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Clinicopathological Profile and Etiological Evaluation of Hoarseness of Voice: A Cross-Sectional Observational Study.

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ABSTRACT

Dysphonia (hoarseness of voice) is a prevalent clinical symptom in otorhinolaryngology that masks a diverse spectrum of underlying pathologies, ranging from benign, self-limiting mucosal inflammation to life-threatening upper aerodigestive tract malignancies. This study aims to systematically evaluate the clinicopathological profile, underlying etiologies, and primary predisposing risk factors of patients presenting with hoarseness in a tertiary care setting. A cross-sectional observational study was conducted over an 18-month period, enrolling 150 consecutive patients presenting with a primary complaint of hoarseness to the ENT outpatient department. Comprehensive clinical evaluations were performed, including detailed histories, occupational stratification (Koufman and Isaacson classification), and direct laryngeal visualization via fiberoptic or microlaryngoscopy. The study cohort demonstrated a distinct male preponderance (58.00%) and a peak prevalence during the highly productive fourth decade of life (37.33%). Reflecting the regional demographics, a significant majority of patients were from a rural background (72.66%), with manual labourers constituting the largest occupational group (39.33%). The most frequent pathological etiology was vocal cord paralysis (23.33%), sequentially followed by malignancy (18.00%) and vocal nodules (16.00%). Behavioural habits profoundly impacted pathogenesis; smoking was identified as the predominant predisposing risk factor (58.66%), frequently acting in synergy with gastroesophageal reflux disease (GERD) (39.33%) and smokeless tobacco use (31.33%). Hoarseness of voice is a critical diagnostic indicator heavily influenced by regional, occupational, and behavioural dynamics. The alarmingly high incidence of vocal cord paralysis and laryngeal malignancy—particularly among rural male labourers with a history of smoking—underscores the absolute necessity for early, direct laryngeal evaluation to mitigate diagnostic delays and optimize therapeutic outcomes.

Keywords: Dysphonia, Hoarseness, Vocal Cord Paralysis, Laryngeal Malignancy, Laryngoscopy, Smoking.

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INTRODUCTION

Dysphonia, clinically presenting as hoarseness of voice, is characterized by an involuntary alteration in vocal quality, typically manifesting as a breathy, raspy, or strained sound, often accompanied by a deviation in normal pitch and volume [1, 2]. As one of the most frequent presenting complaints encountered in otorhinolaryngology outpatient departments, it warrants meticulous clinical attention. The production of normal phonation relies on the precise anatomical approximation of the vocal cords, appropriate mucosal stiffness, and their ability to vibrate rhythmically in response to pulmonary airflow. Any structural, inflammatory, or neurological disruption to this delicate biomechanical process invariably results in vocal impairment.

The etiological spectrum of hoarseness is remarkably broad and diagnostically challenging. It encompasses benign, self-limiting pathologies such as acute inflammatory laryngitis and benign mucosal lesions (including vocal nodules and polyps), yet critically extends to severe, life-threatening conditions such as vocal fold paralysis, laryngeal tuberculosis, and invasive upper aerodigestive tract malignancies.

Epidemiological trends indicate that while dysphonia can affect individuals across all demographics, it exhibits a pronounced prevalence among the elderly population [3]. Furthermore, specific occupational cohorts demonstrate a heightened susceptibility to vocal dysfunction. Individuals subjected to chronic vocal strain, such as teachers and elite vocal performers, as well as those exposed to environmental irritants, such as manual labourers, are at a significantly increased risk of developing laryngeal pathologies [4, 5].

Because hoarseness frequently serves as the primary—and sometimes solitary—harbinger of severe underlying local or systemic disease, a thorough diagnostic evaluation is mandatory. Therefore, the primary objective of this cross-sectional study is to systematically analyze the clinical profile, underlying etiologies, and associated predisposing risk factors of dysphonia within a cohort of 150 patients presenting to a ENT OPD at tertiary care hospital. By mapping these demographic and clinical variables, this study aims to enhance early diagnostic accuracy and optimize therapeutic interventions for vocal disorders.

MATERIAL AND METHODS

Study Design and Setting A cross-sectional observational study was conducted within the Otorhinolaryngology Outpatient Department (OPD) of a tertiary care hospital. The clinical investigation was carried out over an 18-month period, spanning from August 2022 to February 2024, following formal approval from the Institutional Ethics Committee.

Eligibility Criteria The study cohort consisted of 150 consecutive patients who presented with a primary clinical complaint of dysphonia (hoarseness of voice). Participants were universally included in the study irrespective of their age, gender, or the chronological duration of their symptoms.

Clinical Evaluation and Occupational Classification Every patient underwent a comprehensive clinical evaluation, which included a detailed medical history and a thorough physical ear, nose, and throat (ENT) examination. To accurately assess the impact of vocal demand on the pathology, patients were stratified into four distinct categories based on the Koufman and Isaacson classification system for vocal professionals:

- **Level I (elite vocal performers):** It included sophisticated voice users like the singers and actors, where even a slight vocal difficulty causes serious consequences to them and their careers.
- **Level II (professional voice users):** For whom even moderate vocal difficulty would hamper adequate job performance. Clergymen, politicians, public speakers and telephone operators would classify in this level of voice users.
- **Level III (non-vocal professionals):** It includes teachers and lawyers. They can perform their jobs with slight or moderate voice problems; only severe dysphonia endangers adequate job performance.
- **Level IV (non-vocal non-professionals):** It includes labourers, homemakers, businessmen and clerks. These are the persons who are not impeded from doing their work when they experience any kind of dysphonia.

Diagnostic Workup A standard battery of routine baseline investigations was performed for all participants. This included a complete blood count (CBC), blood sugar estimation, routine urinalysis, a posteroanterior (PA) chest radiograph, and both anteroposterior (AP) and lateral soft tissue radiographs of the neck.

Laryngeal Examination The primary visualization of the laryngeal anatomy and vocal cord mobility was achieved using fiberoptic laryngoscopy. If a suspicious mucosal area or lesion was identified during this initial screening, the patient was subsequently subjected to direct microlaryngoscopy under general anaesthesia, accompanied by a targeted tissue biopsy to secure a definitive histopathological diagnosis.

Statistical Analysis The gathered demographic and clinical data were systematically catalogued using Microsoft Excel. Subsequent data processing and statistical analysis were executed utilizing the Statistical Package for the Social Sciences (SPSS) software, version 29.

RESULTS

Incidence

The total ENT OPD attendance during the study period was 20,513 patients (11,235 new cases and 9,278 old cases). Out of this, 150 patients presented with the primary complaint of hoarseness of voice. Thus, the incidence calculated was 0.73% of all OPD cases and 1.33% of new OPD cases.

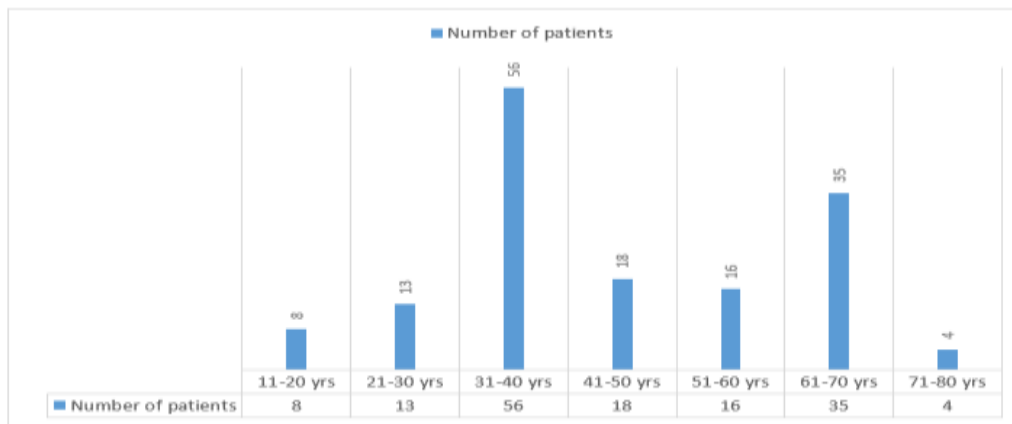
Table 1: Baseline Sociodemographic Characteristics of the Study Cohort (n=150)

Variable	Classification	Number of Cases	Percentage (%)
Gender	Male	87	58.00
	Female	63	42.00
Demographics	Rural	109	72.66
	Urban	41	27.33
Symptom Duration	< 3 months	79	52.66
	3–6 months	29	19.33
	6–12 months	23	15.33
	> 12 months	19	12.66
Occupation	Labourer	59	39.33
	Housewife	37	24.66
	Teacher	15	10.00
	Private Job	12	8.00
	Vendor/Hawker	10	6.66
	Student	9	6.00
	Singer	8	5.33

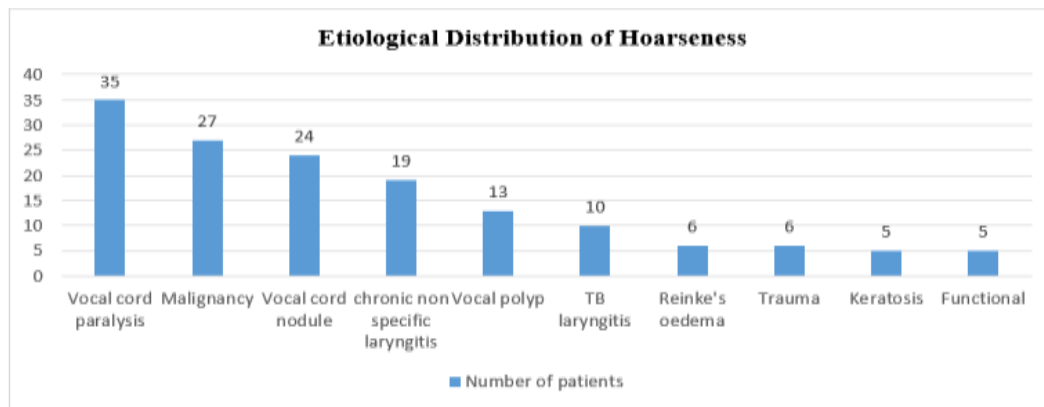
Clinical Profile of Hoarseness

As detailed in Table 1, out of the 150 patients evaluated, the majority were male (58.00%), and nearly three-fourths of the study population (72.66%) belonged to rural areas. More than half of the patients (52.66%) presented to the outpatient department within 3 months of the initial appearance of symptoms.

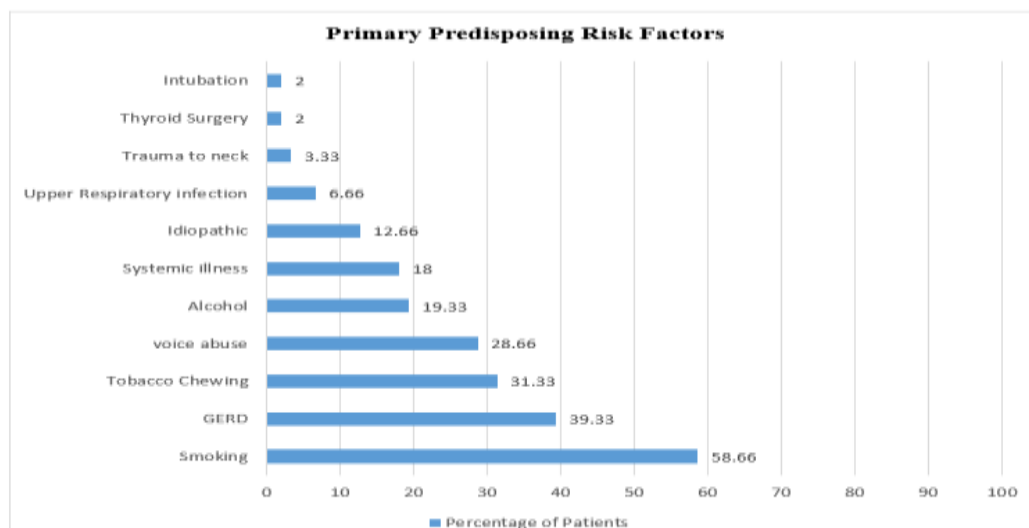
The labourer class constituted the single largest occupational group of patients (39.33%), followed closely by housewives (24.66%). Vocal professionals were categorized according to the classification outlined by Koufman and Isaacson. Level I or elite vocal performers (singers) constituted 5.33% (n=8) of the cohort. Level II or professional voice users (private job) comprised 8.00% (n=12). Level III or non-vocal professionals (teachers) accounted for 10.00% (n=15). Level IV or non-vocal non-professionals (labourers, housewives, vendors, and students) formed the vast majority at 76.67% (n=115).

Figure 1: Age Distribution


Hoarseness was seen mostly in the middle age group. As illustrated in **Figure 1**, the highest prevalence of patients fell in the 4th decade of life (37.33%), followed by a secondary peak in the 7th decade (23.33%). The age of the patients ranged from 15 to 80 years (Mean age: 45.2 years).

Figure 2: Etiological Distribution of Hoarseness


Regarding the underlying pathology, **Figure 2** demonstrates that vocal cord paralysis emerged as the leading pathological cause of hoarseness, diagnosed in 23.33% of the patients. This was sequentially followed by malignancy (18.00%), vocal nodules (16.00%), and chronic non-specific laryngitis (12.66%).

Figure 3: Primary Predisposing Risk Factors


Most of the patients presenting with hoarseness of voice were exposed to multiple overlapping predisposing factors. As highlighted in **Figure 3**, smoking remained the single most significant risk factor, documented in 58.66% of the patients. Gastroesophageal reflux disease (GERD) was the second most common predisposing variable (39.33%), closely followed by the use of smokeless tobacco (31.33%) and a clinical history of voice abuse (28.66%).

DISCUSSION

Dysphonia is a critical clinical indicator that demands a rigorous diagnostic approach, as it frequently serves as the preliminary symptom for both benign laryngeal pathologies and life-threatening upper aerodigestive tract malignancies. By benchmarking the clinical and epidemiological findings of the present 150-patient cohort against the contemporary template study by Rathi et al. [18] and the broader otolaryngological literature, this discussion elucidates the primary demographic and etiological patterns driving vocal dysfunction in a tertiary care setting.

Epidemiological and Demographic Benchmarks

The overall burden of vocal dysfunction appears to be steadily increasing. In the present cohort, the incidence of hoarseness was calculated at 0.73% of the total OPD attendance and 1.33% among new cases. This represents a slightly higher regional presentation rate compared to the benchmark findings of Rathi et al. [18], who reported incidences of 0.66% and 1.15%, respectively. When contrasted with earlier historical data by Banjara et al. [6], which noted a much lower incidence of 0.45% among total cases, a clear, rising epidemiological trend in patients seeking specialist evaluation for voice disorders becomes evident.

Regarding age distribution, the highest prevalence of hoarseness in our study was observed during the fourth decade of life (37.33%). This strongly correlates with the findings of Rathi et al. [18] (33.33%), Baitha et al. [7] (28.18%), and Banjara (Hansa) et al. [6] (22.31%), reflecting the period of maximum occupational and vocal activity. Interestingly, a distinct secondary peak emerged in the seventh decade (23.33%), which directly aligns with the demographic observations of Herrington-Hall et al. [8], who established that severe laryngeal pathologies—particularly invasive carcinomas and neurological vocal fold paralysis—predominantly affect the elderly population.

A definitive male preponderance was noted in our study (58.00%, resulting in a male-to-female ratio of 1.38:1). This gender bias is highly consistent with historical cohorts documented by Rathi et al. [18] (1.68:1), Baitha et al. [7] (2:1), and Deshmukh [11] (1.5:1). This disparity is largely attributed to sociocultural factors, particularly the higher prevalence of heavy smoking, alcohol consumption, and occupational exposure to environmental pollutants among males.

Socio-Occupational Vulnerability

The socio-demographic composition of the current cohort was predominantly rural (72.66%), closely mirroring the 71.42% reported by Rathi et al. [18] and the 75.5% documented by Baitha et al. [7]. Consequently, manual labourers constituted the single largest occupational group (39.33%), which is consistent with the occupational distributions noted by Rathi et al. [18] (42.06%) and Kumar et al. [12] (24%).

When patient occupations were formally stratified using the Koufman and Isaacson classification system [13], the vast majority (76.67%) fell into Level IV (non-vocal non-professionals). This matches the 83.33% documented by Rathi et al. [18] and the 85.26% by Banjara (Hansa) et al. [6], while contrasting slightly with Batra et al. [14], who reported a lower 52.9% in this specific tier.

Presentation Timelines

Early clinical presentation is crucial for optimal therapeutic outcomes and is often driven by either the severe functional disruption of communication or a psychological fear of underlying malignancy (cancer phobia). In this investigation, 52.66% of patients presented within three months of their initial symptom onset. This timeline is statistically identical to the 52.38% early presentation rate

reported by Rath et al. [18] and is highly consistent with the prompt consultation behaviours noted in cohorts studied by Banjara (Hansa) et al. [6] (61.35%) and Batra et al. [14] (59%).

Etiological and Risk Factor Correlates

A thorough etiological breakdown reveals that vocal cord paralysis was the primary pathological driver of hoarseness, diagnosed in 23.33% of our cases. This perfectly matches the 23.01% reported by Rath et al. [18] and closely follows the 33% incidence documented by Pal et al. [15].

Malignancy represented the second leading cause of dysphonia at 18.00%. This high rate of neoplastic disease tracks consistently with the findings of Rath et al. [18] (16.66%), Kumar et al. [12] (15%), and Baitha et al. [7] (14.54%), emphasizing the absolute necessity of direct laryngeal visualization in every patient presenting with chronic hoarseness. Furthermore, vocal nodules accounted for 16.00% of cases, aligning closely with Rath et al. [18] (15.07%) and Baitha et al. [7] (12.72%), validating the significant burden of structural vocal fold lesions caused by vocal abuse.

Finally, the etiopathogenesis of hoarseness was heavily influenced by behavioural risk factors. Smoking was the most prominent predisposing variable (58.66%), corroborating Rath et al. [18], who reported it in 65% of their cohort, as well as Banjara (Hansa) et al. [6] (43%) and Pal et al. [15] (33%). Gastroesophageal reflux disease (GERD) served as a major co-factor, present in 39.33% of our patients. This nearly mirrors the 40% incidence reported by Rath et al. [18], suggesting a powerful, well-documented synergistic effect between inhaled mucosal irritants and gastric acid in the development of chronic laryngeal pathology.

CONCLUSION

Dysphonia remains a highly prevalent presenting symptom in the otorhinolaryngology outpatient department. In the present study, the overall incidence of hoarseness was calculated at 0.73% of total OPD attendance and 1.33% among newly registered cases. The underlying etiology spans a broad clinical spectrum, ranging from benign, self-limiting infections to severe, life-threatening malignancies. Furthermore, the clinical profile and predisposing risk factors for vocal dysfunction are heavily influenced by regional and sociocultural dynamics. As our tertiary care center primarily serves the surrounding agrarian and semi-urban populations, the vast majority of our cohort (72.66%) presented from a rural background. Consequently, manual labourers constituted the single largest occupational demographic (39.33%), with smoking emerging as the most significant predisposing habit, documented in 58.66% of the affected patients.

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