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Socio-Demographic and Occupational Factors in Benign Mucosal Vocal Fold Lesion

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Background: Benign mucosal vocal fold lesions are common disorders in our Otolaryngology department. Most of the patient presents with changes of voice quality ranging from voice hoarseness to voice weakness. Fibre optic laryngoscopic diagnosis of benign mucosal vocal fold lesion was taken from a sample population in this study. Vocal fold nodules were the commonest benign mucosal vocal fold lesion (46%); followed by vocal fold polyp (32%), thickened vocal fold (9%), keratosis (4%), multiple papilloma (3%), vocal fold cyst (3%), Reinke's edema (2%), contact ulcer (1%). **Materials and Methods:** This cross sectional study was carried out at the Otolaryngology department of the Shaheed Suhrawardy Medical College Hospital (ShSMCH), Dhaka for a period of six (06) months from 22^{2nd} June, 2014 to 21^{1st} December, 2014 on patients who had undergone fibre optic laryngoscopy (FOL) examination inpatient and outpatient department. Patient who was diagnosed with benign mucosal vocal fold lesions by FOL and gave informed written consent was included in this study. **Results:** The total number of first hundred cases has been taken in this study. The study population was comprised of (65%) male and (35%) female. A male preponderance with a male to female ratio of 1.8:1 was observed. Majority of the patients were in the age group of 21-30 years. The youngest patient was 12 years and the oldest was 72 years of age. The average age of male subjects (37.34 years) was significantly higher compared to that of females (33.76 years). Majority of the vocal fold pathology were vocal fold nodules (46%), followed by vocal fold polyp (32%), thickened vocal fold (9%), keratosis (4%), multiple papilloma (3%), vocal fold cyst (3%), Reinke's edema (2%), contact ulcer (1%). Among the study subject's majority were housewife (19%), followed by service holder (18%), Garments worker (7%), student (9%), agriculture workers (8%), teacher (7%), hawker (5%), Imam (4%), business man (5%), salesman (3%), lawyer (2%), birth attendant (2%), unemployed

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(2%), singer (1%), engineer (1%), beggar (1%) and nurse (1%). **Conclusion:** It was found that people of different occupations, ages and both sexes, were suffering from benign mucosal vocal fold lesions. Early diagnosis of the lesions can lead to effective management and good recovery. As such, the standard treatment of choice in benign vocal fold lesion consist of triad of approach that includes microlaryngeal surgery, voice rest and vocal rehabilitation.

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INTRODUCTION

Benign mucosal vocal fold lesions produce symptoms which can vary from mild hoarseness to voice weakness. These lesions can create a lot of mental and emotional tension in patient and the family. The significance of benign lesions of the larynx lies in the importance of its function in speaking and the contribution of the voice to one's identity. Hoarseness is a vague term that patients often use to describe a change in voice quality ranging from voice hoarseness to voice weakness[1]. Human voice is a powerful instrument for communication. It should be emphasized, however, that dysphonia can affect the quality of life. Everyone, as we rely significantly on verbal communication for our daily needs and socialization[2]. The common benign mucosal vocal fold lesions are vocal fold nodule, polyp, cyst, papilloma, Renke's edema contact ulcer. Despite their clinical appearance, these lesions do not significantly involve the surface epithelium. The major site of disease is within the superficial layer of lamina propria (SLLP)[2]. Vocal fold polyp is a benign swelling of greater than 3mm that arises from the edge of the vocal fold[3]. It is usually unilateral. Most frequently seen in smokers and between the age of 30 and 50 years. The exact cause of polyp formation is not known but most authors agree that phonotrauma due to sudden yelling or shouting is an important etiological factor. There appears to be disruption of vascular membrane, capillary proliferation, thrombosis, minute hemorrhage and fibrin exudation[3]. Vocal fold polyp is covered with stratified squamous epithelium and may exhibit a variety of changes in the stroma which include edema, fibrosis, increased vascularity haemorrhage and hyaline changes[3]. Vocal fold nodule and cysts does not significantly involve surface epithelium. The major site of disease is within the superficial layer of lamina propria[4]. Vocal nodules are usually bilateral, small swelling less than 3mm in diameter that develop on the free edge of vocal fold approximately at the junction of anterior 1/3 and posterior 2/3 of vocal fold. Higher percentages are found in teachers and singers with voice problem. The etiology of vocal fold nodule is not known but traditionally they are thought to be due to 'voice abuse'. Voice abuse is characterized by forced voice production due to strain in the neck and shoulder region producing harsh quality to the voice. Vocal fold cysts are two primary types: mucous retention cyst and epidermoid cyst. A mucous retention cyst is thought to arise from a blocked minor salivary gland possibly secondary to phonotrauma or inflammation. It is lined by cuboidal or low columnar epithelium. Epidermoid cysts are lined by squamous epithelium and are filled with keratin and cholesterol debris. The epithelium shows nonspecific changes and basement membrane layer is usually thickened. In severe cases the vocal folds look like bags of fluid that flop up and down through the glottis with respiration. The laryngeal lesion can create a lot of mental and emotional tension in the patient and family. Early diagnosis of the lesions can lead to be effective management and good recovery[5.] Although occupational

exposure is obiously important, the effect of various exposures is difficult to quantify and isolate[6]. Phonosurgery using the operating microscope has replaced simple resections of benign lesions on the vocal fold polyp's cyst and nodules in order to optimize the preservation or restoration of the voice[7]. With the development of microscope and advance endoscopes, it has become possible to easily diagnose and perform microsurgery on the larynx with great precision thus reducing the burden of the disease to great extent. Newer advances in surgical line of management like CO_2 LASER and diode LASER have used the procedure in a day care surgery thus minimizing patient trauma and ameliorated the results [9]. There are so many patients with benign mucosal vocal fold lesions existing in our country. But there are only a few study was done in Bangladesh. This study is aimed to determine age, sex, educational status, socio-economic status, disease distribution and occupational relation of benign mucosal vocal fold lesions in our country. This study will give fresh interpretation of known facts and concept for solution of problem.

MATERIALS AND METHODS

Study Design: It was a cross sectional study.

Place of Study: The study was carried out in the Shaheed Suhrawardy Medical College Hospital Dhaka, Bangladesh.

Study Period: This study was conducted from 22^{2nd} June, 2014 to 21^{1st}december, 2014 for a period of six (06) months.

Study population: Patients had been diagnosed as benign mucosal vocal fold lesion by fibre optic laryngoscopy (Machine Model no- OLYMPUS VISERA OTV-S7, Digital processor, OLYMPUS CLH-250, Monitor Sony.) in all age groups and both sexes inpatient and outpatient Department of Otolaryngology at Shaheed Suhrawardy Medical College Hospital, Dhaka were taken as the study population. The patients were voluntarily included in the study with their consent and they were neither supported nor additionally burdened financially.

Inclusion criteria:

1. Patient has been diagnosed as benign mucosal vocal fold lesion by fibre optic laryngoscopy in all age groups and both sexes inpatient and outpatient Department of Otolaryngology at Shaheed Suhrawardy Medical College Hospital, Dhaka were taken up as study sample. Benign vocal fold mucosal lesions working definition: Accuracy of diagnosis based on clinical visual examination by fiber optic laryngoscopy.
2. Patient with benign mucosal vocal fold lesion who had provided informed written consent form.

Exclusion criteria:

Patients with benign mucosal vocal fold lesion who did not provide informed written consent form.

Sample size: A total number of first hundred cases were taken as study population.

Sampling technique: The sampling technique was convenient sampling technique was used as per inclusions and exclusion criteria.

Study Procedure: After taking informed consent from the patient, a detail history had taken. A preformed data sheet containing relevant information's like age, sex, educational qualification, socio-economic status, diseases pattern and occupation were recorded.

Data analysis: All data were recorded systematically in preformed data collection form (questionnaire) and quantitative data was expressed as mean and standard deviation and qualitative data was expressed as percentage.

RESULTS

Table-1: Demographic characteristics of patients with benign mucosal vocal fold lesions (n=100)

Age Groups	Number of patients	Percent (%)
11-20	4	4.0
21-30	40	40.0

31-40	26	26.0
41-50	18	18.0
51-60	8	8.0
61-70	3	3.0
71-80	1	1.0
Total	100	100.0
Mean	36.13±12.19	
Sex		
Male	65	65%
Female	35	35%
Total	**100**	**100%**
Education		
Illiterate	13	13.0
Primary	24	24.0
S S C	26	26.0
H S C	9	9.0
Graduate	13	13.0
Masters	15	15.0
Total	100	100.0
Socio-economic status		
Lower class	50	50.0
Middle class	40	40.0
Higher class	10	10.0
Total	100	100.0

The total numbers of one hundred cases were taken as a sample population. Table 1 shows that distribution of patients with peak age in 21-30 years 40%. The age of the patients ranged from 12 years to 72 years. The mean age was 36.13 years. The standard deviation was ±12.19. Shows that out of one hundred cases of benign mucosal vocal fold lesions, (65%) were male and (35%) were female. Male female ratio was 1.8: 1. Majority of patients were educated up to primary and SSC 50%. There was a significant amount of Illiterate (13%), HSC (9%), Graduate (13%) and masters (15%). The distributions of patient according to socio-economic status. Majority (50%) of patients come of lower socio-economic class, followed by middle class (40%) and higher class (10%).

Table-2: Disease (Pathology) pattern of study subjects (n=100)

Disease	**Frequency**	**Percent (%)**
Vocal Cord Nodule	46	46.0
Vocal Cord Polyp	32	32.0
Vocal Cord Cyst	3	3.0
Multiple Papilloma	3	3.0
Thickened Vocal Fold	9	9.0
Keratosis	4	4.0

Reinke's edema	2	2.0
Contact Ulcer	1	1.0
Total	**100**	**100.0**

Table-2 shows that most common benign mucosal vocal fold lesion was vocal fold nodule (46%) followed by vocal fold polyp (32%). Rest of the benign mucosal vocal fold lesions were vocal fold cyst (3%), multiple papilloma (3%), thickened vocal fold (9%), keratosis (4%), Reinke's edema (2%), contact ulcer (1%). Vocal cord nodules and polyps were predominant of all benign mucosal vocal fold lesions.

Table-3: Distribution of site of lesion (n=100)

Site of lesion	Number	Percentage (%)
Anterior one third of vocal fold	79	79
Middle one third of vocal fold	4	4
Posterior one third of vocal fold	3	3
Diffuse	14	14

Table-3 shows that majority (79%) of the lesions had involved anterior 1/3rd of vocal fold 79%, followed by diffuse pathology (14%) middle 1/3rd (4%) and posterior 1/3rd (3%). Socio-economic status: BBS (Bangladesh bureau of statistics) has said per capita income of Bangladesh US Dollar 1190 news May21,2014 bdnews24.com.1US Dollar=77.5 taka on 16/06/2014. Dollar conversion into taka 1190x77.5=92225 taka. Average monthly income is 7685 takas. I mention this study Patient having monthly income below average <7685 taka is poor, thrice of average7685-23056 taka regarded as middle class and >23056 taka regarded as higher class.

Table-4: Distribution of benign mucosal vocal fold lesions (pathology) in relation to age (n=100)

Age Groups	**Pathology Pattern of the Patients**								**Total**
	Nodule	Polyp	Cyst	Multiple Papilloma	Thickened Vocal Fold	Keratosis	Reinke's edema	Contact Ulcer	
11-20	1	2	0	1	0	0	0	0	4
21-30	21	12	1	1	1	2	1	1	40
31-40	14	7	0	0	5	0	0	0	26
41-50	5	7	2	0	1	2	1	0	18
51-60	3	2	0	1	2	0	0	0	8
61-70	2	1	0	0	0	0	0	0	3
71-80	0	1	0	0	0	0	0	0	1
Total Count	46	32	3	3	9	4	2	1	100

Table-4 shows the distributions of vocal fold lesions in relation to age. The peak age incidence was found in 21-30 years (40%). Benign mucosal vocal fold lesions (Pathology) 84% were found in age group 21-50 years of the patients.

Table-5: Distribution of benign mucosal vocal fold lesions (pathology) in relation to sex (n=100)

Sex of patients	Disease(Pathology) Pattern of Patients									Total	P-value
		Nodule	Polyp	Cyst	MP	Thickened Vocal Fold	Keratosis	Reinke's edema	Contact Ulcer		
Female	Count	21	5	1	2	5	1	0	0	35	0.089[ns]
	%	60.0	14.3	2.9	5.7	14.3	2.9	0	0	100.0	
Male	Count	25	27	2	1	4	3	2	1	65	
	%	38.5	41.5	3.1	1.5	6.2	4.6	3.1	1.5	100.0	
Total	Count	46	32	3	3	9	4	2	1	100	
	%	46.0	32.0	3.0	3.0	9.0	4.0	2.0	1.0	100.0	

Note. Here P-value= .005 in case of polyp individually. *P*-value extracted from chi-square test. Note. MP= Multiple Papilloma, *P*-value extracted from chi-square test over all cases, ns= Not significant.

Table-5 shows that P-value was not significant in overall cases but P-value= .005 in case of polyp individually. There was significant difference occurrence of polyp in male patients. So Polyp was predominant in male patients.

Table-6: Distribution of benign mucosal vocal fold lesions (Pathology) in relation to educational qualification (n=100)

Education status	**Educational Qualification with Disease Pattern of Patients**									
	Disease Pattern of Patients									
	Nodule	Polyp	Cyst	MP	Thick Vocal Fold	Keratosis	Reinke's edema	Contact Ulcer	Total	P-value
Illiterate	5	3	1	1	1	2	0	0	13	0.792[ns]
Primary	12	9	0	0	1	1	1	0	24	
S S C	11	9	0	1	3	1	1	0	26	
H S C	6	1	0	1	1	0	0	0	9	
Graduate	5	6	1	0	1	0	0	0	13	
Masters	7	4	1	0	2	0	0	1	15	
Total	46	32	3	3	9	4	2	1	100	

Note. MP= Multiple Papilloma, Thick= Thickened, *P*-value extracted from one-way ANOVA. ns= Not significant.

Table-6 shows that there was no significant difference observed in occurrence of diseases among different educational qualification group. So there was no predominance in occurring different benign mucosal vocal fold disease with different education level.

Table-7: Distribution of benign mucosal vocal fold lesions (pathology) in relation to different socio-economic classes (n=100)

Socio-economic status with Disease Pattern of Patients											
Social economic status		Disease Pattern of Patients									
		Nodule	Polyp	Cyst	MP	Thick Vocal Fold	Keratosis	Reinke's edema	Contact Ulcer	Total	P-value
Lower Class	Count	28	11	1	2	4	3	0	1	50	
	%	56.0	22.	2.0	4.0	8.0	6.0	.0	2.0	100	

Middle Class	Count	14	18	2	1	2	1	2	0	40	0.825^{ns}
	%	35.0	45.	5.0	2.5	5.0	2.5	5.0	.0	100	
Higher Class	Count	4	3	0	0	3	0	0	0	10	
	%	40.0	30	0	0	30.0	0	0	0	100	
Total	Count	46	32	3	3	9	4	2	1	100	
	%	46.0	32.	3.0	3.0	9.0	4.0	2.0	1.0	100	

Table-7 shows that there was no significant difference observed in occurrence of diseases among different socio-economic classes. So there was no predominance in occurring different benign mucosal vocal fold disease with different socio-economic classes.

DISCUSSION

Hoarseness of voice is a common ailment for consultation with an Otolaryngologist. However, varieties of benign lesions cause hoarseness of voice and are source of concern of worry as it can affect the self-esteem of a person, besides it can be a cause of job threat to professional like singers, teachers and preachers. However, a proper diagnosis and management can be rewarding in most of these benign lesions[1]. One hundred cases were included in this study in the department of Otolaryngology and Head Neck surgery, Shaheed Suhrawardy Medical College Hospital, Dhaka from June to December 2014. All patients were selected as per inclusion criteria. The most common age group suffered with benign mucosal vocal fold lesion was third decade of life 21-30 years (40%), and minimum in seventh decade (1%). Minimum age in this study was 12 years and maximum age was 72 years. It was seen that benign mucosal vocal fold lesions were found in all age group. The average age in male was 37.34 years and female 33.7 years and in both sexes were 36.13 years. Standard deviation (SD) was 12.19. The main working population in our country are among the third, fourth and fifth decade. General population in our country people that are likely to shouting as like mothers of small children caring her baby, students especially in madrasa uses high pitch voice. These results were also almost identical with the result of others[4, 5, 8, 9, 19]. In this study male comprised of 65% and female 35%, male-female ratio was 1.8:1 showing male preponderance in this study. Male population in our country is the main working group. They are exposed to excessive use of voice for earning money as like Imam, hawker, service holder, garments workers etc. The result was almost identical with the result of others .[1, 4, 5, 8, 9, 19] Educational status of the majority of patients were SSC (26%) followed by primary (24%), masters (15%), graduate (13%), illiterate (13%), HSC (9%). This study indicates that all people from illiterate to highly educated group may suffer from benign mucosal vocal fold lesions. *P*-value extracted from one-way ANOVA. P-value = 0.793. There was no significant difference observed in occurrence of diseases among different educational qualification group. Vocal cord nodule was the most common pathology (46%) in this study. The male-female sex distribution was almost similar (male 25% and female 21%). The second most common pathology was vocal fold polyp (32%), here pre-dominance in male sex (27% versus 5%). Rest of the pathology were vocal fold thickened vocal fold (9%), keratosis (4%), cyst (3%), papilloma (3%), Reinke's edema (2%), contact ulcer (1%). *P*-value extracted from chi-square test. P-value=.089. There was no significant difference observed in occurrence of diseases among different sexes. Wani AA, et al, had showed that vocal cord nodule (37%) and vocal fold polyp (26%). India and Bangladesh are neighboring country with similar social, cultural and occupational association of the peoples. So the results in two countries were coincides with each other's. The results of

others similar studies were identical.[1,9,17,19,26] This result varies from others studies result. (Pawan Singhal, et al.2006) They had found vocal fold polyp (66%), followed by vocal fold nodules (16%), others results were almost identical. [5,8] Majority of the lesions involved anterior 1/3rd of vocal fold (79%), followed by diffuse (14%) and middle 1/3rd &posterior 1/3rd only (4%) and (3%) respectively. (Wani AA, et al. 2012) They had also described (47%) of the benign mucosal vocal fold lesions in the anterior 1/3rd, followed by posterior 1/3rd (22%), diffusely involved (20%) and middle 1/3rd (11%) only. Distribution of patients were more on the right side (51%), left side (25%) and bilateral involvement (24%). This study picture was reflected others similar study.[1, 19] The most common benign mucosal vocal fold lesions were found in lower socioeconomic class (51%) according to the operational definition of this study, followed by middle class (39%) and higher class (10%). Our country is agriculture based and majority of our population has below average income especially housewives, hawker, Imam, madrasha teacher, garments worker, beggar, and students. They have lack of training and practice of vocal hygiene and often they abuse their voice. Vocal fold nodule was found in lower class (28%), middle class (14%) and higher class (4%). Similarly, vocal fold polyp was the highest in middle class (18%), flowed by lower class (11%), and higher class (3%). There was no significant difference in different types of the benign mucosal vocal fold lesion in different classes. *P*-value extracted from one-way ANOVA. P-Value=0.825. No significant difference was observed in occurrence of diseases among different socio-economic classes. In an Indian study Sharma DK et al. was revealed that majority of the patients with benign mucosal vocal fold lesions more prevalence in middle class group. The definition of socio-economic class may vary from study to study and country to country.[4] The maximum occurrence of benign mucosal vocal fold lesion in housewives (19%), service holder (18%), student (9%), agriculture worker (8%), garments worker (7%), teacher (7%), hawker (5%), business man (5%), labor (5%), Imam (4%), sales man (3%), lawyer (2%), unemployed (2%), birth attendant (2%), singer (1%), engineer (1%), beggar (1%), nurse (1%). This study revealed more association of housewives with benign mucosal vocal fold lesions can be related to their vocal excessive voice use for taking care of multiple small children at home. There was significant variation among the occupations at patients suffering from benign mucosal vocal fold lesion. Affected patients were involved garments worker, hawker, agriculture worker, Imam, etc. who were more prone to vocal abuse for earning money. They had lack of training and poor vocal hygiene form a substantial part of this study population. This study outcome was reflecting similar other studies[4, 8,9,19, 26]**.** Distribution of benign mucosal vocal fold lesions (pathology) in relation to excessive use of voice in personal and occupational life and not excessive use of voice in personal and occupational life has been shown that no significant difference result. *P*-value extracted from chi-square test. P-value = 0.661**.** Here small sample subjects only one hundred cases were taken in comparison to sample size three hundred eighty-four cases. The results may be different if total sample populations ware taken.

CONCLUSION

It was found that people of different occupations, ages and both sexes, were suffering from benign mucosal vocal fold lesions. Early diagnosis of the lesions can lead to effective management and good recovery. As such, the standard treatment of choice in benign vocal fold lesion consist of triad of approach that includes microlaryngeal surgery, voice rest and vocal rehabilitation.

LIMITATION

There are some limitations in this study. Some are mentioned below

1. It was a single centred study.
2. It was a convenient sampling method.
3. The study and follow up period was short in comparable to other series.
4. The diagnostic criteria based solely on the fibre optic laryngoscopic examination of routinely done by department of Otolaryngology in ShSMCH. No surgery was done and long term follow up of the patients.
5. There may be human error.

RECOMMENDATION

For further study, the following recommendations are proposed:

1. Large sample size should be needed for further Prospective study with long term follow up.
2. Proper identification of the risk factors to reduce the morbidity.
3. Accurate diagnosis is done by histopathological examination after microlaryngeal excision.
4. Proper counseling and education (vocal hygiene and training) to predisposed individuals is must

Confect of Interest: None.

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