

# Voice disorders in teachers

## *The role of family physicians*

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### ABSTRACT

**Objectives:** To look at the prevalence and impact of voice problems on teachers and assessing the teachers' knowledge on vocal hygiene and habits, as well as which parameters mostly triggered the seeking of medical attention and how family doctors could intervene in this spectrum.

**Methods:** A survey that consists of 16 questions was used to look at the prevalence and impact of voice problems on teachers and to identify the associated risk factors at the American University of Beirut, Lebanon, during the year 2005.

**Results:** A considerable proportion (46%) perceived their voice as fair or worse, and 79% had never consulted a throat specialist. Voice disorders affected most of teachers particularly on their job. The mean number of vocal habits per person was estimated at 2.4 with smoking being the most common (38.7%). Two thirds of teachers were unaware of more than half the factors that can negatively affect their voice. Symptoms exceeding 6 months significantly increased the probability of consulting a physician by 2.5 folds.

**Conclusion:** Family physicians can reduce the prevalence of vocal dysfunction in teachers through education and by pointing the various symptoms necessitating a specialist's early consultation especially when history of smoking is present.

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Teachers are more likely to develop voice disorders compared to non-teachers in other occupations. They are often cited as a high-risk group for vocal dysfunction. Females are twice more likely to report vocal symptoms than males, with an average of 2 symptoms per person.<sup>1</sup> The prevalence rates varies markedly from around 5% when auditory, and perceptual judgment is used for identification to 81% when self reported surveys are used.<sup>2-4</sup> Such a high rate reflects the extent of self perception of vocal discomfort as reported by the teachers compared to expert judges. Further studies have highlighted the impact of these voice problems on their communication, social life, personal emotions, and occupation.<sup>5</sup> Voice symptoms described as tired, effortful or difficulties in phonation, and deviant voice qualities are very often associated with physical discomfort and disability, a health problem that has an impact on the teachers' personality, profession, and carries significant work related and economic effects. Overall, teachers are more likely to perceive their voice problems negatively affecting their current job performance. Approximately 20% of teachers miss working days due to their voice problems.<sup>6</sup> This has led to the development of several preventive voice care programs, educational and therapeutic, to reduce the incidence of vocal dysfunction in this group of professional voice users.<sup>7</sup> These were attempts to bridge the gap between vocal art in a high-risk population and the medical team consisting mainly of otolaryngologists, voice therapists, and speech language pathologists. Throughout that journey, when a teacher may suffer vocal symptoms yet not attend to a throat specialist, can the family doctor, as a primary care physician, intervene to shorten the suffering and help prevents the occurrence of vocal dysfunction?

The purpose of this report has 2-folds: First, to look at the prevalence of voice problems among teachers who did not receive any vocal training nor were enrolled in a voice care program in a developing

country such as Lebanon, to examine the impact of these voice problems on their daily function, to identify associated risk behaviors, assess their knowledge on vocal habits and hygiene, and finally to detect the means perceived by this group of professional voice users as best needed to reduce the prevalence of voice problems. Second, is to detect which of the above mentioned parameters or factors triggered at most the seeking of medical attention, and so, what role can a family physician play between 2 ends, the pre-appearance of a vocal symptom and the visit to a throat specialist taking into consideration the predisposing factors.

**Methods.** This study was conducted during the year 2005 at the American University of Beirut, Lebanon. The survey used by Yiu<sup>5</sup> for studying the impact and prevention of voice problems in the teaching profession was modified to fit our study. The survey form that we have used consisted of 4 sections with a total of 16 questions. The first section elicited data on self perception of voice over the last 6 months prior to the survey and included a list of 13 symptoms pertaining to the vocal and throat complaint(s) (such as dry throat, vocal fatigue, shortness of breath, pain, and so on), duration of symptoms, and frequency of consulting a nose and throat specialist for the treatment of vocal problems. Section 2, consisted of a series of 8 questions that reflected the respondents' perception of the impact of these voice disorders on the subjects' various realms of life, their daily communication, social life, personal emotions, and finally on job performance (2 questions for each realm). These items were measured on a 4-point Likert scale, and the response options with scores were; (1) for no impact, (2) a little, (3) moderate, and (4) for severe impact. Section 3, consisted of 2 questions that assessed vocal habits in teachers and explored their extent of knowledge on vocal hygiene and care. These consist a list of 9 behaviors and 11 knowledge items. Finally, section 4 included 2 questions that requested subjects to respond to a list of 18 preventive measures taken by the teachers to avoid voice problems, and explored what educational programs should be targeted, direct training related to posture, breathing, and voice projection or indirect training, or both, such as provision of information on vocal hygiene, hydration, and vocal behavioral modifications. We also collected demographic data regarding, age, gender, years of teaching, hours of teaching per week, and topic taught. The questionnaire was self-administered, voluntary, and anonymous. It took less than half an hour for completion. This is a cross-sectional survey conducted among 220 schools and college teachers of various disciplines in the country. The final study sample

included 217 teachers, with 3 questionnaires having incomplete data on variables pertinent to this analysis.

Frequencies and means ( $\pm$  SD) were used to describe the sample, for categorical and continuous variables. Due to the small numbers in the extreme high categories, frequency of consulting a nose and throat specialists, the main outcome variable, was collapsed into a dichotomous variable (none versus any consultation), and differences in independent variables across consulting a specialist were examined using chi-square test. Furthermore, composite indices were computed for vocal symptoms (range 0-13), bad vocal habits (0-9), baseline knowledge (0-11) and actions taken (0-17), and associations between these scores and consulting a specialist was examined using t-test for independent samples.

Using maximum likelihood methods, 2 separate multiple logistic regressions were carried out, with consulting a specialist as the dependent variable and many baseline characteristics as potential co-variables (age, gender, years of teaching, hours per week, and topics taught). Initially, the composite indices of symptoms, bad vocal habits, baseline knowledge, and actions taken were simultaneously examined as the main independent variables. Based on the results of the first model, the second model focused on certain items of the symptoms that were significantly associated with the outcome in the bi-variate analysis, and included also symptom duration as well as impact of voice disorders on various realms of life as independent variables. The prevalence of odds ratios (ORs) and their 95% confidence intervals (CIs) were estimated. Differences were considered significant for  $p < 0.05$ . All analyses were conducted using Statistical Package for Social Sciences (SPSS) software.

**Results.** A total of 217 teachers, most of them were females (62.2%), completed the interview schedule. Their age ranged were between 21 and 69 years with

**Table 1 -** Baseline characteristics of study sample.

Baseline characteristics	n	(%)
Females	135	(62.2)
Age (mean $\pm$ SD)	40.6 $\pm$ 10.9	
Years of teaching (mean $\pm$ SD)	15.2 $\pm$ 10.5	
Hours of teaching per week (mean $\pm$ SD)	18.6 $\pm$ 9.0	
<b>Topics taught</b>		
Sciences	92	(43.8)
Arts	26	(12.4)
Languages	69	(32.9)
Fine art	17	(8.1)
History/geography	6	(2.9)

a mean of 40.6 years (SD = 10.9 years). The majority taught science subjects (43.8%) followed by languages (32.9%). Years of teaching experience as well as hours taught per week varied widely between study subjects (range 1-40 years and 2-40 hours) with a mean of 15.2 years and 18.6 hours (**Table 1**). Results showed that a considerable proportion (46%) of those surveyed perceived their voice as fair or worse in 6 months prior to the survey, with the feeling of a dry throat (33.2%), and vocal fatigue (32.7%) being the most commonly reported symptoms. Additionally, pain in the throat (24%), frequent throat clearing (20.3%), and hoarseness (18.4%) were prevalent of the sample. (**Table 2**). Symptoms were co-present in most of the sample with a sizable proportion (58%) reporting at least 2 of the 13 symptoms listed in the questionnaire (mean 2.2, SD 1.9). In spite of this, data showed that 79% of the teachers had never consulted a throat specialist regarding a voice problem. Symptoms that were significantly associated with likelihood of consulting a specialist included a dry throat, voice loss, vocal fatigue, itchy sensation, shortness of breath, hoarseness, and feelings of pain in the throat ( $p$ -value <0.01). Similarly, findings revealed a positive dose-response relationship between chronicity of symptom and likelihood of consultation (**Table 2**). As shown in **Table 3**, voice disorders impacted in most of the teachers on various realms of their life: communication, social life, self, and work. The proportion of adverse effect (a little and greater) ranged from 50% in effect on job to 27.4% for social outings. For all realms considered, the odds of seeking medical attention increased consistently and significantly with increase in intensity of the impact ( $p$ -value <0.01).

When examining vocal habits and hygiene, almost all the study subjects (91.5%) reported engaging in at least one of the 9 habits listed in the questionnaire, more than half (60.5%) engaging in 2 or more behaviors and 9 subjects in a total of 6 habits. The mean number of bad vocal habits per person was estimated at 2.4 (SD = 1.6). The most common bad vocal habits included smoking (38.7%), eating spicy food (38.0%) followed by talking on the phone for a long period of time (31.5%), and throat cleaning (31.3%) (data not shown). Teachers then were asked on their knowledge on voice care, what can affect their voice, and whether they have taken any measures to prevent or reduce the incidence of voice problems. Data showed that two-thirds of the teachers was unaware of more than half of the factors that can negatively affect their voice. For example, not all were conscious that smoking is bad for the voice (67.3%), and only 20% and 25% recognized that reflux and inappropriate breathing can adversely affect their voice. Subsequently,

results showed that 42% of the sample has not taken any active measure to avoid worsening of voice disorder. The most commonly reported actions included adequate hydration (23%), drinking honey (18.4%), and avoid screaming (18%). In the answer to the last question what should be included in an educational program, 60% recommended direct training versus 48% recommended indirect training. Further analysis showed that in comparison with those who did not consult a specialist, those who sought medical attention had experienced a significantly greater number of bad vocal habits, were more knowledgeable regarding vocal care and hygiene and reported taking more positive steps to improve voice performance (**Table 4**).

The results of the multivariate logistic regression with consulting a specialist being the dependent variable and controlling for baseline characteristics are presented in **Table 5**. Bad vocal habits, baseline knowledge, actions taken, and total symptoms considered as continuous variables were included in the first model as independent variables. While bad vocal habits, baseline knowledge, and actions taken lost their significance in the multivariate analysis, voice symptoms remained significantly associated with the outcome. The odds of consulting a specialist increased in 1.71 fold with each unit increase in the symptoms (95% CI 1.36-2.16). The second model introduced the symptoms that were significantly associated with the outcome at the bi-variate level, and also, the duration of the voice disorder and the impact of voice disorders on various life domains. Results showed that teachers complaining from a dry throat (OR = 2.59), vocal fatigue (OR = 7.30), or hoarseness (OR = 3.32) was more likely to consult a physician, however, this did not reach statistical significance except in the latter 2 complaints. Symptoms exceeding in 2 months were also significantly increased the probability of consulting a physician by 2.5 fold. Of all the domains considered, only the effect of the disorder on job (OR = 5.60), and career image (OR = 7.47) were significantly associated with the outcome.

**Discussion.** The prevalence of vocal problems and the self-perception of these voice problems by the teachers varies across the literature. Such variability in figures has precluded adequate planning for occupational safety services and preventive programs. Information on how these symptoms are perceived, the need for medical advice, the impact of these voice problems on their lives, and finally, what measures teachers believe should be taken are all extremely helpful information to eliminate causes of dysphonia and build voice therapy programs to improve the overall status of this high-risk group of professional voice users

in a developing country. The prevalence of symptoms varies with the methodology used and the population surveyed. In studies where data was collected through questionnaire similar to the one used in our study, the prevalence ranged from 12-26%.<sup>1,8,9</sup> As part of a survey used by Russel et al,<sup>10</sup> one teacher where asked to report voice problems during their careers until the day of the survey, the response rate was 75%. In our study, approximately 46% of teachers described their voice as being fair, bad or very bad over the last 6 months. The most common symptom was a dry throat followed by

vocal fatigue. The most often symptoms in the cross-sectional study reported by Simberg et al<sup>11</sup> were "voice tires easily" and "hoarseness". In our study, hoarseness came as the fourth symptom. Despite the coexistence of several symptoms in most teachers and despite the chronicity of their vocal complaints, yet only 21% had an ear, nose, and throat consultation after an average time of at least one year for their vocal complaint in >50% of the teachers. Yiu<sup>5</sup> reported that 37% of practicing teachers consulted laryngologists for their

**Table 2** - Distribution of voice symptoms in total sample and by consultation status.

Symptoms	Total n (%)	Percentage of teachers who did not consult a specialist (n=171)	Percentage of teachers who consulted a specialist (n=46)	p-value
<b>Total symptoms</b>				<0.001
Range (max 13)	0-9			
Mean score ± SD	2.2 ± 1.9	1.8 ± 1.6	3.8 ± 2.3	
<b>Dry throat</b>				<0.001
Absent	145 (66.8)	86.9	13.1	
Present	72 (33.2)	62.5	37.5	
<b>Voice loss</b>				0.003
Absent	187 (86.2)	82.4	17.6	
Present	30 (13.8)	56.5	43.5	
<b>Vocal fatigue</b>				<0.001
Absent	146 (67.3)	88.4	11.6	
Present	71 (32.7)	59.2	40.8	
<b>Voice spasms</b>				0.505
Absent	200 (92.2)	79.0	21.0	
Present	17 (7.8)	76.5	23.5	
<b>Itchy sensation</b>				0.001
Absent	192 (88.5)	82.3	17.7	
Present	25 (11.5)	52.0	48.0	
<b>Shortness of breath</b>				0.008
Absent	184 (84.8)	82.1	17.9	
Present	33 (15.2)	60.6	39.4	
<b>Hoarseness</b>				0.001
Absent	177 (81.6)	83.6	16.4	
Present	40 (18.4)	57.5	42.5	
<b>Can't sing low notes</b>				0.098
Absent	208 (95.5)	79.8	20.2	
Present	9 (4.1)	55.6	44.4	
<b>Frequent throat clearing</b>				0.183
Absent	173 (79.7)	80.3	19.7	
Present	44 (20.3)	72.7	27.3	
<b>Pain in throat</b>				0.001
Absent	165 (76.0)	84.2	15.8	
Present	52 (24.0)	61.5	38.5	
<b>Weak voice</b>				0.059
Absent	179 (82.9)	81.0	19.0	
Present	37 (17.1)	67.6	32.4	
<b>Lost control of voice</b>				0.451
Absent	201 (92.6)	79.1	20.9	
Present	16 (7.4)	75.0	25.0	
<b>Can't sing high notes</b>				0.222
Absent	193 (88.9)	79.8	20.2	
Present	24 (11.1)	70.8	29.2	
<b>Duration of symptom(s)</b>				<0.001
None	88 (40.7)	95.5	4.5	
<month	15 (6.9)	93.3	6.7	
1-3 months	12 (5.6)	83.3	16.7	
3-6 months	15 (6.9)	73.3	26.7	
>6 months	86 (39.8)	59.3	40.7	

**Table 3** - Impact of voice disorders on various realms of life of teachers in total sample and by consultation status.

Impact of voice disorders	Total	Percentage of teachers who did not consult a specialist (n=171)	Percentage of teachers who consulted a specialist (n=46)	P-value
<b>Effect on communication</b>				
<i>Difficulty for people to understand message</i>				
Not at all	53.5	88.8	11.2	<0.001
A little	32.7	73.2	26.8	
Moderate	9.7	61.9	38.1	
Severe	4.1	33.3	66.7	
<i>Request from others to repeat message</i>				
Not at all	52.5	90.4	9.6	<0.001
A little	31.3	70.6	29.4	
Moderate	12.4	70.4	29.6	
Severe	3.7	12.5	87.5	
<b>Effect on social spheres</b>				
<i>Impact on social outings</i>				
Not at all	72.6	84.0	16.0	0.003
A little	21.9	68.1	31.9	
Moderate	3.7	62.5	37.5	
Severe	1.9	25.0	75.0	
<i>Impact on students, family or friends</i>				
Not at all	62.5	88.1	11.9	<0.001
A little	26.4	70.2	29.8	
Moderate	5.1	63.6	36.4	
Severe	6.0	38.5	61.5	
<b>Effect on self</b>				
<i>Sad or distressed</i>				
Not at all	59.7	90.7	9.3	<0.001
A little	29.2	65.1	34.9	
Moderate	7.4	68.8	31.3	
Severe	3.7	12.5	87.5	
<i>Embarrassed</i>				
Not at all	65.9	87.4	12.6	<0.001
A little	25.3	70.9	29.1	
Moderate	6.5	42.9	57.1	
Severe	2.3	20.0	80.0	
<b>Effect on work</b>				
<i>Impact on job</i>				
Not at all	50.0	88.9	11.1	<0.001
A little	36.6	79.7	20.3	
Moderate	6.5	42.9	57.1	
Severe	6.9	33.3	66.7	
<i>Impact on career image</i>				
Not at all	66.2	88.1	11.9	<0.001
A little	23.1	66.0	34.0	
Moderate	7.9	58.8	41.2	
Severe	2.8	16.7	83.3	

**Table 4** - Relationship of bad vocal habits, baseline knowledge and actions taken to protect voice performance with consulting a specialist: results of t-test.

Voice performance	Total	Percentage of teachers did not consult a specialist (n=171)	Percentage of teachers consulted a specialist (n=46)	P-value
<b>Bad vocal habits</b>				
Range (max 9)	0-7			0.022
Mean score $\pm$ SD	2.4 $\pm$ 1.6	2.3 $\pm$ 1.5	2.9 $\pm$ 1.8	
<b>Baseline knowledge</b>				
Range (max 11)	0-11			0.009
Mean score $\pm$ SD	3.9 $\pm$ 2.2	3.7 $\pm$ 2.2	4.7 $\pm$ 2.3	
<b>Actions taken</b>				
Range (max 18)	0-13			<0.001
Mean score $\pm$ SD	2.3 $\pm$ 2.7	1.9 $\pm$ 2.4	3.6 $\pm$ 3.2	

voice problems. This was in accordance with Morton and Watson findings.<sup>12</sup> This was attributed to the fact that teachers believed that their voice did not warrant medical attention. In addition to the lack of workshops to be enrolled in, the poor social and economic situation can be added as another cause to the sharp drop in the percentage of teachers seeking a specialist opinion in our study. Using multivariate analysis, only the emergence of symptoms triggered patients to seek medical attention, despite the higher prevalence of bad vocal habits and the scarcity in the baseline knowledge on voice care and hygiene. Although vocal symptoms in teachers are invariably of benign origin, yet their impact on their daily activities such as occupational and social has been

reported to be similar to those experienced by subjects with life threatening conditions.<sup>13</sup> The self-reported data gathered from these questionnaires reflect the extent of impairment or limitation of activity experienced by the affected persons. The most common consequences of voice problems are usually reported as missing work, affecting social activities, and job performance.<sup>14</sup> Looking at the overall impact of dysphonia in our study, it is only when their job performance was affected that they felt the need to seek a laryngologist opinion, despite the adverse effects on their social life, communication and themselves. The presence of a low percentage of teachers seeking a specialist's consultation, despite the coexistence of several symptoms that carry devastating impact on their lives, and the lapse of 6 months before that visit is made, brings up an important issue and that is the role of family physicians as intermediates between these professional voice users and otolaryngologists at 3 different fronts: 1) In preventing or reducing the prevalence of vocal complaints in teachers by educating them on vocal hygiene and the avoidance of bad vocal habits. The bi-variate analysis showed that those who were more knowledgeable sought more medical attention than those who were less knowledgeable. Looking further at the results of the multivariate logistic regression with consulting a specialist being the dependent variable, only voice symptoms triggered teachers to seek medical attention. These symptoms were ultimately the end result of abusive behavior of the vocal folds, lack of proper vocal hygiene, and abundance of environmental and endogenous risk factors such as reflux, smoking, and many others. For instance in our study, one fifth did not know that gastroesophageal reflux can affect their voice, and one fourth did not correlate the importance of breathing to voice production. Almost 39% of teachers smoked compared to none in the practicing group of teachers studied by Yiu.<sup>5</sup> Furthermore, almost 38% did not avoid eating spicy food. In a nutshell, the provision of information on vocal hygiene and care and the importance of breathing in voice projection will help improve their knowledge and perceptions on voice and help them establish preventive measures to reduce the incidence of vocal disorders before visiting a specialist. 2) In drawing their attention to the fact that vocal dysfunction does not mean only hoarseness. Complaints other than hoarseness and vocal fatigue, the 2 symptoms shown in the results using the multivariate analysis as the ones that significantly triggered laryngologist's consultations, merit medical attention as potential precursors of vocal dysfunction. 3) In shortening the duration between the onset of vocal symptoms and the specialist's consultation. Results have shown that only symptoms exceeding 6 months increased the probability

**Table 5** - Results of the logistic regression: factors associated with consulting a specialist.

Parameters	Model 1*		
	OR	95% CI	p-value
Bad vocal habits	0.95	0.71-1.26	0.712
Baseline knowledge	1.07	0.88-1.30	0.492
Actions taken	1.08	0.92-1.28	0.335
Symptoms	1.71	1.36-2.16	<0.001
	Model 2†		
	OR	95% CI	P-value
<b>Symptoms</b>			
Dry throat	2.59	0.84-8.02	0.099
Voice loss	0.75	0.19-2.98	0.678
Vocal fatigue	7.30	2.31-23.03	0.001
Itchy sensation	0.83	0.18-3.87	0.817
Shortness of breath	1.10	0.30-4.04	0.889
Hoarseness	3.32	1.05-10.53	0.042
Pain in throat	0.78	0.23-2.73	0.703
<b>Duration of symptoms</b>			
>6 months versus ≤6 months	2.50	1.46-4.29	0.001
<b>Effect on communication</b>			
Difficulty for people to understand message	0.93	0.22-4.01	0.923
Request from others to repeat message	1.21	0.30-4.88	0.791
<b>Effect on social spheres</b>			
Impact on social life.	1.67	0.46-5.98	0.434
Impact on students, family or friends	1.08	0.30-3.96	0.905
<b>Effect on self</b>			
Sad or distressed	2.59	0.74-9.02	0.136
Embarrassed	1.16	0.29-4.59	0.835
<b>Effect on work</b>			
Impact on job	5.60	1.27-24.7	0.023
Impact on career image	7.47	1.88-29.8	0.004

\*Model 1: controlling for baseline characteristics (age, gender, years of teaching, hours per week and topics). †Model 2: controlling for baseline characteristics (age, gender, years of teaching, hours per week and topics) and additionally for bad vocal habits, baseline knowledge, and actions taken

of consulting a specialist. It is true that most causes of dysphonia in teachers are benign, yet in cases where it is not, especially in a sample like ours where smoking was present in close to 39%, early diagnosis and medical attention are crucial in the management of laryngeal cancer.

In view of the higher percentage of teachers experiencing voice problems in terms of frequency and number of symptoms, and with the current aforementioned conditions very often experienced in developing countries, the role of family doctors must prevail. When more than one symptom may be present for close to one year and starts affecting his or her job performance before a teacher seeks a specialist opinion, a family physician can help filling the gap between the emergence of these vocal complaints or even before the manifestation of dysfunction of the vocal apparatus. This can be achieved by providing teachers who are generally in a high-risk category for voice disorders with vocal hygiene instruction sheets that carry also strategies to eliminate abusive vocal behaviors and promote healthy voice production. Family physicians can also play a role in clarifying the importance of breathing exercises for voicing coordination and as a preventive measure. They can also increase their awareness regarding vocal symptoms, the persistence of which may necessitate early medical intervention. Until full educational programs are available, engaged, and included in the curriculum of teacher's training, family doctors, voice specialists, and otolaryngologists should all act as safety valve to markedly reduce the number of teachers affected by voice disorders.

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