

Teachers' voice disorders collateral effects

Czynnościowe następstwa zaburzeń głosu u nauczycieli

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Wprowadzenie. Nauczanie jest uważane za duże obciążenie dla narządu głosu, który wymaga u nauczycieli odporności na długotrwałe używanie go i narażenie na niekorzystne czynniki środowiskowe. Ponadto większość nauczycieli nadużywa głosu, gdyż nie posiada technicznej kontroli nad wysiłkową fonacją.

Cel pracy. Praca ma na celu analizę problemów ubocznych związanych z zaburzeniami głosu u nauczycieli.

Materiał i metody. Badania przeprowadzone u 282 nauczycieli za pomocą trzech rodzajów ankiet w celu określenia: a) częstości występowania i charakteru zaburzeń głosu; b) psychospołecznych obciążeń związanych z zatrudnieniem; c) jakości życia związanej z głosem.

Wyniki. Zaburzenia głosu w chwili przeprowadzania badań zgłaszało 62,7% nauczycieli. W porównaniu z pedagogami nie mającymi problemów głosowych, wśród osób z dysfoniami przeważały kobiety-nauczycielki klas przedszkolnych; narażone one były na wyższy poziom hałasu w klasach, większą wagę musiały również przykładać do braku dyscypliny uczniów. Osoby te wykazywały wolniejszą regenerację głosu, zwiększoną absencję w pracy oraz zwiększone zapotrzebowanie na opiekę zdrowotną. Odnosząc się do uwarunkowań psychospołecznych, u osób tych występowały zwiększone wymagania w pracy i miały one mniejsze wynagrodzenie; w konsekwencji doświadczały istotnie większych skutków stresu, jak również gorzej oceniały swoją vitalność życiową i satysfakcję z pracy. Zaburzenia głosu miały również wpływ na podstawowe dziedziny związane z zależną od głosu jakością życia, co skutkowało niższą aktywnością w życiu społecznym.

Wnioski. Uboczne skutki zawodowych zaburzeń głosu u nauczycieli mają wpływ na ich socjalno-ekonomiczny poziom i jakość życia. Działania profilaktyczne i rehabilitacyjne powinny obejmować higienę głosu, naukę technik emisji głosu, strategie radzenia sobie ze stresem oraz poprawę warunków środowiskowych.

Słowa kluczowe: zawodowe choroby narządu głosu, występowanie, absencja chorobowa, skutki psychospołeczne

Introduction. Teaching is considered a most demanding task for voice since it requires a great resistance to stand prolonged use and environmental risk factors. Moreover most teachers make an abusive vocal use because they manage it without any technical control of their vocal strain.

Aim. This paper is aimed at analysing the collateral problems which are frequently associated to teachers' voice disorders.

Material and methods. 282 schoolteachers were surveyed by three types of questionnaires in order to assess: a) voice disorders prevalence and characteristics; b) psychosocial dimensions of employment; and c) voice-related quality of life.

Results. 62.7% teachers were currently experiencing voice disorders. Compared to those without voice problems dysphonic subjects were predominantly female teachers and worked in kindergarten levels; they experienced higher noise levels in their classrooms, and were more concerned about their pupils' indiscipline. They also showed a delayed vocal recovery, increased absenteeism, and more health services demands. Regarding psychosocial conditions they experienced increased work demands and decreased compensations; consequently they further evidenced significantly more stress effects as well as poorer perceptions of health, vitality and job satisfaction. Voice disorders also showed an impact on several functional and critical domains of health-related quality of life, all of which resulted in lower activity and social participation.

Conclusions. Collateral effects of teachers' occupational voice disorders encompass the physiological and psychosocial dimensions, together with an impact on socioeconomic levels and teachers' quality of life. Preventive and assistive measures should include vocal hygiene, vocal technique, stress coping strategies and improvement of environmental conditions.

Key words: occupational voice diseases, prevalence, absenteeism, psychosocial effects

Voice is a spontaneous feature of human personality and feelings, it is one of the pathways through which emotions are conveyed; it serves so an important function of regulating social communication and interactions [1]. Voice cues such as pitch, intensity and timbre, as well as speech rate or pauses play a primary role in transmitting information about emotional aspects of communication [2]. Further, these vocal cues are very relevant for eliciting emotional responses in listeners [3].

A great deal of recent research about health problems has moved from a traditional biomedical model toward a biopsychosocial model of health and disease [4]. As a result of these new perspectives, broad implications of emotions and stress have been found on vocal disorders [1]. Central nervous system together with autonomic nervous system interact to induce adaptive biological and social behaviour to environmental changes. These mechanisms are responsible for regulating vocal responses to emotions and stress through pathways such as muscle tension, blood supply and mucous secretion [5]. As far as stress is an emotional manifestation that affects the physiological and motor mechanisms of vocal performance [6], laryngeal and vocal tract tension is an inherent part of the stress reactivity [7]. Stress has proved to produce a narrowing of voice, with pharyngeal constriction, elevation of larynx, and a raise of acute frequencies in the vocal spectrum [8]. It is then a commonplace to state the obvious relationship between emotion and voicing, between stress and voicing [9].

When voice is used as a professional tool, not only emotions are conveyed through it, but also livelihood and professional achievements are dependent on it. So, in the work context vocal acoustic features must be adjusted not only to communicational intentions but also to external requirements such as physical environment and psychosocial conditions of employment.

Teaching is considered among the most demanding tasks for voice [10], and it requires a great dose of resistance to stand prolonged use, frequently in adverse external circumstances that make it strained [11]. When job circumstances are demanding it is frequently the teacher the one who must adapt his/her phonatory pattern to external requirements such as size of the working place, type of audience, background noise, or duration of speaking time. Teachers also need coping with quality of air and other contextual factors which may affect their voice health [12]. According to Nofer Institute of Occupational Medicine in Łódź 70% Polish teachers suffer during their career different forms of temporary or permanent voice problems, and dysphonia has been reported to be 68.2% in female teachers [12].

Additionally to occupational risk factors, most teachers expose their voice to an abusive use because they manage it spontaneously, without any technical control of their vocal wear or strain. If professional voice is managed in such a spontaneous non-trained way, the natural process of constraining the air against the impedance of larynx and supraglottal cavities is done with excessive muscular tension. Emotional states may thus have a considerable effect on the way teachers use their larynx, vocal tract and air supply. When stress interferes with vocal performance, the lack of vocal training is reflected on voice acoustic features, posture and mimic because these are very precise emotion indicators

[6]. In a previous study [13] significantly greater scores in the Emotional Exhaustion scale of the Maslach Burnout Inventory were found in those teachers who referred either a very loud voice ($p < .01$) and/or much neck and shoulders muscle tension ($p < .001$) during their teaching tasks.

Now we present this paper to analyse the links between teachers' voice disorders and other collateral problems which are frequently associated. These data belong to a larger cross-sectional work which was performed in Malaga city (Spain) to further analyze schoolteachers' vocal use pattern, their vocal risk factors and voice disorders prevalence [14-16].

SUBJECTS AND MATERIAL

Two hundred eighty two Kindergarten and Elementary schoolteachers were surveyed by use of three types of questionnaires. The Occupational Voice Profile (OVP) questionnaire [15] was made up on the basis of literature [17] and clinical experience to assess professional voice use in school teachers. To study psychosocial conditions ISTAS-21 [18] was employed, which is an adapted Spanish version of the Copenhagen Psychosocial Questionnaire (CoPsoQ) [19]; it addresses four dimensions of employment risk factors, and also includes health scales and several measures of the stress profile. In third place we used the Voice Activity and Participation Profile (VAPP) [20], which was designed in response to the 1999 World Health Organization's revised ICIDH-2 Beta 2 [<http://www.who.int/icidh>] to encompass activity limitation and participation restriction scores in the measurement of five dimensions of vocal-health-related quality of life; so it scores the impact of vocal problems on daily, social, and job communication, self-perception of voice, and emotions.

RESULTS AND DISCUSSION

Among the studied 282 teachers, 74.6% were women ($n=200$) and 25.4% men ($n=82$) (Table I). Regarding their teaching level 46.2% subjects ($n=120$) worked in Kindergarten. Noise levels were low for only 26.4% ($n=57$) teachers, moderate for 51.4% ($n=111$) and high for 22.2% ($n=48$); being these noise levels above those found in another Spanish population of teachers [21].

When asked whether they perceived vocal effort and/or voice complaints during their working hours, most teachers (95%, $n=268$) answered positively to any of these variables. To analyse voice disorders prevalence we proceeded similarly to previous studies criteria [22,23], and so in this work a voice disorder was established whenever a subject referred perceiving vocal effort to teach plus more than two frequent voice complaints at the end of their working day. As a result of this we found that 62.7% teachers ($n=168$) were currently experiencing voice disorders, whereas 37.3% ($n=100$) subjects did not referred either vocal effort or voice complaints; the former were denominated Unhealthy Voice Teachers (UVT) and the latter Healthy Voice Teachers (HVT).

Voice problems in this work resulted more prevalent among female subjects ($p < .01$) and kindergarten teachers ($p < .001$). Noise levels were also related to teachers' voice

Table I. Variables significantly associated to Unhealthy Voice Teachers (UVT), compared with Healthy Voice Teachers (HVT) [χ^2 : Pearson's squared chi value; df: degrees of freedom; p: significance]

Variables	Teachers		Associations to UVT			
	HVT	UVT	χ^2	df	p	
	% (n)	% (n)				
Gender	Male	51.5 (35)	48.5 (33)	7.808	1	.005
	Female	32.5 (65)	67.5 (135)			
Grade	Kindergarten	25.8 (31)	74.2 (89)	12.545	1	.000
Background noise levels	Low	52.6 (30)	47.4 (27)	9.648	2	.008
	Moderate	39.6 (44)	60.4 (67)			
	High	22.9 (11)	77.1 (37)			
Time required to reduce vocal symptoms	½ day break	38.4 (38)	61.6 (61)	25.752	2	.000
	Two days break	11.1 (8)	88.9 (64)			
	Holiday	5.3 (2)	94.7 (36)			
Dysphonia episodes duration	One week	35.5 (33)	64.5 (60)	22.568	2	.000
	2-3 weeks	9.6 (5)	90.4 (47)			
	> 4 weeks	2.8 (1)	97.2 (35)			
Socioeconomic components of voice disorders	Sick leaves	5.0 (5)	16.7 (28)	8.622	2	.013
	Medical consultations	24.7 (37)	75.3 (113)	23.792	2	.000
	Vocal therapy	20.3 (14)	79.7 (55)	12.000	1	.000
Interaction with pupils	Indiscipline	17.7 (20)	82.3 (93)	32.136	1	.000

disorders ($p < .01$) independently of gender and age; all of which is in agreement with other authors' findings [12, 24-27].

Consequences of voice disorders in teachers

Regarding the possible consequences of vocal problems, we found three large categories of collateral factors which resulted associated to teachers' voice disorders, e.g. physiological, socioeconomic, and psychosocial conditions of work. Nonetheless it should be kept in mind that no causality can be implied in this point based on this cross-sectional study since this type of epidemiologic methodology is aimed at pointing out the relationships among variables, not their possible cause-effect interactions.

Physiological conditions associated to teachers with voice problems

In this study almost half of subjects with voice complaints (47.1%, $n=100$) required a break of 10-12 hours to alleviate voice complaints, whereas the rest (52.6%, $n=110$) needed more than two days (or even a holiday period). Regarding the average duration of their voice problems 51.4% subjects ($n=99$) referred less than two weeks, and the remaining 48.6% teachers ($n=88$) required more than two weeks. Both of these physiologic variables about vocal recovery were found to be significantly increased in UVT compared with HVT (Table I). As far as slow healing can be a consequence of sustained stress [28], and delayed laryngeal recovery is a mechanism that connects acute and chronic voice disorders [1], it can be suggested from these data that a rough half of UVT are prone to short and frequent voice problems, whereas a bit more than a half of them experience longer and even chronic vocal problems. Once dysphonia is permanent it

can affect daily life and can interfere with professional demands; the teacher may then react emotionally to vocal dysfunction and generate a vicious circle [29]. The tendency of voice problems to be chronic seems to depend on the individual's pattern of reactivity to stress and also on the perceived intensity of stress [8].

Socioeconomic components associated to teachers' voice disorders

Absenteeism due to laryngeal problems was significantly increased ($p < .05$) among UVT compared to HVT (Table I), as it was also found by other authors [30]. Nevertheless it was unexpected to find that only 16.7% UVT had missed workdays due to a voice problem during the previous year. This low amount of sick leaves may be due to the fact that UVT refrain from taking sick leaves until the problem is severe enough as to prevent them from teaching.

Health services demands increased among UVT compared to HVT ($p < .001$) (Table I) which is in agreement with other surveys [30]. However it is noteworthy that among UVT ($n=168$) there were just 68.1% ($n=113$) of medical consultations, whereas 31.9% UVT ($n=55$) did not seek for any medical assistance despite their current voice problems. Morton and cols. [31] also found that teachers are reluctant to seek medical care. This event may resemble either a lack of self-consciousness about the importance of vocal complaints as alerting signs, or an assumption that vocal problems are "inherent" to the teaching job and consequently they cannot be avoided. Both attitudes deserve further analyses and should be modified in order to make preventive measures really effective.

Voice therapy demands were also significantly higher among those with voice problems ($p < .001$) compared to the HVT (Table I). In this regard, data analysis revealed that only a minority of UVT (33.5%, $n=57$) received vocal

therapy, whereas a majority of them (66.5%, n=111) did not have any type of treatment. These results are again indicating that teachers are not very prone to seek vocal care; it also may be that practitioners and patients delay treatment until the vocal problem is quite severe. Treatment percentages are even lower than those of medical consultations, thus resembling that this type of treatment is insufficiently prescribed as a first line measure. It seems then that voice disorders remain poorly understood and poorly managed by healthcare professionals [32]. Furthermore though vocal therapy has proved its efficacy in solving and preventing worsening of professional voice disorders [33], this therapeutic approach is nonetheless underestimated. In any case the actual reasons for this underuse of vocal therapy should be investigated in depth.

Psychosocial factors associated to teachers' voice disorders

Three large categories of psychosocial conditions were found to be affected in teachers with voice disorders, mainly their interaction with pupils, psychosocial factors of employment, and quality of life.

Teacher-pupils' interactions

Daily work in the classroom may become a stressful task in case of pupils' disruptive behaviour and lack of time to achieve objectives [34]. In agreement with others' findings [35-36], in this study pupils' indiscipline was also found to be one of the factors which were significantly increased among UVT compared to HVT ($p < .001$). A teacher's hoarse voice has proved to influence children's learning abilities due to the extra auditory effort they must exert [37,38]. It is believed that this auditory effort overloads pupils' cognitive abilities (e.g. processing of speech, auditory memory, attention span) earlier than in circumstances where teachers' voice is good quality. Several vocal factors such as glottal noise components and lower sonority have been advocated for this effect. Additionally, teacher's dysphonic voice and inappropriate prosodic curves can decrease pupils' motivation [35,36,38-40]. On the other hand teachers with voice disorders have proved to reduce their speaking time, resulting then that interaction with pupils is downsized [41,22]. As far as the contrary could also be true, and disruptive children can increase their teacher's stress and vocal effort, it should be thus interesting to assess these reciprocal relations comprehensively; probably those measures to improve teachers' voice use may also benefit pupils' discipline and vice versa.

Psychosocial factors of employment

Present results indicate that voice disorders interact with work psychosocial dimensions to increase stress in the work place (Tables II and III). In occupational health research the measurement of potentially stressful situations (called organizational factors or psychosocial exposure indicators) has been separated from the evaluation of their effects on health (called stress symptoms or stress in general). In this study UVT were exposed to worse job organizational conditions than HVT, as it is following described. When comparing UVT to HVT regarding work psychological demands (Table I), the former showed to be more emotionally concerned ($p < .05$); UVT needed to pay more attention to work ($p < .01$); and they perceived

having both less control on the distribution of their time at work ($p < .01$) and a minor influence on the type of tasks which was assigned to them ($p < .05$). These data are understandable since teachers' work is addressed to persons such as pupils and their families, with high emotional involvement; therefore a vocal problem can limit their responsiveness to work emotional demands [13]. Additionally it seems that UVT require more time than HVT to achieve their work, and may also feel unable of doing certain kinds of tasks because of their needs to repeat and to rest their voice. Due to this lack of control on work, UVT can experience an imbalanced demand-control model of employment [42], and consequently they can find diminished opportunities to develop their own professional abilities as well as to achieve an active or creative participation in their tasks.

Regarding work reward factors, UVT evidenced lower social support than HVT since they felt less listened to by their peers and superiors ($p < .05$), and it was more frequent for them to think their superiors were inefficient managing conflicts properly ($p < .05$). Teachers with voice disorders further showed a deficit of work compensations in that they felt their role and tasks being more controversial ($p < .05$) or ambiguous ($p < .01$) than HVT did; they perceived a significantly reduced predictability ($p < .01$) because they referred having neither enough information nor time to adapt to work changes; they showed less stability and were more worried about unexpected timetable changes ($p < .05$); and finally UVT also felt deserving more recognition ($p < .05$) and more support ($p < .01$) in difficult times (lower esteem and recognition dimensions). There is scientific evidence about the relevant contribution of increased work demands and decreased compensations to occupational health problems [43]. Occurrence of the above mentioned factors demonstrates a combination of high effort and low benefit which can be ensued by psychosomatic manifestations (Table III). In fact UVT showed significantly more stress effects than HVT since they evidenced poorer perceptions of general health ($p < .05$) and mental health ($p < .01$); lower vitality ($p < .05$); and more reduced job satisfaction ($p < .01$). Additionally UVT referred increased stress symptoms at different levels such as the behavioural ($p < .05$), somatic ($p < .05$), and cognitive dimensions ($p < .01$).

Quality of life

In this study as well as in others [44,20] UVT showed an impact on several functional and critical domains of health-related quality of life (QOL). The emphasis on quality of life (QOL) is consistent with a view of health and disease that goes beyond physical impairment to include mental state and social functioning [10]. Information on how voice disorders impact the daily functional activities of teachers is helpful to promote occupational health and to plan preventive measures in accordance to what domains of teachers' life are being affected. Teachers with occupational voice disorders obtained significantly higher medians than HVT (Wilcoxon's $p < .0001$) in the VAPP total score as well as in the activity limitation and the participation restriction measures (Table IV). Teachers with voice disorders further showed significant differences with HVT regarding the other voice-related QOL dimensions: they had a worse perception of their voice; they evidenced more emotional consequences of their vocal problems,

Table II. Psychosocial exposure indicators which were significantly related to teachers with voice disorders (UVT) compared to teachers without voice disorders (HVT) [X^2 : Pearson's squared chi value; df: degrees of freedom; p: significance]

ISTAS-21 Psychosocial Dimensions	Specific items or scales associated to UVT	% UVT	% HVT	X^2	df	p
Sensorial demands	They need to pay constant attention to work	67.1%	44.9%	15.920	4	.003
Emotional demands	They never can leave job problems behind	37.9%	25.5%	10.241	4	.037
	They always perceive job as emotionally devastating	63.6%	43.9%	12.407	4	.015
	They always feel situations as emotionally exhausting	55.1%	32.9%	14.868	4	.005
Control on work time	They never can leave their work place momentarily	6.2%	14%	11.487	3	.009
Influence at work	Their opinion is never taken into account when tasks are being assigned to them	39.8%	58.2%	12.360	4	.015
Role conflict	They always perceive their tasks as contradictory or ambiguous	9.1%	7%	12.888	4	.012
	They think tasks are always done incorrectly	25.6%	13.2%	10.801	4	.029
Role clarity	They always feel uncertain about their role at work	35.6%	59.6%	14.610	3	.002
Predictability	They can always foresee their tasks and get enough information and time to adapt to work	49.7%	60%	12.397	4	.015
Social support	They think their colleagues always listen to them when problems arise at work	25.2%	42.3%	13.259	4	.010
	They think their superiors always listen to them when problems arise at work	25.8%	45.9%	13.746	4	.008
	They always perceive their supervisors' support	49.7%	72.7%	15.517	4	.004
Quality of leadership	They think superiors never solve conflicts properly	9.8%	–	10.141	4	.038
Work insecurity	They are worried about unexpected changes in their schedule	14%	7.1%	11.088	4	.026
Esteem	They are aware of their superiors' recognition	12.6%	30.5%	12.859	4	.012
	They perceive support in controversial situations	15.4%	31.6%	14.845	4	.005

Table III. Psychosocial effects indicators which were significantly related to teachers with voice disorders (UVT) compared to teachers without voice disorders (HVT) [X^2 : Pearson's squared chi value; df: degrees of freedom; p: significance]

Psychosomatic effects dimensions	Specific scales associated to UVT	% UVT	% HVT	X^2	df	p
General Health	General health is valued as bad or not so good	16.1%	8.1%	11.936	4	.018
	Feel they can get sick easily	6.8%	3.1%	18.386	4	.001
	Feel they are not as healthy as anyone else	9.7%	5.1%	18.325	4	.001
	Value their health as excellent	59.4%	65%	13.144	4	.011
Mental Health	Feel nervous (frequently/always)	43%	27.3%	32.528	5	.000
	Feel in poor spirits (frequently/always)	2.4%	1%	18.278	5	.003
	Feel calm (frequently/always)	35.7%	62%	25.086	6	.000
	Feel downhearted or sad (frequently/always)	11%	8.1%	18.030	4	.001
Vitality	Feel lively (frequently/always)	16.3%	30.3%	11.698	5	.039
	Feel energetic (frequently/always)	39%	47.5%	15.838	5	.007
	Feel exhausted (frequently/always)	35.4%	18.1%	16.682	5	.005
	Feel tired (frequently/always)	8.1%	6.1%	19.899	5	.001
Behavioural Stress Symptoms	Prefer to be left alone (frequently/always)	10.2%	1%	22.206	4	.000
	Sleep uneasily (frequently/always)	18.1%	9.1%	9.823	4	.044
	Feel irritable (frequently)	21.1%	7.1%	18.928	3	.000
	Feel overloaded (frequently)	27.4%	8.1%	19.433	3	.000
Somatic Stress Symptoms	Chest tightness (frequently)	6%	2%	8.993	3	.029
	Short of breath (frequently)	4.2%	–	12.234	3	.007
	Muscular tension (frequently/always)	21.6%	6.1%	28.157	4	.000
	Headache (frequently)	50.6%	28.3%	25.589	4	.000
Cognitive Stress Symptoms	Difficulties to concentrate (frequently)	10.3%	2%	17.973	3	.000
	Difficulties to take decisions (frequently/always)	10.2%	3.1%	13.744	4	.008
	Difficulties to think clearly (frequently)	12.2%	4%	15.049	3	.002
Job Satisfaction	Disapprove environmental conditions (noise, ventilation, temperatur)	29.5%	12.1%	14.600	4	.006

more communication difficulties in their job, greater limitations in social communication, and higher scores in daily communication pitfalls. The distribution of responses for every one of these VAPP variables did not follow a normal distribution, which is probably due to the fact that the impact of a health disorder on quality of life is not only dependent on the physical impairment, but also on how the individual perceives and adjusts to the problem [45], therefore there was a great variability in both UVT and HVT perceptions regarding their QOL.

CONCLUSIONS

These data evidence the importance of facing teachers' voice problems from interdisciplinary and multidimensional perspectives. Preventive and assistive measures should include vocal hygiene information and vocal technique training, together with stress coping strategies and improvement of environmental factors such as acoustics. As far as health is considered a multidimensional system resulting from physical, mental and social facets of life, it should be advocated that the multifactor variety of risk factors involved in teachers' work are included in the treatment and prevention of teachers' occupational voice disorders.

It is also necessary to improve teachers' preventive culture and their self consciousness about vocal problems so that they start considering their vocal health a preventive objective, instead of assuming voice disorders as inevitable consequences of their job or eventual diseases to be treated.

Teachers get stressed when they feel that job demands are higher than their ability to cope with them. In sum, stress at the work place is dependant upon the organization and design of tasks as well as on the individuals' physical and psychological resources; therefore stress prevention

Table IV. Teachers' voice disorders impact on quality of life related variables

VAPP subscales	Teachers' voice quality	Median	Interquartile Range	Wilcoxon's p
Total Score	Healthy	8.5	22.25	.0000
	Unhealthy	54	85.75	.0000
Activity Limitation	Healthy	1	3.63	.0000
	Unhealthy	8	10	.0000
Participation Restriction	Healthy	0	1.5	.0000
	Unhealthy	2	8.75	.0000
Self-Perception of voice problem	Healthy	0.50	2	.0000
	Unhealthy	4	4	.0000
Job	Healthy	1	4	.0000
	Unhealthy	9	11.75	.0000
Daily Communication	Healthy	3	8	.0000
	Unhealthy	22	40.25	.0000
Social Communication	Healthy	0	2	.0000
	Unhealthy	5	11.75	.0000
Emotions	Healthy	0	3.50	.0000
	Unhealthy	10.75	21.13	.0000

must rely basically on the improvement of these work psychosocial factors [46]. It is then important that also stress factors are recognized in the origin of voice symptoms and addressed in the voice therapy management of professional voice users; teachers should learn to manage both stress and vocal technique at an efficient level to avoid overactivation, exhaustion or phonastenia. This approach must result in teachers being able of standing long-term and intensive vocal use, and probably discipline and social interaction with pupils would be enhanced as a consequence of better vocal strategies [9].

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