 Males are also exposed to occupational hazards, which rural women are not exposed to as they mostly lead an indoor life. Another possible explanation for male predominance is due to different habits e.g. smoking, chewing tobacco with lime and alcohol intake, which accounts for the higher frequency of malignancies in males, as seen in our study.^{5,6}

CONCLUSION

With its vast etiology, dysphonia is often just the "tip of the iceberg" for a much greater underlying disease process and should therefore always be scrutinized in every patient. For treating doctors and health care workers in rural areas, the results of this study serve as a reminder as well as an insight into the possible differential diagnosis for dysphonia based on age and gender of the patient. As observed in this study, the most common causes for dysphonia in the rural population of our district are laryngopharyngeal reflux disease and laryngeal/hypopharyngeal malignancies; both of which are amenable to prevention by lifestyle modification, early detection by appropriate clinical and investigative measures, and suitable medical/surgical treatment. Thus early and correct identification of the cause for dysphonia aids in its early management, thereby reducing its associated morbidity and mortality.

Clinical significance

Keeping in mind differential diagnoses in view of age, gender and geographic location, all patients presenting with persisting dysphonia require complete evaluation to identify its etiology, thereby facilitating appropriate and prompt management of the same.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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