EJNSO



Prevalence of Laryngeal Disorders among Patients Attending Phoniatric unit, Menoufia, Egypt (5-Year Survey)

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Abstract:

Background: Voice disorders (dysphonia) are one of the commonest symptoms in otolaryngological practice, and they include diseases ranging from simple benign conditions to the most malignant conditions. This study aimed to assess the prevalence and type of laryngeal affection and its associated predisposing factor.

Patients and methods: A retrospective hospital-based survey was conducted to collect hospital record data from January 2019 to December 2023. The included 6222 cases had come to the phoniatric unit complaining of dysphonia or aphonia and were diagnosed by rigid or flexible laryngeoscopy according to the patient's age.

Results; Among the included 6222 cases, the age of the studied cases was 48.52 ± 22.57 , with 22.6% being in childhood (<18 years) and 29.8% being old age (>60 years). Male patients were 53.8%; 32.9% were smokers. 15.2% experienced professional voice use. Functional voice disorders were 28.8%; the most common form of laryngeal disorders was vocal fold nodule (10.9%), which was especially prevalent in the children (15.2%); Reinke's edema was 9.2%; and acute and chronic laryngitis were 7.76%. Laryngeal malignancy was present in 2.5% of the studied sample. Smoking and voice misuse were significant predisposing factors for multiple types of voice disorders.

Conclusions: Laryngeal disorders are common and affect all age groups, both sexes, causing obvious limitations in communication. Functional voice disorders and vocal fold nodules represent almost half of the studied cases. These disorders have been predisposed by voice misuse, which is a modifiable preventable disorder. This declared the importance of increasing public awareness about the importance of proper voice use.

Keywords: Prevalence, laryngeal disorders, dysphonia, Egyptian population.

Introduction

A reliable voice is an essential component of everyday communication. ¹ The voice can become disordered when the quality, pitch, loudness, flexibility and vocal effort are perceived to be different from others of a similar age, gender or cultural group or geographic area. ² A voice disorder is

present when an individual expresses concern about having an abnormal voice that does not meet daily needs—even if others do not perceive it as different or deviant.³

Voice disorders are common ailment. Voice disorders result in negative effects on patients' quality of life (QOL) due to impaired communication, social isolation, and depression. ⁴⁻⁵ So, early detection and treatment of these disorders is an essential issue for the community.

The voice disorders may be organic (inflammatory, infectious, congenital, traumatic, neurological, iatrogenic) or functional, the most common cause of vocal fold disorders is vocal abuse or misuse. This includes excessive use of the voice when singing, talking, coughing or yelling. Smoking and inhaling irritants are also considered vocal abuse. ⁶⁻⁷

Laryngeal dysfunction may be divided into three categories; organic, neurologic and functional disorders. Dysphonia and hoarseness are the most common symptoms and, in some cases, the only signs of laryngeal dysfunction. In differential diagnosis of any type of chronic hoarseness, a neoplastic process must be considered. ⁸

Laryngoscopy is essential for their diagnosis because it helps differentiate several laryngeal lesions, leading to a decision for suitable treatments considering each case. ⁹⁻¹¹

In Egypt, numerous studies have been conducted on different lesions affecting vocal folds and larynx that affected voice quality, e.g., Minimal associated pathological lesions. ¹²⁻¹³ Some studies on pediatric dysphonia.¹⁴ It was also observed that, all studies covered individual disorders, as well as, lack of the epidemiologic studies of such disorders. Up to the best of authors' knowledge, Egyptian survey studies tracing different types of laryngeal disorders causing voice affection are unavailable, so, this work aimed to assess prevalence of laryngeal affection, type of laryngeal affection (organic, functional and neurological) with possible associated risk factors.

Patients and Methods

This 5-year survey (retrospective study based on hospital records) was approved by Menoufia Faculty of Medicine Institutional Review Board under number (1/24 COM 10-2). It included patients who attended the phoniatric unit in Menoufia University Hospitals complaining of dysphonia or aphonia during the period from January 2019 to December 2023. The study included 6222 voice disorders cases, who were recruited in the study as follows: (**Figure 1**)

The total recorded cases were 6834 cases; 612 cases were excluded for incomplete records, and the remaining 6222 cases were included. Their data that was collected and analyzed were:

- Sociodemographic data and suspected risk factors related to voice affection were checked, including age, sex, smoking, GERD, and professional or excessive voice use.
- The type of laryngeal disorder was assessed using rigid laryngoscopy or a flexible fiberoptic laryngoscope. Laryngoscopic examination, as well as stroboscopic examination, allow an objective evaluation of larynx and vocal folds and allow recognizing the cause and nature of voice affection.

Statistical analysis:

Data were transferred to a personal computer, classified, and analyzed using SPSS (version 20, SPSS Inc., Illinois, Chicago, USA). The quantitative data described as mean, standard was deviation and range while qualitative data was described as number and percentage. Z score calculator was used to compare proportions in independent groups [15], it is the way that was used to compare rate of each disorder between different risk subgroups. Pvalue <0.05 was considered statistically significant.

Results

In this study, the age of the studied cases was 48.52±22.57, with 22.6% being in childhood (<18 years) and 29.8% being of old age (>60 years). Male patients were 53.8%, smokers were 32.9%, 15.2% improperly used their voice, and 26.4% of the studied cases complained GERD. Regarding types of laryngeal disorders; vocal fold nodule was the most common cause of laryngeal affection (10.88%) of the studied patients, Reinks's edema was presented in (9.18%), laryngitis was (7.76%), vocal fold polyps, and cysts were (6.94% & 5.8%) respectively, and laryngeal malignancy accounted for 2.7% cases. Functional of voice disorders without organic or neurological cause accounted for 28.8% of laryngeal disorders causes; moreover, psychogenic-related voice disorders contributed to 5.85% of cases (table 1).

Figure 2 showed that the distribution of the voice disorders cases was 25.2%, 10.0%, 15.9%, 23.1%, and 25.8%, respectively, over the 5 studied years from 2019 to 2023. It is clear that the 2020 attendance rate in the phoniatric unit has dropped by 60.3% from the 2019 attendance rate; this reduction extended for 2021, as the reduction percentage was 37.2%, and returned to the 2019 attendant rate in 2022 and 2023.

Congenital disorders are represented in this study as 2.05% of the total recruited cases, presented in the childhood period, and represent 9.1% of causes of dysphonia in children.

In the childhood period, vocal fold nodule is the most common etiologic factor of dysphonia in children (15.2%); it is also a significant etiology among adults which were totally females (11.4%). Functional disorders were 40.6% of childhood dysphonia causes, with the highest prevalence for chronic childhood habitual dysphonia. mutational voice disorders. and phonathenia (10.38%, 7.32%. and 5.55%, respectively). Regarding sex, vocal fold nodule is the most prevalent cause in females (19.69%), while Reinks's edema was the most prevalent disorder in males (12.31%). Vocal fold polyps, vocal fold scarring, chronic nonspecific laryngitis, and neoplasms were significantly higher among males. (Table 2)

Smoking was a significant risk factor that played a role in multiple laryngeal disorders such as vocal fold nodules, polyps and cysts, laryngoscleroma, muscle tension dysphonia, hyperkeratosis, and laryngeal malignancy. Also, vocal fold nodules, muscle tension dysphonia, prebyphonia, and vocal fatigue were significantly more prevalent among professional voice users (Table 3).



Figure 1: Flow chart for patients' recruitment in the study

Socia demographia	The studied notionts
Socio-demographic	N = 6222
Age (vears)	
Moon +SD	48 52+22 57
	48.52 ± 22.57
	0-71
Age groups	(51 (10.5))
1 - 9	0.51(10.5)
10 - 18	/55 (12.1)
19 – 39	9/1 (15.6)
40 - 59	1988 (32.0)
Old age >60	1857 (29.8)
Sex	
Male	3348 (53.8)
Female	2874 (46.2)
Smoking	
Yes	2045 (32.9)
No	4177 (67.1)
Professional voice use	
Yes	946 (15.2)
No	5276 (84.8)
GERD	
Yes	1644 (26.4)
No	4578 (73.6)
Types of laryngeal disorders	
Organic	1876 (30.2)
MAPLs	2189 (35.2)
Non organic (functional)	1793 (28.8)
Accompanied to psychiatric disorders	364 (5.9)
Organic	
Congenital	128 (2.05)

Table 1: Socio-demographic criteria, risk factors and types of laryngeal disorders among the studied patients

Traumatic	276 (4.43)
Inflammatory (laryngitis)	483 (7.76)
Allergy	228 (3.66)
Neurologic (palsy & paresis)	359 (5.77)
Benign lesions	234 (3.76)
Malignant lesions	168 (2.70)
Functional	
Hyper-functional childhood dysphonia	146 (2.35)
Mutational dysphonia	113 (1.82)
Hyper-functional dysphonia	284 (4.56)
Hypofunctional dysphonia	243 (3.91)
Phonathenia	270 (4.34)
Ventricular dysphonia	228 (2.66)
Habitual aphonia	302 (4.85)
Psychogenic	207 (3.33)
Minimal associated pathological lesions (MAPLs)	
Vocal folds polyp	432 (6.94)
Vocal folds Nodule	677 (10.88)
Vocal folds Cyst	361(5.80)
Reinks's edema	571(9.18)
Contact granuloma (post intubation)	148 (2.38)



Figure 2: Distribution of cases over the studied years

	Total	Age			P Sex			P value
		Child	Adult	Old age	value	Male	Female	
	N =6222	N=1406	N=2959	N=1857		N=3348	N=2874	
Laryngeal web	21(0.3)	21(1.49)	0 (0.0)	0 (0.0)	< 0.001	10(0.30)	11(0.38)	0.73
Sulcus vocalis	13(0.2)	13(0.92)	0 (0.0)	0 (0.0)	< 0.001	8(0.24)	5(0.17)	0.78
Epiglottic cyst	25(0.4)	25(1.78)	0 (0.0)	0 (0.0)	< 0.001	10 (0.30)	15(0.52)	0.23
Laryngeal clefts	6(0.09)	6(0.42)	0 (0.0)	0 (0.0)	0.004	5 (0.15)	1(0.03)	0.30
Laryngomalacia	36(0.6)	36(2.56)	0 (0.0)	0 (0.0)	< 0.001	27(0.81)	9 (0.31)	0.02
Subglottic heamangioma	27(0.43)	27(1.92)	0 (0.0)	0 (0.0)	< 0.001	17(0.51)	10(0.35)	0.44
Vocal fold nodule	677(10.9)	214(15.2)	338(11.4)	125(6.73)	< 0.001	111(3.32)	566(19.69)	< 0.001
Vocal fold polyp	432(6.9)	61 (4.33)	248 (8.4)	123(6.62)	< 0.001	270(8.06)	162(5.64)	< 0.001
Vocal fold cyst	361(5.8)	91(6.47)	166(5.60)	104(5.60)	0.95	159(4.75)	202 (7.03)	0.001
Reinke's edema	571(9.2)	124(8.82)	295(9.97)	152(8.19)	0.07	412(12.31)	159(5.53)	< 0.001
Contact ulcers/granuloma	148(2.4)	10 (0.71)	87(2.94)	51(2.75)	< 0.001	82 (2.45)	66(2.30)	0.76
Vocal fold scarring	248(4.0)	11(0.78)	109(3.68)	128(6.89)	< 0.001	146(4.36)	102(3.55)	0.12
GERD/LPR	261(4.2)	29 (2.06)	145(4.9)	87 (4.68)	0.003	182(5.44)	79(2.75)	0.001
Acute laryngitis	172(2.8)	45 (3.20)	94(3.17)	33(1.78)	0.01	97 (2.90)	75 (2.61)	0.54
Chronic non-specific	205(3.3)	13 (0.92)	116(3.92)	76 (4.09)	0.006	134(4.0)	71(2.47)	0.001
laryngitis								
Laryngoscleroma	95(1.5)	11(0.78)	49(1.65)	35(1.88)	0.09	50(1.49)	45(1.56)	0.90
Tremors	59(0.94)	3 (0.21)	30(1.01)	26 (1.40)	0.001	31(0.93)	28(0.97)	0.94
Muscle tension dysphonia	92(1.47)	6 (0.42)	46 (1.55)	40(2.15)	< 0.001	61(1.82)	31(1.08)	0.02
Dysphonia plica	82 (1.32)	9(0.64)	50 (1.69)	23 (1.24)	0.12	56(1.57)	26(0.90)	0.11
ventricularis								
Spasmodic dysphonia	181(2.91)	43(3.06)	107(3.61)	31(1.67)	0.03	97(2.89)	84(2.92)	0.99
Prebyphonia	137(2.2)	0 (0.0)	34 (1.15)	103(5.55)	< 0.001	71 (2.12)	66(2.30)	0.70
Vocal fold paresis	82(1.32)	5 (0.35)	46 (1.55)	31 (1.67)	0.001	46(1.37)	36(1.25)	0.76
Vocal fold paralysis	76(1.22)	4 (0.28)	37(1.25)	35 (1.88)	0.001	47(1.40)	29 (1.01)	0.19
Laryngeal papilloma	132(2.12)	15 (1.07)	75(2.53)	42(2.26)	0.01	79(2.36)	53 (1.84)	0.19
Hyperkeratosis/leukoplakia	122(1.96)	3 (0.21)	55 (1.86)	64 (3.45)	< 0.001	88(2.63)	34(1.18)	0.001
Laryngeal neoplasm	168(2.7)	10 (0.71)	38 (1.28)	120(6.46)	< 0.001	111(3.32)	57(1.98)	0.002
Chronic habitual childhood	146(2.34)	146(10.38)	0 (0.0)	0 (0.0)	< 0.001	71(2.12)	75(2.61)	0.23
dysphonia								
Mutational voice disorders	113(1.81)	103(7.32)	10 (0.34)	0(0.0)	< 0.001	80(2.39))	33(1.15)	< 0.001
Hyper-functional	284(4.56)	67 (4.76)	139(4.70)	78(4.20)	0.49	165(3.93)	119 (4.14)	0.15
dysphonia								
Hypo-functional dysphonia	243(3.9)	51(3.62)	125(4.22)	67(3.61)	0.39	125(3.73)	118 (4.11)	0.49
Vocal fatigue	270(4.33)	78(5.55)	121(4.09)	71(3.82)	0.04	100(2.99)	170 (5.91)	< 0.001
(phonathenia)								
Ventricular dysphonia	228(3.66)	52(3.69)	107(3.61)	69(3.72)	0.28	116(3.46)	112(3.90)	0.40
Habitual aphonia	302(4.85)	40(2.84)	171(5.78)	91(4.90)	< 0.01	166(4.96)	136(4.73)	0.72
Psychogenic	207(3.32)	34(2.41)	121(4.09)	52(2.80)	0.004	118(3.52)	89(3.09)	0.39
dysphonia/aphonia								

 Table 2: type of laryngeal disorders in relation to age groups and sex of the studied
 patients

Table 3: type of laryngeal disorders in relation to smoking and professional voice use among the studied patients

	Total	Smoking		P value	Professional voice use		P value
		Smoker Non smokers			Yes No		
	N=6222	N= 2045	N=4177		N = 946	N=5276	
Laryngeal web	21(0.3)	0 (0.0)	21(0.50)	< 0.001	0 (0.0)	21(0.40)	< 0.001
Sulcus vocalis	13(0.2)	0 (0.0)	13(0.31)	< 0.001	0 (0.0)	13(0.25)	< 0.001
Epiglottic cyst	25(0.4)	0 (0.0)	25(0.60)	< 0.001	0 (0.0)	25(0.47)	< 0.001
Laryngeal clefts	6(0.09)	0 (0.0)	6(0.14)	0.004	0 (0.0)	6(0.11)	0.004
Laryngomalacia	36(0.6)	0 (0.0)	36(0.86)	< 0.001	0 (0.0)	36(0.68)	< 0.001
Subglottic heamangioma	27(0.43)	0 (0.0)	27(0.65)	< 0.001	0 (0.0)	27(0.51)	< 0.001
Vocal fold nodule	677(10.9)	188(9.19)	489(11.71)	0.003	126(13.3)	551(10.4)	0.009
Vocal fold polyp	432(6.9)	209(10.22)	223(5.34)	< 0.001	56 (5.92)	376(7.13)	0.18
Vocal fold cyst	361(5.8)	159(7.77)	202 (4.84)	< 0.001	62 (6.55)	299(5.67)	0.28
Reinke's edema	571(9.2)	179(8.75)	392 (9.38)	0.42	82 (8.67)	489(9.27)	0.55
Contact ulcers/granuloma	148(2.4)	53 (2.59)	95 (2.27)	0.44	27 (2.85)	121(2.29)	0.29
Vocal fold scarring	248(4.0)	72 (3.52)	176 (4.21)	0.19	51 (5.39)	197(2.29)	0.02
GERD/LPR	261(4.2)	68 (3.32)	193 (4.62)	0.02	89 (9.40)	172(3.26)	< 0.001
Acute laryngitis	172(2.8)	67 (3.28)	105 (2.51)	0.08	23 (2.43)	149(2.82)	0.50
Chronic non-specific laryngitis	205(3.3)	61 (2.98)	144 (3.45)	0.34	17 (1.79)	188(3.56)	< 0.001
Laryngoscleroma	95(1.5)	47 (2.30)	48 (1.15)	0.001	22 (2.33)	73(1.38)	0.03
Tremors	59(0.94)	12 (0.59)	47 (1.12)	0.04	11(1.16)	48(0.91)	0.46
Muscle tension dysphonia	92(1.47)	55 (2.69)	37 (0.89)	< 0.001	13 (1.37)	79(1.50)	0.77
Dysphonia plica ventricularis	82 (1.32)	38 (1.86)	44 (1.05)	0.009	10 (1.06)	72(1.36)	0.45
Spasmodic dysphonia	181(2.91)	42 (2.05)	139 (3.33)	0.005	53 (5.60)	128(2.43)	< 0.001
Prebyphonia	137(2.2)	48(2.35)	89 (2.13)	0.58	35 (3.70)	102(1.93)	< 0.001
Vocal fold paresis	82(1.32)	33 (1.61)	49 (1.17)	0.15	8 (0.85)	74(1.40	0.17
Vocal fold paralysis	76(1.22)	27 (1.32)	49(1.17)	0.62	11 (1.16)	65(1.23)	0.86
Laryngeal papilloma	132(2.12)	36(1.76)	96(2.29)	0.17	12 (1.27)	120(2.27)	0.047
Hyperkeratosis/leukoplakia	122(1.96)	67(3.27)	55(1.32)	< 0.001	15(1.58)	107(2.03)	0.37
Laryngeal neoplasm	168(2.7)	91(4.45)	77(1.84)	< 0.001	16(1.69)	152(2.88)	0.037
Chronic habitual childhood dysphonia	146(2.34)	0 (0.0)	146 (3.49)	<0.001	17 (1.80)	129(2.44)	0.23
Mutational voice disorders	113(1.81)	42 (2.05)	71 (1.70)	0.33	11 (1.16)	102(1.93)	0.10
Hyper-functional dysphonia	284(4.56)	89 (4.35)	195 (4.67)	0.57	16 (1.69)	268(5.08)	< 0.001
Hypo-functional dysphonia	243(3.9)	38(1.86)	205 (4.91)	< 0.001	13 (1.37)	230(4.36)	< 0.001
Vocal fatigue (phonathenia)	270(4.33)	62 (3.03)	208 (4.98)	0.004	55 (5.81)	215(4.15)	0.015
Ventricular dysphonia	228(3.66)	81 (3.96)	147 (3.52)	0.38	12 (1.27)	216(4.09)	< 0.001
Habitual aphonia	302(4.85)	95 (4.65)	207 (4.96)	0.60	45(4.76)	257(4.87)	0.88
Psychogenic dysphonia/aphonia	207(3.32)	86 (4.20)	121 (2.90)	0.007	38 (4.02)	169(3.20)	0.20

Discussion:

Individual with voice disorder had significant physical, mental, social, and emotional limitations that can be explained as the main communication tool, which is considered the utmost need in daily life and some professions. ¹⁶

Laryngeal disorders are presented in all age groups (age of presentation ranged from 0 - 70 years) with slightly higher rate above the age of forty. This can be explained as this study included all available voice disorders presented, including congenital, inflammatory, functional, and neoplasm, with their discrepant age of presentation.

Regarding sex distribution, the disorders were almost equally presented in both sexes, males and females. Chavan et al 2021¹⁷ documented male predominance among the studied cases dysphonia while Lyberg-Åhlander et al, 2019¹⁸ reported that Women were significantly more prone to report voice problems than men and Hah et al, 2015¹⁹ revealed that Prevalence of laryngeal disease was higher in males, whereas the rate of subjective voice complaints was higher in females. This difference in trend may be attributed to differences in studied population characteristics, their selection criteria, and the difference in the laryngeal disorders detected.

During the duration of the study, COVID-19 pandemic hit the health system causing significant reduction in hospital attendance rate for non-COVID related conditions than pre pandemic rate, 2020 attendance rate in phoniatric unit dropped by 60.3% than 2019 attendance rate, this reduction extended through 2021 as reduction percentage was 37.2%. Similar findings were noted by **Fyntanidou et al**, **2022**²⁰ as they documented 58% reduction in attendance rate of non-COVID related

condition with highest decrease in ears, nose, throat (ENT), and ophthalmology attendances. Coincident findings observed in other studies that cover different localities in the world. ²¹⁻²²

Stigma and being worried about catching a COVID-19 infection from the hospital and the unavailability of transport due to lockdown could be the main cause of such lowered attendance.

current work documented The different types of laryngeal disorders causing voice affection; vocal fold nodule was the most common cause of dysphonia (10.88%) in the studied sample, followed by Reinks's edema (9.18%), laryngitis (7.76%), vocal fold polyps, and cysts (6.94% & 5.8%). et 19 Similarly, Hah al. 2015 documented the most common form of laryngeal disorders in their sample were laryngitis, vocal nodules, vocal polyp, Reinke's edema, and epiglottic cyst, Kiakojoury et al, 2014²³ revealed that Vocal nodules and Reinke's edema were among the most common causes of organic dysphonia, and also Van Houtte et al, 2010²⁴ reported a rate of by vocal fold nodule (15%) in a population based 5-year survey in Belgium. This is in addition to the high rate of functional dysphonia (28.8%) in the current work; that was also of high rate in the study of Van Houtte et al, **2010** ²⁴ (30%) and **Martins et al. 2015** ²⁵ (20.5%) were of functional voice disorders. This can be interpreted as insufficient or misuse of phonation is very common, leading to functional dysphonia without anatomical or neurological abnormalities, or even prolonged and frequent voice misuse may develop anatomical lesions of the larynx (as nodules or polyps).²⁶

Regarding laryngitis, in this study, it is more prevalent in adult (19 - 59)years) in its acute and chronic form as well as allergic laryngitis, the same was reported by **House & Fisher, 2017**²⁷.

The current study documented that Laryngeal Malignancy rate was 2.7%, similarly, Kiakojoury et al, 2014²³ documented that 2.5% of all diagnosed cases were laryngeal carcinoma. It is more common among old age, males and smokers, according to American cancer society ²⁸, most people diagnosed with laryngeal cancer were above the age of 55 with mean age 66 years and males had a prevalence of four-fold that of females. Menach et al, 2012²⁹ documented a significant role in predisposition of laryngeal cancer. Also, Byeon and Cha, 2020 ³⁰ & Widuri, and Wiratama, 2021 ³¹ documented that cigarette smoke affects vocal folds through irritation or even tissue dysplasia that of degradation of voice performance.

In the current work, professional voice users were presented mainly as nodules (13.3%) and functional dysphonia (17.8%), in the same line, **Van Houtte et al, 2010**²⁴ revealed that in professional voice users, functional dysphonia occurred in 41%, vocal fold nodules in 15%. **Roy et al, 2005**³² documented that many voice disorders were related to voice use patterns and demands.

Dysphonia is a many-sided issue, with its effect extending from mild form to complete aphonia, depending on the underlying cause. The approach to prevention, diagnosis and treatment needs to be tailored to the individual's specific condition and needs.

Conclusion:

Voice disorders are common in different age groups and in both sexes specially among children. As voice is one of the main communication tools and its ailment affecting patients' quality of life, in addition that many types of laryngeal disorders are preventable by controlling risk factors as smoking and excessive voice use. So, it is recommended to develop a program to increase the awareness of the public about optimum voice use and the risk factors that may affect voice as smoking.

Funding support: Our study did not receive any funding support.

Conflicts of interest: No

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