Section: Otorhinolaryngology

Original Research Article

CLINICODEMOGRAPHIC PROFILE AND RISK FACTORS OF BENIGN VOCAL CORD LESIONS IN PATIENTS WITH HOARSENESS: A DESCRIPTIVE CROSS-SECTIONAL STUDY

Natarajan S[1], Ilavarasi N[2], Mahendran K[3]

[1]Assistant Professor, Department of Otorhinolaryngology, Government Mohan Kumaramangalam Medical College and Hospital, Salem, Tamil Nadu, India.
[2]Assistant Professor, Department of General Medicine, Government Mohan Kumaramangalam Medical College and Hospital, Salem, Tamil Nadu, India.
[3]Associate Professor, Department of Otorhinolaryngology, Government Mohan Kumaramangalam Medical College and Hospital, Salem, Tamil Nadu, India.

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Corresponding Author:
Dr. Mahendran K,
Email: drkmahendran@gmail.com

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ABSTRACT

Background: Hoarseness of voice is a common presenting complaint in otolaryngology practice and is frequently associated with benign vocal cord lesions. These lesions can significantly affect quality of life, especially during the most vocally active years. Understanding the clinicodemographic distribution of benign vocal cord lesions is essential for early diagnosis and effective management. **Objective:** To study the clinicodemographic profile and distribution of benign vocal cord lesions among patients presenting with hoarseness of voice in a tertiary care hospital. **Materials and Methods:** A descriptive cross-sectional study was conducted in the Department of Otorhinolaryngology at a tertiary care hospital in Salem from March 2024 to March 2025. Fifty patients aged 10–70 years presenting with hoarseness of voice and diagnosed with benign vocal cord lesions were included. All patients underwent detailed clinical evaluation, indirect laryngoscopy, and flexible fibreoptic laryngoscopy. Data were analyzed using descriptive statistics and chi-square test to assess associations between age, sex, occupation, and type of lesion. **Results:** The mean age of the study population was 43.36 ± 14.51 years, with the highest proportion of patients in the 41–50-year age group (26%). Males constituted 52% and females 48% of the study population. The majority of patients were unskilled workers (74%). Vocal nodules were the most common lesion (70%), followed by vocal polyps (14%), hemorrhagic polyps (8%), granulomatous lesions (6%), and juvenile-onset recurrent respiratory papillomatosis (2%). A statistically significant association was observed between age group and type of benign vocal cord lesion ($p < 0.05$). Associations with sex and occupation were not statistically significant. **Conclusion:** Benign vocal cord lesions were most commonly observed in middle-aged adults, with vocal nodules being the predominant lesion. Age showed a significant association with lesion type, highlighting the importance of early evaluation of hoarseness for timely diagnosis and management.

INTRODUCTION

Human voice is a distinctive characteristic that enables communication, emotional expression, and professional interaction. It is produced by a finely coordinated interaction between respiration, phonation, and resonance, with the vocal cords serving as the primary vibratory structure. Any alteration in the structure or function of the vocal cords can significantly affect voice quality, leading to symptoms such as hoarseness, breathiness, reduced loudness, pitch variation, and vocal fatigue.[1,2] Because voice plays a central role in daily activities and occupational performance, disorders affecting voice can result in substantial psychosocial and functional impairment.

Hoarseness of voice is one of the most common presenting complaints in otorhinolaryngology practice. It is defined as an abnormal change in voice quality characterized by roughness, strain, breathiness, or weakness. Chevalier Jackson famously emphasized that hoarseness should never be ignored, as it may represent the earliest symptom of serious laryngeal pathology, including malignancy.[3] While many cases of hoarseness are transient and related to acute inflammation, persistent

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hoarseness warrants thorough evaluation to identify underlying organic causes.

Benign vocal cord lesions constitute a major proportion of organic causes of chronic hoarseness. These lesions include vocal nodules, vocal polyps, haemorrhagic polyps, granulomas, cysts, Reinke's edema, and recurrent respiratory papillomatosis. Although these conditions are non-malignant, they may significantly impair voice quality and adversely affect quality of life, particularly among individuals who depend on their voice for professional purposes.[4,5] Benign lesions are often multifactorial in origin, resulting from a combination of mechanical, inflammatory, behavioural, and environmental factors.

Phono trauma resulting from vocal abuse or misuse is considered the most important etiological factor in the development of benign vocal cord lesions. Excessive voice use, speaking in noisy environments, improper pitch, and lack of vocal rest subject the vocal fold mucosa to repeated mechanical stress. According to Bernoulli's principle, airflow passing through the adducted vocal cords generates negative pressure, leading to vibration of the mucosal surface. Repeated vibratory trauma, particularly at the junction of the anterior one-third and posterior two-thirds of the vocal cords, results in microvascular injury, edema, and epithelial thickening, eventually leading to lesion formation such as nodules or polyps.[6]

In addition to vocal abuse, laryngopharyngeal reflux has emerged as a significant contributing factor in benign vocal cord pathology. Reflux of gastric contents into the larynx causes chronic mucosal inflammation, impaired epithelial healing, and increased susceptibility to phono traumatic injury.[7] Smoking, alcohol consumption, prior endotracheal intubation, exposure to irritant fumes, and recurrent infections have also been implicated as risk factors.[8,9] These factors often coexist, compounding the severity of vocal fold damage.

Epidemiological studies suggest that benign vocal cord lesions are most commonly seen in adults between the third and fifth decades of life, corresponding to periods of peak occupational and social voice use. Gender distribution varies with lesion type; vocal nodules are reported more frequently in females, while vocal polyps and granulomas show male predominance.[10-12] Occupational voice users such as teachers, singers, call-center employees, and manual labourers working in noisy environments are at increased risk due to sustained vocal demand and inadequate voice hygiene.[13]

Despite the high prevalence of benign vocal cord lesions, Indian data on their clinicodemographic profile and associated risk factors remain limited, particularly from public sector tertiary care hospitals. Many existing studies are retrospective or focus on individual lesion types, limiting comprehensive understanding. A systematic evaluation of benign vocal cord lesions, correlating demographic variables, lesion distribution, and modifiable risk factors, is essential to inform preventive strategies and optimize patient management.

The present study was undertaken to analyse the clinicodemographic characteristics, spectrum of benign vocal cord lesions, and associated risk factors among patients presenting with hoarseness of voice in a tertiary care hospital in Chennai.

Objective

To study the clinicodemographic profile, distribution, and associated risk factors of benign vocal cord lesions among patients presenting with hoarseness of voice in a tertiary care hospital.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted in the Department of Otorhinolaryngology at Government Mohan Kumaramangalam Medical College and Hospital, Salem from March 2024 to March 2025. The study population included patients aged 18–70 years presenting to the ENT outpatient department with complaints of change in voice.

A total of 50 patients diagnosed with benign vocal cord lesions were included based on predefined inclusion and exclusion criteria. Patients with malignant vocal cord lesions, prior treatment for benign lesions, or unwillingness to participate were excluded. Written informed consent was obtained from all participants, and institutional ethics committee approval was obtained prior to study initiation.

All patients underwent detailed history taking, including demographic details, occupational exposure, vocal habits, and associated risk factors such as vocal abuse, smoking, alcohol intake, reflux symptoms, and prior intubation. Clinical examination included indirect laryngoscopy followed by flexible fibreoptic laryngoscopy using a Pentax EB-1970 TK system. Histopathological confirmation was obtained where clinically indicated.

Data were entered into Microsoft Excel and analyzed using SPSS version 16. Continuous variables were summarized using mean and standard deviation, while categorical variables were expressed as frequency and percentage. Associations between demographic variables and lesion type were assessed using the chi-square test, with a p-value <0.05 considered statistically significant.

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RESULTS

Table 1: Age-wise distribution of patients with benign vocal cord lesions (n = 50) in a tertiary care Hospital in Tamil Nadu

Age group (years)	Frequency	Percentage (%)
10–20	3	6.0
21–30	8	16.0
31–40	10	20.0
41–50	13	26.0
51–60	10	20.0
61–70	6	12.0
Total	50	100.0

Table 1 shows the age-wise distribution of patients with benign vocal cord lesions. The study population ranged from 10 to 70 years, with a mean age of 43.36 ± 14.51 years. The highest proportion of patients was observed in the 41–50-year age group, accounting for 26% of the total study population. This was followed by the 31–40-year and 51–60-year age groups, each contributing 20% of cases. Younger age groups constituted a smaller proportion, with 16% of patients in the 21–30-year group and only 6% in the 10–20-year group. Patients aged 61–70 years accounted for 12% of the cases. Overall, the distribution indicates that benign vocal cord lesions were most commonly observed in middle-aged adults, particularly between 31 and 60 years of age. This age pattern suggests a higher burden of benign vocal cord lesions during the most vocally active years of life, likely reflecting cumulative phono traumatic exposure related to occupational and social voice use.

Table 2: Sex distribution of patients with benign vocal cord lesions in a tertiary care Hospital in Tamil Nadu

Sex	Frequency	Percentage (%)
Male	26	52.0
Female	24	48.0
Total	**50**	**100.0**

Table 2 depicts the sex-wise distribution of patients with benign vocal cord lesions. Among the 50 study participants, 26 (52%) were males and 24 (48%) were females, showing an almost equal representation of both sexes. This indicates that benign vocal cord lesions affected males and females nearly equally in the present study population.

Table 3: Occupational distribution of patients with benign vocal cord lesions in a tertiary care Hospital in Tamil Nadu

Occupation	Frequency	Percentage (%)
Unskilled	37	74.0
Skilled	4	8.0
Professional	9	18.0
Total	**50**	**100.0**

Table 3 presents the occupational distribution of patients with benign vocal cord lesions. The majority of patients were unskilled workers, accounting for 74% of the study population. Professionals constituted 18% of cases, while skilled workers represented the smallest group at 8%. This distribution suggests a higher occurrence of benign vocal cord lesions among individuals engaged in unskilled occupations.

Table 4: Association between age group and type of benign vocal cord lesion in a tertiary care Hospital in Tamil Nadu

Age group	Vocal nodule	Vocal polyp	Hemorrhagic polyp	JORRP	Granulomatous lesion	Total
10–20	1	0	1	1	0	3
21–30	7	0	1	0	0	8
31–40	8	1	1	0	0	10
41–50	9	2	1	0	1	13
51–60	8	1	0	0	1	10
61–70	2	3	0	0	1	6
Total	**35**	**7**	**4**	**1**	**3**	**50**

$\chi^2 = 32.10$; df = 20; p = 0.0329. Statistically significant association between age group and lesion type.

Table 4 shows the association between age group and type of benign vocal cord lesion. Vocal nodules were the most common lesion across all age groups. The highest number of vocal nodules was observed in the 41–50-year age group. Vocal polyps were more frequently seen in the 61–70-year age group. Hemorrhagic polyps were observed mainly in the 21–50-year age range. Granulomatous lesions were predominantly noted in patients above 40 years of age. A statistically significant association was observed between age group and type of lesion (χ^2 = 32.10, df = 20, p = 0.0329).

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Table 5: Association between sex and type of benign vocal cord lesion in a tertiary care Hospital in Tamil Nadu

Sex	Vocal nodule	Vocal polyp	Hemorrhagic polyp	JORRP	Granulomatous lesion	Total
Male	14	5	3	1	3	26
Female	21	2	1	0	0	24
Total	**35**	**7**	**4**	**1**	**3**	**50**

$\chi^2 = 7.62$; df = 4; p = 0.1066, Not statistically significant.

Table 5 describes the association between sex and type of benign vocal cord lesion. Vocal nodules were more common among females, while vocal polyps, hemorrhagic polyps, granulomatous lesions, and juvenile-onset recurrent respiratory papillomatosis were more frequently observed among males. However, the association between sex and lesion type was not statistically significant ($\chi^2 = 7.62$, df = 4, p = 0.1066).

Table 6: Association between occupation and type of benign vocal cord lesion in a tertiary care Hospital in Tamil Nadu

Occupation	Vocal nodule	Vocal polyp	Hemorrhagic polyp	JORRP	Granulomatous lesion	Total
Unskilled	28	4	2	1	2	37
Skilled	1	2	0	0	1	4
Professional	6	1	2	0	0	9
Total	**35**	**7**	**4**	**1**	**3**	**50**

$\chi^2 = 11.59$; df = 8; p = 0.1703, Not statistically significant.

Table 6 illustrates the association between occupation and type of benign vocal cord lesion. Vocal nodules were most frequently observed among unskilled workers, followed by professionals and skilled workers. Vocal polyps were relatively more common among skilled workers compared to other occupational groups. However, no statistically significant association was found between occupation and type of benign vocal cord lesion ($\chi^2 = 11.59$, df = 8, p = 0.1703).

DISCUSSION

The present study evaluated the clinicodemographic profile of patients with benign vocal cord lesions presenting with hoarseness of voice. The mean age of the study population was 43.36 ± 14.51 years, with the highest proportion of cases occurring in the 41–50-year age group. This finding is consistent with earlier Indian studies that reported peak incidence of benign vocal cord lesions during the most vocally active decades of adulthood.[10,11] Increased occupational and social voice use during this period may contribute to cumulative phono traumatic injury.

A near-equal gender distribution was observed, with a slight male predominance. Vocal nodules were more commonly observed among females, whereas vocal polyps, haemorrhagic polyps, granulomatous lesions, and juvenile-onset recurrent respiratory papillomatosis were more frequent among males. Similar gender-based trends have been documented in previous studies and may reflect differences in vocal behaviour, occupational exposure, and lifestyle habits.[9,12] However, the association between sex and lesion type was not statistically significant in the present study.

Vocal nodules constituted the most common lesion, accounting for 70% of cases. This finding supports the well-established role of chronic vocal abuse in the pathogenesis of benign vocal cord lesions. The high proportion of vocal nodules observed may also be attributed to early detection using flexible fibreoptic laryngoscopy, which allows identification of subtle lesions at an early stage.[6,13]

A statistically significant association was observed between age group and type of lesion, with granulomatous lesions occurring more frequently in older age groups. This may reflect cumulative exposure to irritants and age-related changes in vocal fold tissue. Occupational analysis revealed a higher prevalence of lesions among unskilled laborers; however, no statistically significant association was observed between occupation and lesion type. This suggests that while occupational voice use patterns may influence lesion development, age-related phono trauma plays a more dominant role.

Previous studies have highlighted vocal abuse and laryngopharyngeal reflux as important contributors to benign vocal cord pathology.[7,14] Although reflux and other lifestyle factors were not analyzed as independent variables in the present study, their role in lesion development is well documented and should be considered during clinical evaluation and management.

Overall, the findings of this study emphasize the importance of early evaluation of hoarseness and identification of demographic patterns associated with benign vocal cord lesions. Understanding these patterns can aid in timely diagnosis, targeted counselling, and implementation of preventive strategies to reduce disease burden and recurrence.

Strengths of the Study

This study was conducted in a tertiary care public sector hospital catering to a diverse patient population, enhancing the generalizability of findings. All patients underwent systematic evaluation using indirect and flexible fibreoptic laryngoscopy, ensuring accurate diagnosis. The use of standardized diagnostic methods and statistical analysis to evaluate associations with age, sex, and

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occupation strengthens the validity of the findings and their relevance to routine clinical practice.

Limitations of the Study

The cross-sectional design limits the ability to establish temporal associations, particularly between vocal abuse, reflux symptoms, and lesion development. The sample size was relatively small and drawn from a single center, which may limit the statistical power and external validity of the results. Additionally, assessment of risk factors such as vocal abuse and reflux symptoms was largely based on patient self-reporting, which may be subject to recall bias.

CONCLUSION

Benign vocal cord lesions constitute a common cause of hoarseness of voice and are frequently encountered in otorhinolaryngology practice. The present study demonstrates that vocal nodules are the most prevalent benign vocal cord lesion, with peak occurrence in the fourth and fifth decades of life. A significant association was observed between age group and type of lesion, highlighting the role of cumulative phono traumatic exposure.

Early recognition of hoarseness and prompt laryngeal evaluation are essential for timely diagnosis and effective management. Understanding age- and sex-related patterns of benign vocal cord lesions can aid clinicians in providing targeted counseling and preventive care.

Recommendations

1. Patients with persistent hoarseness of voice should undergo early laryngeal examination to facilitate timely diagnosis of benign vocal cord lesions.
2. Education regarding proper voice use and vocal hygiene should be emphasized, particularly among individuals with high vocal demand occupations.
3. Voice therapy should be considered an integral component of management for patients with benign vocal cord lesions, especially vocal nodules.
4. Clinicians should remain vigilant for contributory factors such as reflux disease and phono traumatic behaviors during routine evaluation.
5. Preventive strategies focusing on awareness and early intervention may reduce morbidity and recurrence associated with benign vocal cord lesions.
6. Future studies with larger sample sizes and longitudinal follow-up are recommended to explore causal associations and treatment outcomes.

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