

Article

A cross-sectional observational study of hoarseness of voice in a tertiary care hospital

K G Somashekara¹, Ravikeerthi G¹, Vibha B^{2,*} and Norma Thomas³

¹ Department of ENT H & N, Sapthagiri Institute of Medical Sciences and Research Centre, Bengaluru, Karnataka, India.

² Department of ENT H & N, Government Hospital, Bangalore North, Karnataka, India.

³ Department of ENT H & N Government Hospital, Kanakapura, Ramanagar District, Karnataka, India.

* Correspondence: vibha1994@gmail.com

Received: 2 February 2023; Accepted: 18 February 2023; Published: 28 February 2023.

Abstract: Background: Hoarseness of voice is a common manifestation of structural or functional anomalies affecting the glottis. A detailed examination is necessary to ensure accurate diagnosis and management. Patients from rural areas often present with the condition at a later stage, emphasizing the need for creating awareness to facilitate early diagnosis and treatment. Indirect or video laryngoscopy (IDL/VDL) is the preferred method for evaluating hoarseness.

Objectives: The objectives of this study were to determine the socio-demographic profile of patients with hoarseness of voice and identify common predisposing factors for the condition.

Methods: We conducted a study of 100 cases of hoarseness of voice at the Department of Otorhinolaryngology, Bangalore, Karnataka, over 18 months. Detailed histories, including habits and socio-demographic information, were obtained. We documented information on the onset, duration, precipitating factors, aggravating and relieving factors, and socio-economic status. All patients underwent general clinical and otorhinolaryngological, head, and neck examinations, as well as IDL/VDL.

Results: In our study, the most commonly affected age group was 50-60 years (21%), and males were more affected than females in a ratio of 1.2:1. The majority of patients were from urban areas, with most belonging to class 3 (36%). Agricultural workers and manual laborers had the highest incidence. The majority of patients presented within 15 days of symptom onset, and vocal abuse (32%) was the most common predisposing factor. All patients presented with a change in voice (100%), with associated symptoms including difficulty in swallowing (34%), voice fatigue (26%), weight loss, and loss of appetite.

Conclusion: Due to the prevailing COVID-19 situation, most patients in our study presented at a later stage, with significant changes in voice or associated symptoms. This was a major limitation of our study. We emphasize that any change in voice can have varied etiologies, and therefore requires appropriate investigation, screening, and early management. Awareness of the ill-effects of smoking, alcohol, tobacco, and vocal abuse is crucial in preventing various laryngeal pathologies.

Keywords: Hoarseness of voice; Indirect laryngoscopy; Laryngeal malignancy.

1. Introduction

According to Merriam-Webster, the "sound produced by vertebrates by means of lungs, larynx, or syrinx; especially: sound so produced by human beings" is defined as "sound produced by vertebrates by means of lungs, larynx, or syrinx." They are the means by which we communicate a great deal with the outside world: our ideas, of course, as well as our emotions and personalities. The speaker's voice is irrevocably woven into the fabric of speech as a symbol of the speaker. In this sense, each of our spoken language utterances not only conveys its own message but also serves as an audible proclamation of our membership in specific social regional groupings, thanks to accent, tone of voice, and habitual voice quality, of our bodily and psychological identities, as well as our current mood. Voices are also one of the media via which we recognize other humans who are important to us—family members, celebrities, friends, and foes [1].

Hoarseness is a voice quality that is scratchy, grating, harsh, more or less discordant, and has a lower pitch than normal. It is a precursor to serious disorders of the larynx or elsewhere. There will be a shift in anatomical structures and pathophysiological processes in the formation of hoarseness of voice. Other important definitions to consider are:

1. Dysphonia: Altered vocal quality, pitch, loudness, or vocal effort that impairs communication as assessed by a clinician and affects quality of life.
2. Hoarseness: A symptom of altered voice quality reported by patients.
3. Worsened voice-related quality of life: Self-perceived decrement in function or a decline in economic status as a result of voice-related dysfunction.
4. Dysarthria: A speech disorder due to impaired movement of the structures used for speech production, including the lips, tongue, and complex musculature involved in articulation.
5. Dyspnea: Difficult or labored breathing, shortness of breath.
6. Laryngoscopy: A term used to describe visualization of the larynx. Unless otherwise specified, its use in this guideline refers to indirect laryngoscopy (visualization of the larynx), which can be done by several methods, including mirror examination, rigid rod-lens telescope examination, rigid rod-lens telescope, flexible fiber-optic, or flexible distal chip scopes. Each laryngoscopy technique has specific diagnostic indications.
7. Stroboscopy: Advanced laryngeal imaging designed to visualize vocal fold vibratory abnormalities that cannot be appreciated using continuous light laryngoscopy. It uses a synchronized flashing light that passes through a laryngoscope [2].

The causes of hoarseness are diverse. It is critical to conduct a thorough examination of the patient. Age, sex, duration of hoarseness, accompanying complaints, physical examination, and investigations all play a role in making a diagnosis and determining the etiological component. The most significant method for determining a diagnosis is the IDL assessment. Because video laryngoscopy allows for better visualization of hidden areas, it has mostly supplanted IDL. The diseases of the laryngeal mucous membrane, disturbances of the internal laryngeal muscles and their innervations, changes in the anatomy of the vocal cords, and laryngeal joint motions all cause hoarseness. Any change from the normal voice production results in one of the three characteristic variations in sound.

1. A change in the pitch- The mass and tension of the vocal cords play a role. The cause of abnormally high pitch is usually psychological or caused by a laryngeal web. The paralysis of the vocal cord with flaccidity of the affected cord, or a growth with an increase in the mass of vibrating cords, can cause abnormally low pitch.
2. A change in the volume- changes with variations in air pressure or vocal cord inelasticity. The loudness problems could be caused by a weakening in one or both cords, or they could be psychological in nature.
3. A change in the quality- affected by any alteration in the regular vibratory pattern, incomplete interruption of the air, or the development of turbulence. Poor approximation can be caused by tumors, surgery, or paralysis, and the change in vibratory pattern can be caused by minor edema of the vocal cords, scar tissue, or trauma. Transient disturbance on the margins or surfaces of the vocal cords can cause turbulence.

Hoarseness is not a disease in and of itself, but rather a sign of disease of the larynx, and the pathology and pathogenesis of hoarseness of voice differs depending on the kind of laryngeal lesions.

2. Objectives

The objective of this study is to determine the socio-demographic profile of patients with hoarseness of voice and identify common predisposing factors for the condition.

3. Materials and Methods

This is a cross-sectional observational study conducted at the Department of Otorhinolaryngology in Bangalore, Karnataka, India. The study period was 18 months from November 2019 to May 2021. The sampling technique used was universal sampling.

Inclusion criteria for the study were all patients presenting to the outpatient department (OPD) with hoarseness of voice. Patients who did not provide consent for the study were excluded.

4. Methodology

The study included 100 cases of voice changes and was carried out at a tertiary care hospital in Bangalore, Karnataka. Written informed consent was obtained from all participants willing to participate in the study. Detailed history was taken, including socio-demographic information and habits. The history included the onset, duration, precipitating factors, and aggravating and relieving factors, all of which were documented.

Socioeconomic status was determined according to the Modified Kuppuswamy classification. A general clinical and otorhinolaryngological, head and neck examination was conducted. All patients underwent indirect laryngoscopy and video laryngoscopy. Routine investigations and imaging studies, such as chest X-ray, CT scan, and MRI scan, were performed based on the findings.

Specimens obtained from examination under anesthesia and biopsy were sent for histopathological examination. A flow chart (see Figure 1) was followed for the workup of patients (see reference [3] for details).

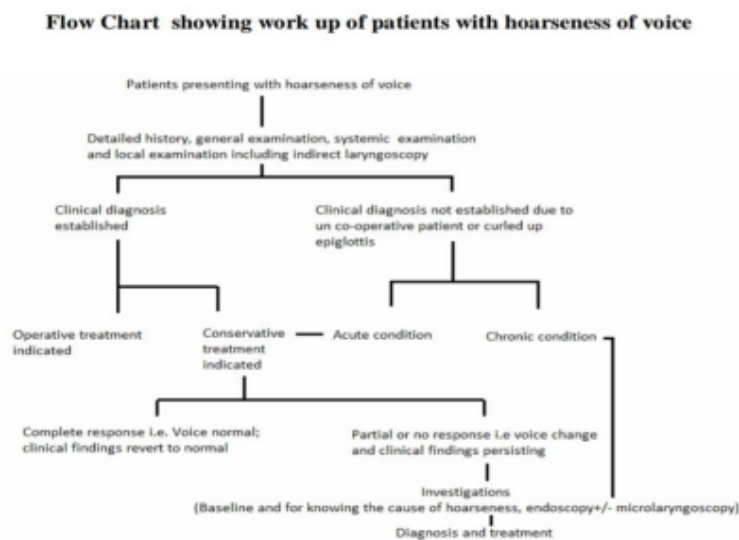


Figure 1. Flowchart showing work-up of patients with hoarseness of voice

4.1. Statistical Analysis

The collected data were entered into a Microsoft Excel sheet and analyzed using SPSS v.20. Descriptive statistics such as mean, standard deviation, and frequency, along with inferential statistics such as the chi-square test, were used to express the results. A p-value less than 0.05 was considered statistically significant.

5. Results

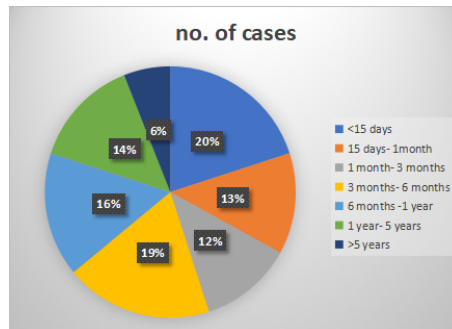
A study was conducted in the Department of Otorhinolaryngology, Head and Neck Surgery to determine the socio-demographic profile and predisposing factors for hoarseness of voice. The results of the study are as follows:

The age group most commonly affected by hoarseness of voice was 50-60 years (21%), followed by 40-50 years (19%). The least incidence was observed in the age group of 0-10 years (1%), followed by those over 80 years of age (6%). The male to female ratio was 1.2:1, with males being more affected than females. Hindus had a higher incidence than individuals of other religions. Geographically, most patients were from Bangalore Urban (39%), followed by other places in Karnataka (30%), with Tumkur and Kolar districts having a higher prevalence. Only 19% of the patients were from Bangalore Rural. Approximately 12% of patients were from other states, mainly Tamil Nadu and Andhra Pradesh.

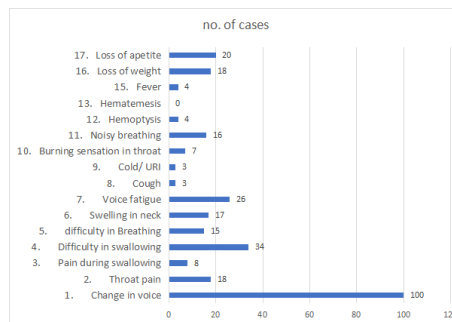
In terms of socio-economic status, most patients belonged to class 3 (36%) of the Modified Kuppuswamy classification, followed by class 4 (26%). The least number of patients belonged to class 1 (4%).

Agriculturists and coolies had the highest incidence (34%) of hoarseness of voice, followed by others (23%), including housewives (11%), IT professionals, and doctors. Teachers, students, and businessmen had a similar incidence. Vegetable vendors (3%) and singers (4%) were also found to be affected.

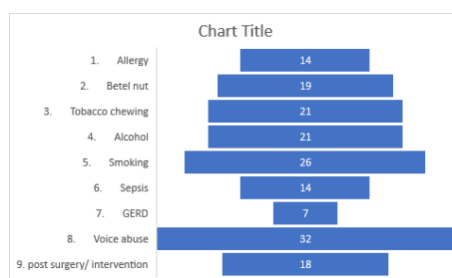
The majority of patients presented with complaints of less than 15 days' duration (20%). Most of the patients had a duration of 6 months to 1 year (19%), followed by 3 to 6 months. The least number of patients presented with a duration of more than 5 years.



All patients included in this study presented with a chief complaint of hoarseness of voice (100%). Additional symptoms, such as difficulty in swallowing (34%) and voice fatigue (26%), as well as weight loss and loss of appetite were noted. None of the patients presented with hematemesis. Stridor was observed in 16 patients, of which 7 required tracheostomy, while the remaining patients declined hospitalization.



Vocal abuse (32%) was identified as the most frequent predisposing factor for hoarseness of voice in our study. Other common factors included smoking (26%), alcohol consumption (21%), and tobacco chewing (21%). Betel nut chewing was also found to be a factor in 19% of patients. Post-surgical complications such as thyroid surgeries or neck dissections, and post-intubation (8%), were associated with 18% of hoarseness of voice cases. Gastroesophageal reflux disease (GERD) had the least incidence of 7%.



In the present study, the most common condition observed was malignancy (29%), with the majority being supraglottic (12%), followed by glottic (9%) and transglottic (6%) malignancies. The least common was nasopharyngeal malignancy (2%). Hypopharyngeal masses, comprising of vallecular cysts and malignancies, accounted for 5% of cases. The next most common condition was vocal polyps (26%), with the highest

prevalence on the right side (15%), followed by bilateral (6%) and left-sided (5%) involvement. Neurological conditions were noted in 20% of cases, with recurrent laryngeal nerve (RLN) palsy in 18% and superior laryngeal nerve (SLN) involvement in 2% of cases (right - 1%, left - 1%). Right RLN palsy was found in 9% of cases, followed by left-sided (5%) and bilateral (4%) involvement. Post-surgical conditions, such as thyroidectomy and post-intubation, were most commonly associated with nerve palsy. Laryngitis was noted in 8% of cases, including acute laryngitis (5%), chronic laryngitis (3%), and tuberculosis (TB) laryngitis (3%). Other less common conditions included keratosis, post-cricoid stricture, internal laryngocele, Reinke's edema, and saccular cyst.

Among the cases of laryngeal malignancy, supraglottic malignancy was the most common (13 cases), followed by glottic (9 cases) and transglottic malignancy (6 cases). Of the 13 cases of supraglottic malignancy, 8 were male and 5 were female. Similarly, 5 males and 4 females were affected by glottic malignancy, while transglottic malignancy affected 4 males and 2 females. Males were found to be more commonly affected than females with a ratio of 1.6:1, although the p-value was not statistically significant, indicating that both sexes may be equally susceptible to laryngeal malignancy.

Sl no.	malignancy	male	Female
1	Supraglottic/ hypopharyngeal	8	5
2	glottic	5	4
3	Trans-glottic	4	2
4	Nasopharyngeal	1	1

In cases of supraglottic malignancy, tobacco chewing was found to have a greater impact compared to betel nut, alcohol, and smoking which had an equal incidence.

In cases of glottic malignancy, smoking and tobacco chewing had a higher incidence than other predisposing factors.

For patients with trans-glottic malignancy, the primary predisposing factor was tobacco chewing, and the majority of these patients belonged to the elderly age group

6. Discussion

Various socio-demographic features and etiology of hoarseness of voice were studied in our institution. It is a commonly ignored symptom, especially in rural populations who do not have access to hospitals, and therefore, present late. Only the patients whose profession depends on their voice present early, and hence, the diagnosis can be made at an early stage. In our study, we tried to determine the most common condition prevailing in the patients presenting to our OPD and the most common predisposing factor.

In a study conducted by Parikh in 1991 [4], and Banjara *et al.*, in 2011 [5], the incidence of hoarseness was found to be higher in males than females, which is also supported by our study. This could be due to the fact that men have more addictive habits of smoking, alcohol, and tobacco compared to women.

According to the age distribution, we found that most of our patients were above the age group of 60 years (31%), whereas in a study by Banjara *et al.*, [5] the maximum incidence was found in the age group of 31-40 years (22.32%), and in a study by Nimish Parikh [4], it was in the age group of 21-50 years (69.5%). The higher incidence in the older age group can be due to the higher incidence of malignancy in that age group.

In a study by Baitha *et al.*, [3] hoarseness was predominantly from rural areas (75.5%) and 24.5% from urban areas. In our study, 39% were from urban areas, while the rest of 61% were from rural areas.

In a study by Baitha *et al.*, [3] the maximum duration of symptoms was noted in patients with symptoms lasting for months (50%). In a study by Banjara *et al.*, [5] most of the symptoms were seen in patients with a duration of 3 months (61.35%), which is almost similar to the present study (19%). However, the majority of patients in the present study had an acute presentation, as most of them presented with acute illness or stridor (20%).

The present study on hoarseness of voice included all patients with a symptom of change in voice (100%). Mehta in 1985 [6], and Parikh in 1991 [4] and Baitha in 2002 [3] have also noted that 100% of cases presented with hoarseness. As with the present study, other associated symptoms like cough, dyspnea, dysphagia, throat pain, loss of weight, loss of appetite, and foreign body sensation have also been documented by other authors.

Comparing the incidence of vocal polyps in different studies, the present study shows a higher incidence of right vocal polyps, although the total incidence is only 26% compared to Parikh's study, which had a 50% incidence.

In a study by Baitha *et al.*, [3] the neoplastic incidence was found to be 14.54%, and in Parikh's study [4], it was found to be 12%. In the present study, the incidence was 29%. The higher incidence can be attributed to the fact that the hospital is the nearest tertiary care hospital for most of the rural areas around the city.

Patients in whom malignancy was suspected were posted for biopsy, and after confirmation, further management was suggested.

In Banjara's study [3], smoking and vocal abuse were predisposing factors in 43% and 31% of cases, respectively. In Nimish Parikh's study [4], vocal abuse was seen in 56% of cases and septic foci in 43%, and smoking in 20% of cases. This is supported by the present study, which had an incidence of 38% and 26% for vocal abuse and smoking, respectively. Hence, it is mandatory for patients whose profession is voice dependent to undergo regular screening for early diagnosis and treatment.

7. Conclusion

The study on hoarseness of voice, its socio-demographic distribution and etiopathogenesis was an interesting study carried out in our department. The incidence was more prevalent in the 4th and 5th decade of life. Patients who reported to us early were the ones who were well-educated, aware of the ill-effects of smoking, tobacco chewing, and alcohol, and professionals who were dependent on their voice.

Male predominance was noted with a ratio of 1.2:1. Agricultural workers and laborers comprised the majority of cases (34%). Most of our patients were from urban settings, possibly due to changes in lifestyle that include smoking and alcohol practices. Patients from the lower-middle-class comprised the majority of the cases (36%).

Most of our patients presented with acute symptoms of less than 15 days, followed by patients who presented with symptoms from 3 to 6 months. All the patients had a change in voice (100%), associated with difficulty in swallowing in 34% of cases and vocal fatigue in 26%. Sixteen of our patients presented with stridor, and emergency tracheostomy was performed in patients willing to undergo the procedure.

The most common predisposing factor was voice abuse in 32% of cases, followed by smoking, alcohol (21%), and tobacco chewing (21%).

The most probable diagnosis for most of our patients was malignancy. The second most common incidence was found to be vocal polyp. The varied etiology and presentation for hoarseness of voice are emphasized in our study for early treatment and diagnosis. Indirect laryngoscopy and videolaryngoscopy were performed in all patients. Only patients who were not cooperative, apprehensive, or had exaggerated reflexes underwent videolaryngoscopy only.

8. Limitation of Study

The increased incidence of malignancy observed in this study may be attributed to delayed presentation to the outpatient department during the COVID-19 pandemic. Patients with mild voice changes may have been hesitant to seek medical attention and only presented when their symptoms had progressed significantly. Therefore, a larger sample size and longer duration of the study may have provided a more comprehensive analysis of various benign and malignant etiologies.

The results of this study emphasize the importance of investigating any change in voice, as it may have a variety of causes. Early screening, proper investigation, and management are essential. Furthermore, public awareness of the negative effects of smoking, alcohol, tobacco, and voice abuse is necessary to prevent the development of various laryngeal pathologies.

Annexures/Photos/Images



Figure 2. Left vocal polyp



Figure 3. Ulcero-proliferative mass over anterior commissure- glottic malignancy



Figure 4. Left SLN palsy- bowing of right Left vocal cord seen



Figure 5. Proliferative mass over pyriform fossa



Figure 6. Ulcero-proliferative mass involving transglottis

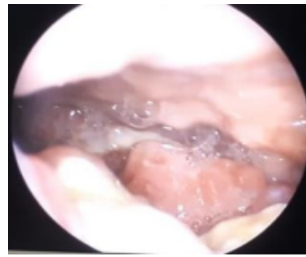


Figure 7. Proliferative mass involving left AEF, arytenoids and crico-arytenoid joint- supraglottic malignancy

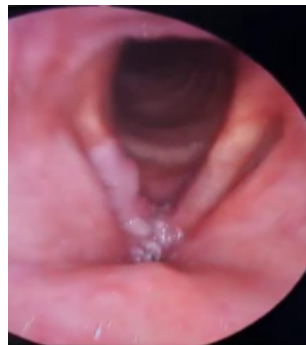


Figure 8. Keratotic lesion over anterior commissure involving right vocal cords



Figure 9. Saccular cyst arising from left side



Figure 10. Chronic laryngitis due to GERD



Figure 11. Acute laryngitis

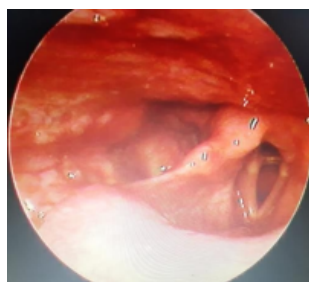


Figure 12. Left RLN palsy



Figure 13. B/L RLN palsy



Figure 14. B/L early vocal polyp over anterior 1/3rd of vocal cords



Figure 15. Mass over left cricoarytenoid joint causing fixation of left hemilarynx



Figure 16. Reinke's edema resulting in anterior glottic chink closure

Author Contributions: All authors contributed equally to the writing of this paper. All authors read and approved the final manuscript.

Conflicts of Interest: "Authors declare that they do not have any competing interests."

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