



Etiology of Hoarseness of Voice Based on FOL

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Abstract

Background: Hoarseness (dysphonia) is the reason for about 1% of all consultations in primary care. Numerous conditions can cause hoarseness, ranging from simple inflammatory processes to more serious systemic, neurologic, or cancerous conditions involving the larynx. Evaluation of a patient with hoarseness includes a careful history, physical examination, and in many cases, laryngoscopy. This study aimed to analyze the etiology of hoarseness of voice based on a fiberoptic laryngoscope (FOL). **Material & Methods:** This cross-sectional study was conducted in the Department of ENT, in Bangabandhu Sheikh Mujib Medical College Hospital, Faridpur for 2 years; from January 2017 to December 2018. A total of 75 subjects fulfilling the inclusion criteria were enrolled as study subjects. Data were processed and analyzed using the software SPSS (Statistical Package for Social Sciences) version 11.5. **Results:** In this study, most of the patients (18, 24.0%) belonged to the age group of 41-50 years, followed by 16 (21.33%) patients in the 61-70 years of age group, and then 15 (20.0%) patients were in 21-30 years of age group. None was from 0-10 years and only 2 (2.66%) patients belonged to the 11-20 years age group. Concerning the sex of the patients, 62 (83.0%) patients were male and the rest 13 (17.0%) were female indicating male predominance. 40 (53.33%) respondents had a smoking habit, and the rest 35 (46.66%) patients did not have a smoking habit. Regarding occupation, most of the patients (24, 32.0%) were farmers, followed by 19 (25.33%) were businessmen, and 10 (13.33%) patients were service holders. Concerning the findings, most of the patients (20, 26.66%) had growth of larynx, followed by 11 (14.66%) patients had polyp/cyst, 10 (13.33%) patients had paresis, 8 (10.66%) patients had nodule, 6 (8.0%) patients had edema, 4 (5.33%) patients had chronic laryngitis, 3 (4.0%) patients had keratosis/leukoplakia and another 3 (4.0%) patients had a phonatory gap. **Conclusion:** Hoarseness of voice is a symptom, not a diagnosis, and therefore warrants a careful determination of the underlying cause in every case. Fiber optic laryngoscopy was an excellent tool for the diagnosis of hoarseness. Causes of hoarseness included growth in the larynx, polyp/cyst, nodules, edema, chronic laryngitis, keratosis/leukoplakia, and phonatory gaps in this study.

Keywords:- Hoarseness, FOL, Phonation, Laryngitis.



INTRODUCTION

The term dysphonia is used to describe any impairment of the voice alteration in the sound of the voice with hoarseness, restriction of vocal performance, or strained vocalization. The pathophysiology of hoarseness is characterized by muscle tone-related irregularity in the oscillation of the vocal cords owing to hypertonic dysphonia, incomplete closure of the glottis on vocalization, or an increase in vocal cord bulk, perhaps due to a tumor.^[1] Any patient with hoarseness lasting longer than two weeks in the absence of an apparent benign cause requires a thorough evaluation of the larynx by direct or indirect laryngoscopy. The management of hoarseness includes identification and treatment of any underlying conditions, vocal hygiene, voice therapy, and specific treatment of vocal cord lesions.^[2] Laryngeal examination of patients with hoarseness is essential to diagnose a wide range of pathologies. Laryngeal visualization has progressed from simple indirect mirror examination to virtual laryngoscopy with flexible fiber optic laryngoscope as an acceptable option.^[3] Hoarseness is a common symptom among patients who present to tertiary care hospitals.^[4] Except for the cricothyroid, all of the intrinsic muscles of the larynx are innervated by the recurrent laryngeal nerve. An important anatomic consideration is the location of the left and right branches of the recurrent laryngeal nerve; after leaving the vagus nerve, the right recurrent laryngeal nerve loops around the subclavian artery, while the left recurrent laryngeal nerve loops around the arch of the aorta. Both branches travel cephalad into the neck in the tracheoesophageal groove and then enter the larynx. A mass lesion

anywhere along the course of the nerve may result in paralysis of the vocal cord. Diseases of the brain stem, the neck, and the mediastinum must, therefore, be included in the evaluation of dysphonia resulting from vocal cord paralysis.^[5] According to a study, it is the abnormal quality of voice that is rough, grating, harsh, and more or less discordant and has a lower pitch than normal for the individual. Moreover, it is an early symptom and indicates some underlying cause. The etiology ranges from trivial infections to life-threatening malignancies. So, sequential history, examination, and investigations can lead to an appropriate diagnosis. Avoidance of vocal abuse and cessation of smoking, tobacco, and alcohol can lead to a significant reduction in the burden of hoarseness.^[6] Smoking is known to be a major risk factor for laryngeal diseases. Chronic smoking is a major risk factor in Reinke edema, laryngeal keratosis, and laryngeal leukoplakia, as well as benign vocal fold lesions.^[7] Voice disorders have significant public health consequences for the patient's quality of life and their ability to function in social or workplace settings.^[8] This study aimed to analyze the etiology of hoarseness of voice based on a fiberoptic laryngoscope (FOL).

Objective

General Objective

- To analyze the etiology of hoarseness of voice based on fiberoptic laryngoscope (FOL).

Specific Objectives

- To observe the epidemiological background of hoarseness of voice.
- To determine the prevalence of hoarseness in smokers.

MATERIAL AND METHODS

This cross-sectional study was conducted in the Department of ENT in Bangabandhu Sheikh Mujib Medical College Hospital, Faridpur for 2 years; from January 2017 to December 2018. A total of 75 subjects fulfilling the inclusion criteria were enrolled as study subjects. Written consent was obtained from each subject. A structured questionnaire (research instrument) was developed containing all the variables of interest. All patients underwent necessary investigations. Data were processed and analyzed using the software SPSS (Statistical Package for Social Sciences) version 11.5. Prior permission was taken for this study from the Ethical Committee of Bangabandhu Sheikh Mujib Medical College Hospital, Faridpur, Bangladesh.

Inclusion Criteria

- Patients of all ages.
- Patients who had given consent to participate in the study.

Exclusion Criteria

- Patients who did not give consent to participate in the study.
- Patients with any chronic diseases.

RESULTS

Concerning the sex of the patients, 62 (83.0%) patients were male and the rest 13 (17.0%) were female indicating male predominance. [Figure 1]

Regarding residents, 62 (83.0%) patients were from rural areas and the rest 13 (17.0%) were from urban areas [Figure 2].

In this study, 40 (53.33%) respondents had a smoking habit, and the rest 35 (46.66%) patients did not have a smoking habit. [Figure 3]

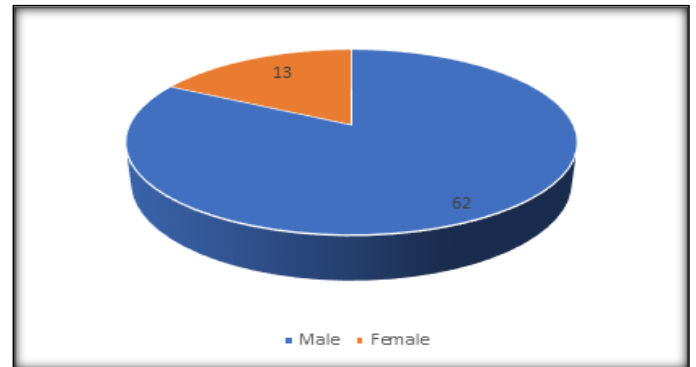


Figure 1: Distribution of patients according to sex (N=75).

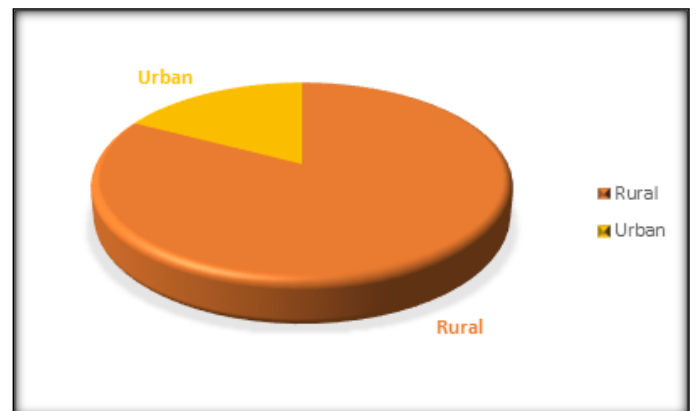


Figure 2: Distribution of patients according to the residence (N=75).

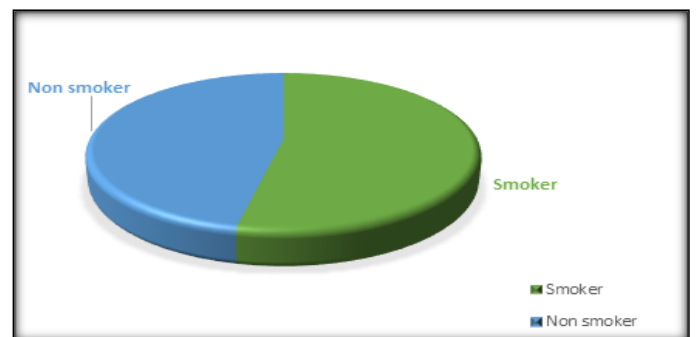


Figure 3: Distribution of patients according to smoking habit (N=75).



Table 1: Distribution of respondents according to age (N=75).

Age (Years)	N	%
0-10	0	0.0
11-20	2	2.66
21-30	15	20.0
31-40	06	8.0
41-50	18	24.0
51-60	07	9.33
61-70	16	21.33
71 & above	11	14.66

In this study, most of the patients (18, 24.0%) belonged to the age group of 41-50 years, followed by 16 (21.33%) patients in the 61-70 years of age group, and then 15 (20.0%) patients were in 21-30 years of age group. None was from 0-10 years and only 2 (2.66%) patients belonged to the 11-20 years age group. [Table 1]

Table 2: Distribution of patients according to the occupation (N=75).

Occupation	N	%
Farmer	24	32.0
Businessman	19	25.33
Student	7	9.33
Service holder	10	13.33
Housewife	9	12.0
Day laborer	4	5.33
Unemployed	2	2.66

Regarding occupation, most of the patients (24, 32.0%) were farmers, followed by 19 (25.33%) were businessmen, and 10 (13.33%) patients were service holders [Table 2].

Table 3: Distribution of patients according to findings on laryngoscopy (N=75).

Findings	N	%
Polyp/Cyst	11	14.66
Nodule	8	10.66
Keratoses/Leukoplakia	3	4.0
Growth	20	26.66
Thickening	2	2.66
Paresis	10	13.33
Chronic laryngitis/Inflammatory condition	4	5.33
Oedema/Post radiation oedema	6	8.0
Phonatory gap	3	4.0
Non-organic/ NAD	8	10.66



Concerning the findings, most of the patients (20, 26.66%) had growth of larynx, followed by 11 (14.66%) patients had polyp/cyst, 10 (13.33%) patients had paresis, 8 (10.66%) patients had nodule, 6 (8.0%) patients had edema, 4 (5.33%) patients had chronic laryngitis, 3 (4.0%) patients had keratosis/leukoplakia and another 3 (4.0%) patients had a phonatory gap. [Table 3]

DISCUSSION

In this study, most of the patients (18, 24.0%) belonged to the age group of 41-50 years, followed by 16 (21.33%) patients in the 61-70 years of age group, and then 15 (20.0%) patients were in 21-30 years of age group. None was from 0-10 years and only 2 (2.66%) patients belonged to the 11-20 years age group. According to a study, the age of patients ranged between 6 to 71 years. Male to female ratio was 2:1.9 Another study showed, aged between 19 and 85 years the average age was 48.3 ± 16.8 years.^[10] Concerning the sex of the patients, 62 (83.0%) patients were male and the rest 13 (17.0%) were female indicating male predominance. In another study, there were 58.4% of males with a male-to-female ratio being 1.5:1 which was relatable to this study.^[11,12] Regarding residents, 62 (83.0%) patients were from rural areas and the rest 13 (17.0%) were from urban areas. The majority of patients were from a rural background which showed similarity with this present study.^[13] In this study, 40 (53.33%) respondents had a smoking habit, and the rest 35 (46.66%) patients did not have a smoking habit. In a study, statistically significant ($P < 0.05$) associations were observed between smoking and various vocal fold pathological characteristics. There was a statistically significant association of

smoking with the overall possibility of benign vocal fold lesions ($P = 0.0129$). A significant association was noted between smoking with specific lesions like leukoplakia ($P = 0.02$), erythema ($P = 0.0161$), and Reinke's edema ($P = 0.322$). The mean M.P.T. was 9.5 s in smokers and 11 s in non-smokers.^[14] Another study stated that smoking appeared to be the most dominant etiological factor.^[15] It was also seen in another study where there was an association between smoking and Reinke's edema and leukoplakia.^[16] Regarding occupation, most of the patients (24, 32.0%) were farmers, followed by 19 (25.33%) were businessmen, and 10 (13.33%) patients were service holders. According to some studies, teachers made the largest group of professional voice users and dysphonia.^[17,18,19] While in another study, a maximum (22%) of the study subjects were a businessman.^[20] This difference might be due to the place of study. In this study, most of the patients (20, 26.66%) had growth of larynx, followed by 11 (14.66%) patients had polyp/cyst, 10 (13.33%) patients had paresis, 8 (10.66%) patients had nodule, 6 (8.0%) patients had edema, 4 (5.33%) patients had chronic laryngitis, 3 (4.0%) patients had keratosis/leukoplakia and another 3 (4.0%) patients had a phonatory gap. According to a study, nodules and cysts were predominant in children, functional dysphonia and reflux in adults, and presbyphonia and Reinke's edema in the elderly.^[21] Another study showed vocal polyps were the commonest type of lesion.^[22] Another study stated, 7 cases of vocal cord nodules, presenting with hoarseness of voice and laryngoscopic findings of a small nodular growth over the cord, and another 9 cases were diagnosed with laryngeal papillomas and papillomatosis.^[23] Another study showed the



most common cause of dysphonia was reflux laryngitis, affecting 208 patients (17.9%).^[24]

Limitations of the Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSIONS

Hoarseness of voice is a symptom, not a diagnosis, and therefore warrants a careful determination of the underlying cause in every case. Fiber optic laryngoscopy was an excellent tool for the diagnosis of hoarseness. Causes of

hoarseness included growth in the larynx, polyp/cyst, nodules, edema, chronic laryngitis, keratosis/leukoplakia, and phonatory gaps.

Recommendation

Voice therapy, vocal cord surgery, and drug therapy for appropriate groups of patients with hoarseness are well documented as effective by the available evidence. In patients with risk factors, especially smokers, hoarseness should be immediately evaluated by laryngoscopy. Moreover, further studies should be conducted involving a large sample size and multiple centers in this regard.

REFERENCES

1. Reiter R, Hoffmann TK, Pickard A, Brosch S. Hoarseness – causes and treatments. *Deutsch Ärztebl Int.* 2015;112(19):329.
2. Feierabend RH, Shahram MN. Hoarseness in adults. *Am Fam Physician.* 2009;80(4):363-70.
3. Khan RZ, Iqbal A, Saqulain G. Diagnostic accuracy of fiber optic laryngoscopy. *J Islamabad Med Dent Coll.* 2021;10(2):101-4.
4. Hameed A, Aziz B, Mushwani M, Sheikh SI. Clinico-etiological Study of Hoarseness in 100 Patients. *J Fatima Jinnah Med University.* 2013;7(3):8-11.
5. Rosen CA, Anderson D, Murry T. Evaluating hoarseness: keeping your patient's voice healthy. *Am Fam Physician.* 1998;57(11):2775-82.
6. Gaurav K, Aditi S, Baldev S, Sanjeev B, Ravinder S. Hoarseness of voice: Etiological spectrum. *Online J Otolaryngol.* 2015;5:13.
7. Byeon H. Relationships among smoking, organic, and functional voice disorders in Korean general population. *J Voice.* 2015;29(3):312-6.
8. Spantideas N, Drosou E, Karatsis A, Assimakopoulos D. Voice disorders in the general Greek population and patients with laryngopharyngeal reflux. Prevalence and risk factors. *J Voice.* 2015;29(3):389-e27.
9. Baitha S, Raizada RM, Singh AK, Puttewar MP, Chaturvedi VN. Clinical profile of hoarseness of voice. *Indian J Otolaryngol.* 2002;54(1):14-8.
10. Moers C, Möbius B, Rosanowski F, Nöth E, Eysholdt U, Haderlein T. Vowel- and text-based cepstral analysis of chronic hoarseness. *J Voice.* 2012;26(4):416-24.
11. Siddhartharaj MK, Haridas PV. The demographic and clinical study of hoarseness of voice. *J Evol Med Dent Sci.* 2016;5(59):4120-7.
12. Adegbiyi WA, Aremu SK, Nwawolo C, Olajuyin OA, Olatoke F. Diagnosis and management of hoarseness in a developing country. *Open Sci J.* 2018;3(2):1-10.
13. Vivek S, Shankar G. Changing Trend in the Etiological Spectrum of Hoarseness of Voice in Rural India: A Prospective Hospital-Based Study. *Indian J Otolaryngol Head Neck Surg.* 2022;74(Suppl 2):1896-1901. doi: 10.1007/s12070-020-01902-0.
14. Raghuvanshi N, Mundra A, Dubey NK, Godha S, Mundra R. Multimodal Analysis of Dysphonia in Smokers: A Two Year Comprehensive Study. *Indian J Otolaryngol Head Neck Surg.* 2022;74(Suppl 3):4948-4953. doi: 10.1007/s12070-021-02419-w.
15. Yonekawa H. A clinical study of Reinke's edema. *Auris Nasus Larynx.* 1988;15(1):57-78. doi: 10.1016/s0385-8146(88)80010-5.
16. Fortes FS, Imamura R, Tsuji DH, Sennes LU. Profile of voice professionals seen in a tertiary health center.



- Braz J Otorhinolaryngol. 2007;73(1):27-31. doi: 10.1016/s1808-8694(15)31118-6.
17. Kosztyła-Hojna B, Rogowski M, Ruczaj J, Pepiński W, Lobaczuk-Sitnik A. An analysis of occupational dysphonia diagnosed in the North-East of Poland. *Int J Occup Med Environ Health*. 2004;17(2):273-8.
18. Behlau M, Zambon F, Madazio G. Managing dysphonia in occupational voice users. *Curr Opin Otolaryngol Head Neck Surg*. 2014;22(3):188-94. doi: 10.1097/MOO.0000000000000047.
19. Pereira ER, Tavares EL, Martins RH. Voice Disorders in Teachers: Clinical, Videolaryngoscopic, and Vocal Aspects. *J Voice*. 2015;29(5):564-71. doi: 10.1016/j.jvoice.2014.09.019.
20. Islam MA, Islam R, Talukder D, Sayeed AN, Rumi SN, Choudhury AA, et al. A pattern of Primary Thyroid Malignancy in a Tertiary Care Hospital. *J Dhaka Med Coll*. 2018;27(2):161-74.
21. Martins RH, do Amaral HA, Tavares EL, Martins MG, Gonçalves TM, Dias NH. Voice disorders: etiology and diagnosis. *J Voice*. 2016;30(6):761-e1.
22. Hegde MC, Kamath MP, Bhojwani K, Peter R, Babu PR. Benign lesions of the larynx – A clinical study. *Indian J Otolaryngol Head Neck Sur*. 2005;57(1):35-8.
23. Sachdeva H, Nirupama M, Padmanabha N, Sreeram S, Lobo FD, Pai R, Sreedharan S. Histopathological Study of Benign Tumours of the Larynx: A Descriptive Study in Coastal Karnataka. *Indian J Otolaryngol Head Neck Sur*. 2020;21:1-5.
24. Sivrice ME, YASAN H, Mustafa TU, Erdogan OK, Kumbul YC, Ercan F. Etiology of dysphonia according to age, gender and seasons. *Turkish J Health Sci Life*. 2020;3(2):9-13.

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