



Original Article

## Socio-Demographic Profile and Epidemiology of Vocal Fold Nodules: A Clinical Observational Analysis

Dr. Karishma Kasturi Mishra<sup>1</sup>, Dr. Manisha Mallick<sup>2</sup>, Dr. Tanisha Pattnaik<sup>3</sup>, Dr. Ananthapura Meghashyam<sup>4</sup>, Dr. Sreyash Chowdhary<sup>5</sup>

<sup>1</sup>Senior Resident, Department of Otorhinolaryngology, Kalinga Institute of Medical Sciences, Bhubaneswar

<sup>2</sup>Assistant professor, Department of Otorhinolaryngology, Kalinga Institute of Medical Sciences, Bhubaneswar

<sup>3</sup>Post Graduate Resident, 3rd year, Department of Otorhinolaryngology, Kalinga Institute of Medical Sciences.

<sup>4</sup>Post Graduate Resident, 3rd year, Department of Otorhinolaryngology, Kalinga Institute of Medical Sciences.

<sup>5</sup>Post Graduate Resident, 2nd year, Department of Otorhinolaryngology, Kalinga Institute of Medical Sciences.

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### Corresponding Author:

**Dr. Karishma Kasturi Mishra**  
Senior Resident, Department of  
Otorhinolaryngology, Kalinga  
Institute of Medical Sciences,  
Bhubaneswar

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### ABSTRACT

**Background:** Vocal fold nodules (VFNs) are among the most common benign vocal fold lesions associated with dysphonia. Understanding their socio-demographic distribution and epidemiological characteristics is essential for preventive strategies and early diagnosis, especially in populations exposed to high vocal demand.

**Objective:** To describe the socio-demographic characteristics and epidemiological distribution of patients diagnosed with vocal fold nodules.

**Methods:** A hospital-based observational analysis was conducted on 204 patients diagnosed with vocal fold nodules. Demographic variables including age, sex, and occupation were evaluated and compared with existing epidemiological literature.

**Results:** Vocal fold nodules were more common in females, with a male-to-female ratio of approximately 1:1.8. The median age of affected individuals was in the third to fourth decade. A majority (61.7%) belonged to occupations requiring increased vocal usage, including homemakers, teachers, singers, and sales professionals.

**Conclusion:** Vocal fold nodules predominantly affect young to middle-aged adults, particularly females and individuals engaged in voice-intensive activities. Occupational vocal load and phonotrauma remain key epidemiological determinants.

**Keywords:** Vocal fold nodule, epidemiology, socio-demographic factors, occupation, phonotrauma, dysphonia.

### INTRODUCTION

Vocal fold nodules are benign, typically bilateral mucosal lesions occurring at the junction of the anterior one-third and posterior two-thirds of the vocal folds and are strongly associated with chronic phonotrauma and excessive voice use.<sup>1</sup>

They account for a substantial proportion of persistent hoarseness, reported to cause dysphonia in approximately 25% of children and 6% of adults, and are especially prevalent in individuals with high vocal demand such as teachers and singers.<sup>2</sup>

Despite their frequency, detailed socio-demographic epidemiological patterns remain underreported in many populations. Identification of high-risk groups can help guide preventive vocal health strategies.

### MATERIALS AND METHODS

This observational analysis included 204 patients diagnosed with vocal fold nodules in a tertiary-care otorhinolaryngology department.

**Inclusion criteria:**

- Age 18–59 years
- Diagnosis confirmed on videolaryngoscopy

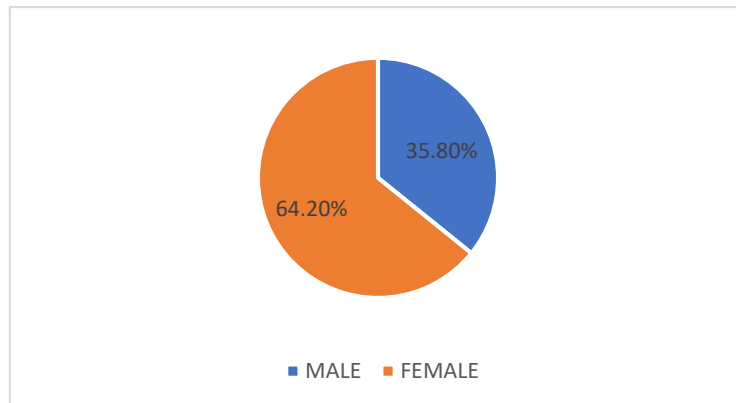
**The following variables were analyzed:**

- Age
- Sex
- Occupation

Findings were interpreted descriptively and compared with previously published epidemiological studies.

**RESULTS****1. Gender Distribution**

Females were affected more frequently than males, with a **male-to-female ratio of approximately 1:1.8**.



**Figure 20: Pie chart showing gender proportion in study subjects**

This female predominance is consistent with prior epidemiological studies demonstrating higher incidence of benign vocal fold lesions in women.<sup>3-5</sup>

Possible explanations include anatomical differences in vocal fold structure, hormonal influences, and behavioral voice-use patterns.<sup>5</sup>

**2. Age Distribution**

The median age of affected patients was in the **third to fourth decade**, indicating that vocal fold nodules predominantly affect young and early middle-aged adults.

Previous studies similarly report that benign vocal fold lesions occur most commonly in individuals **≤40 years of age**, supporting the concept that VFNs are largely a disorder of the younger working population.<sup>3</sup>

**3. Occupational Distribution**

A strong association was observed between vocal fold nodules and occupations involving frequent or excessive voice use.

**Table 4: Occupation distribution among study subjects (VFN patients)**

Sl.no	Occupation	n (%)
1	Homemaker/housewife	48 (23.5)
2	Teacher	38 (18.6)
3	Singer	22 (10.8)
4	Salesman	11 (5.4)
5	Call centre service	07 (3.4)
6	Banking job	15 (7.4)
7	Student	13 (6.4)
8	IT & corporate job/Officers	23 (5.9)
9	Industrial workers	05 (2.5)
10	Other miscellaneous jobs	22 (16.1)

**High voice-demand occupations**

- Homemaker/housewife – **23.5%**

- Teacher – **18.6%**
- Singer – **10.8%**
- Salesman – **5.4%**
- Call-centre worker – **3.4%**

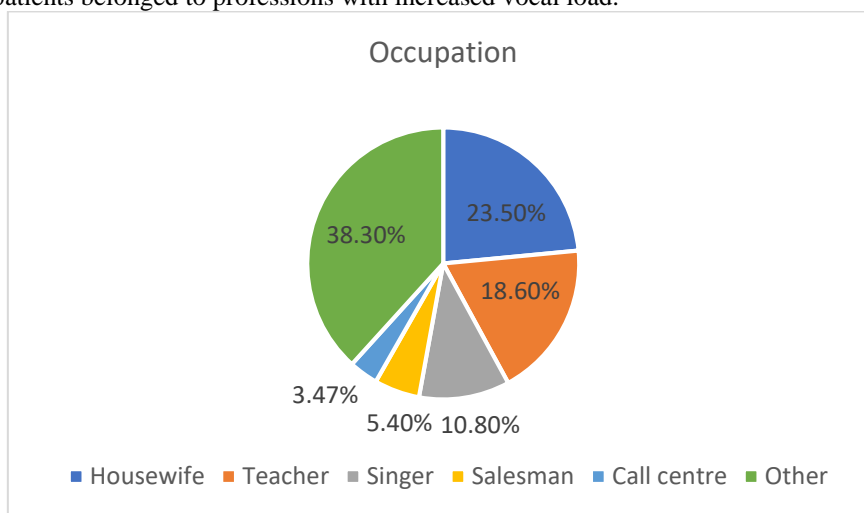
#### Moderate voice-use occupations

- Banking jobs – **7.4%**
- Students – **6.4%**
- IT/corporate/officers – **5.9%**
- Industrial workers – **2.5%**

#### Other occupations

- Miscellaneous – **16.1%**

Overall, 61.7% of patients belonged to professions with increased vocal load.



**Figure 22 : shows pie chart representing study subjects with vocal fold nodule (VFN) in various high voice demanding jobs and other includes mild to non vocation related jobs.**

Teachers and singers have consistently been identified as high-risk groups for vocal fold nodules due to sustained phonatory demands.<sup>1</sup>

Interestingly, homemakers formed the largest affected group in this analysis. Similar findings have been reported in socio-demographic studies of benign mucosal vocal fold lesions, where continuous domestic vocal use contributed significantly to phonotrauma.<sup>6</sup>

Even among individuals without professional voice demand, many reported habitual shouting or prolonged voice use, highlighting behavioral phonotrauma as a key epidemiological factor.<sup>1</sup>

## DISCUSSION

This analysis demonstrates that vocal fold nodules exhibit clear socio-demographic clustering.

### Gender

The observed female predominance aligns with several studies reporting higher rates of benign vocal fold lesions among women.<sup>3-5</sup>

Factors implicated include:

- Thinner lamina propria
- Higher vibratory frequency
- Increased susceptibility to mucosal trauma
- Behavioral and occupational voice use differences

Environmental and psychosocial influences may also contribute.<sup>5</sup>

### Age

The peak incidence in young adults likely reflects:

- Greater occupational voice demand

- Increased participation in communication-intensive professions
- Higher frequency of phonotraumatic behavior

This trend mirrors findings from prior epidemiological investigations.<sup>3</sup>

### Occupation

Occupational voice use remains the most consistent epidemiological risk factor for VFNs.

High-risk categories include:

- Teachers
- Singers
- Call-centre workers
- Sales personnel
- Homemakers with continuous domestic voice use

These findings support the widely accepted understanding that chronic phonotrauma is the principal etiological mechanism underlying nodule formation.<sup>1</sup>

### General Epidemiological Insights

Overall evidence indicates that vocal fold nodules:

- Are among the most common benign vocal fold lesions<sup>1</sup>
- Occur predominantly in females<sup>3-5</sup>
- Affect younger working populations<sup>3</sup>
- Show strong association with occupational and behavioral phonotrauma<sup>1,6</sup>

Recognition of these epidemiological trends is essential for designing preventive voice-health programs and early intervention strategies.

### Limitations

- Hospital-based sample limits generalizability
- Pediatric and elderly populations were excluded
- Vocal load assessment relied on occupational history rather than objective measurement

### CONCLUSION

Vocal fold nodules demonstrate distinct socio-demographic and epidemiological patterns:

- Female predominance
- Peak incidence in young to middle-aged adults
- Strong association with voice-intensive occupations
- Significant contribution from behavioral phonotrauma

Targeted vocal hygiene education and early screening in high-risk populations may reduce disease burden and improve outcomes.

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