

Comparison of teachers' and vocalists' awareness of voice functioning, voice emission therapy and physiotherapy

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Abstract

Introduction

Voice seems to us inalienable, although the lack of proper voice hygiene can result in that we may be excluded from professional activity for a long time or even completely. Therefore, it was decided to check voice functioning awareness of people who professionally speak or sing.

Material and methods

The research was based on a survey on a sample of 135 people from the target group. The form consisted of 28 items, including detailed questions about the type and degree of occupational exposure to voice effort, as well as the level of physical activity, occurrence of possible disorders, addiction to stimulants such as cigarettes or alcohol, and questions regarding participation in classes of correct voice emission, awareness of the existence of physiotherapeutic assistance in the field of voice rehabilitation and many others.

Results

The results presented and discussed in detail include the analysis of answers to questions posed in the survey, as well as the results of the Voice Handicap Index test in the group of teachers and vocalists.

Conclusions

Significant differences in awareness of voice functioning between teachers and vocalists were noticed. It can be stated that among teachers the deteriorating voice correlates with the increase in age. On the other hand, among vocalists, the level of perceived voice fatigue remains relatively constant while aging. Teachers who participated in the study show significantly less awareness of the principles of proper voice emission and hygiene than vocalists, as demonstrated by the Voice Handicap Index.

Key words: voice, disorder, VHI, voice emission, teachers, vocalists, physiotherapy, rehabilitation

INTRODUCTION

The correct sound of the voice can be defined mainly as no disturbances in the structure of the larynx, a properly functioning nervous system, appropriate vocal technique and a balanced emotional state. The correct emission consists of the right way of breathing, phonation and articulation, as well as their mutual coordination and proper functioning of resonance spaces. According to Gundermann, the most important factor predisposing to the occurrence of occupational voice diseases is most often the faulty emission technique [1].

The voice seems to us almost inalienable, whereas the lack of proper hygiene can mean that we will be excluded from professional activity for a long time or even completely [2], so it was decided to check the awareness of professionally speaking and singing people.

In Iowa and Utah, 1,243 teachers and 1,288 non-teachers were interviewed by phone using a voice disorder questionnaire to determine the extent to which teachers are more vulnerable to voice disorder. The frequency of reporting a voice problem was significantly higher for teachers compared to nonteachers (11.0% vs. 6.2%, $\chi^2(1) = 18.2$, $p < 0.001$). The results indicated that being a teacher and a woman between 40 and 59 years of age, having 16 or more years of education, and a family history of voice disorders were positively related to the experience of voice disorders in the past. These results support the view that teaching is a high-risk occupation for voice disorders [3].

However, studies conducted in Italy in 2009 show that about 23% of school counselors were forced to temporarily stop work due to problems with their voice system, and about 5.5% lost their jobs due to the above [4].

One of the main professional group that is exposed to disturbances in voice emission are academic teachers, whose average didactic load per year is about 240 hours, and in the process of teacher training at universities the voice emission program is usually lasts up to 15-30 hours. It is mainly only theoretical education, and classes are subjects of choice, which does not seem to coincide with the assumptions of the effect of education in a given field.

Conducting qualification tests of candidates burdened with excessive vocal effort seems to be of high importance. Such tests are aimed at verifying the condition and the potential of the voice, as well as selecting people who have contraindications and should not practice a profession based on voice work. These contraindications are divided into [5]:

a) relative: recurrent airway inflammation, recurrent palatine tonsillitis, unilateral deafness. They can often be removed by ENT (ear, nose and throat specialist) intervention or surgery.

b) absolute: paralysis of the recurrent laryngeal nerve, laryngeal papillomas, vocal fold nodules and polyps, advanced inflammatory changes of the respiratory tract, severe allergic diseases, palatineopharyngeal insufficiency, moderate or profound hearing loss.

In studies conducted on a group of over 2,000 people in 2016, it was proved that voice problems depend mainly on age. Dysphonia was most common problem in the group of adult women, while nodules and cysts in children, functional dysphonia and reflux in adults, and presbyphonia and Reinki's edema among the elderly [6].

It is possible to rehabilitate voice when its dysfunctions appear, such as, for example, tension in the supra- and supra-supernural muscles, chronic fatigue, airy and almost inaudible voice and pain. The therapeutic process uses kinesitherapy, massage, manual therapy, mainly on hyoid bone, physical therapy (e.g. ionophoresis, electrostimulation, inhalation or magnetic field), as well as a number of unconventional techniques [7, 8, 9, 10].

Already at the prevention stage, in the process of rehabilitation of the voice organ, special attention should be paid to maintaining proper body posture. The load on the cervical spine and tension arising within the peri-clavicular muscles, most often as a result of protraction shoulder position and forward head posture (FHP) abnormal in relation to physiological, result in dysfunction of the vocal apparatus and pain within it, and all due to the wrong position during everyday activities, exercising, or using a mobile phone, computer etc. [11]. The head weighs about 5 kg and when one tilts it, the load increases – a 45-60-degree tilt forward causes muscles on the dorsal side of the neck counterbalance the load of almost 20-30 kg, which in the long term is dangerous for the entire biomechanical system of the body.

MATERIALS AND METHODS

The subject research was based on a survey conducted on a sample of 135 people from the target group. The form consisted of 28 questions, including detailed questions about the type and degree of occupational exposure to voice effort, as well as the level of physical activity, occurrence of possible disorders, addiction to stimulants such as cigarettes or alcohol, or questions regarding participation in classes with correct voice emission, awareness of the existence of physiotherapeutic assistance in the field of voice rehabilitation. Answers were also given to questions about the assessment of workplace conditions, such as climatic factors, noise and lighting, questions about the occurrence of subjective symptoms in the morning and / or after vocal effort, such as: hoarseness, voice fatigue, loss of voice, sore throat, feeling dryness, throat and larynx obstruction, tension, burning, scratching. The questionnaire also related to other diseases and ailments that may affect proper voice emission (e.g. temporomandibular joint dysfunction, previous larynx procedures). The final part of the survey consisted of questions allowing to determine the Voice Handicap Index (VHI) on the Voice Disability Scale. It is a scale consisting of three groups of questions regarding physical, emotional and functional state assessed on a quantitative scale of 0-4, allowing to recognize the causes of voice dysfunction. VHI is sometimes used by medical professionals to monitor the progress of the therapeutic process. The exploratory analysis was carried out using statistics and artificial intelligence methods (rough sets).

RESULTS

135 people participated in the study. The average age of respondents was 32 years (+/- 10 years). Women constituted 79% of the total. The vocalists constituted 50%, the teachers 36% of the respondents, and the rest were both vocalists and teachers. The survey shows that the most numerous group of respondents were vocalists with 5-15 years of experience (54 people), working up to 20 hours per week of voice effort (58 people) and teachers having 20 to 30 hours of voice effort per week (33 people).

Table 1. Professional characteristics of the research group.

Number of people	Occupation
42	Elementary School Teacher
14	High School Teacher
15	University Teacher
85	Vocalist

Source: Own study.

The analysis of the survey shows that over 60% of the surveyed teachers and twice less, that is 32% of vocalists, declare that they do not do sports regularly (Fig. 2). Almost 30% of the surveyed vocalists are physically active 2-3 times a week. The vocalists showed a higher level of activity in the study than teachers.

Slightly more than half of the vocalists (52%) declare that they do not use any specific vocal techniques. When asked about an infection or similar illness that has occurred in the last two years and has excluded respondents from work, 34% of teachers and 63% of vocalists report their incidence. 32% of teachers and 21% of vocalists said that they were not aware of the possibility of rehabilitating the voice organ by working with a physiotherapist. 12% of teachers and 25% of vocalists used the support of a physiotherapist in the field of rehabilitation of the voice apparatus.

The following voice issues were reported by the respondents:

- Morning hoarseness: it occurs for 37% of vocalists and for 10% of teachers.
- Tiredness of voice among teachers does not occur in fewer than 50%, while 53% of vocalists complain of fatigued voice after voice effort.
- Loss of voice occurred among 26% of teachers and 25% of vocalists.
- Sore throat occurs for just over half of teachers, and for fewer than 30% of vocalists.
- A feeling of dry throat occurs among 75% of teachers and 65% of vocalists (in the morning among 12% of teachers and 37% of vocalists).
- Noodle feeling in the throat does never occur among 66% of vocalists and 8 percentage points more of teachers (74%).
- There is no pain associated with voice apparatus among 85% of vocalists and 66% of teachers.
- 44% of vocalists and 26% of teachers report feeling tense in the area of voice apparatus.
- A burning sensation occurs among 13% of vocalists and 28% of teachers.
- Scratching occurs among 64% of teachers while only among 26% of vocalists.

66% of teachers and 72% of vocalists surveyed indicated that they had at least one chronic disorder such as hearing defects, allergy/asthma, endocrine disorders etc.

Over 80% of respondents do not smoke, which is good information, considering the research conducted in 2017 by the Chief Sanitary Inspectorate in Poland, in which it was found that there were almost 25% of people addicted to tobacco in general population.

To the question about awareness of the rules of the correct voice emission, the answer "I did not participate and I do not know the rules" was provided by 46% of teachers and 1% of vocalists. The answers indicate that vocalists are a professional group that receive ongoing education in the field of voice emission and participate in courses or workshops devoted to this topic at least once every 2-3 years. It was also reported that such courses took place in schools or music centers, where vocalists were educated. 25% of vocalists say they do not use a specific vocal technique.

As for the teachers who participated in the study, they either did not take part in voice emission courses at all, or did it during classes conducted while studying at university which was the only such type of training in their career. Usually, the last contact of teachers with

voice emission techniques took place a long time ago, with some teachers even more than 30 years ago.

20% of teachers and 47% of vocalists conduct additional classes or participate in classes (outside work) using their voice.

8% of teachers surveyed and 37% of vocalists received the help of a doctor / physiotherapist / spa treatment due to voice emission disorders.

The average voice effort during the day among the surveyed teachers is 6 h (+/- 2 h), and during the week 32.6 h (+/- 18 h), among vocalists it was 5.7 h (+/- 2, 5 h), and 33 h during the week (+/- 18 h).

Over the past 2 years, infection, laryngitis or similar respiratory diseases have prevented 34% of teachers and nearly twice as many singers (63%) from working. This may indicate the frequency of effort in the work of vocalists. While teachers have a relatively constant level of voice load, vocalists must sing a concert lasting sometimes even several hours with breaks lasting several minutes where they often speak, so the voice does not rest. It is clear that experienced vocalists who have mastered the optimal vocal techniques tolerate vocal effort better than those who sing amateurly and without prior preparation.

The biggest differences among the complaints observed within the voice organ were: hoarseness occurring in the morning among teachers (10%), whereas it is as much as 37% among vocalists, sore throat among teachers occurs in 52%, while among vocalists it is 29%, dry throat mucous membrane in the morning occurs among 12% of teachers and 37% of vocalists, throat scratching occurs among 64% of teachers, while for vocalists it is only 26%.

In the study, 18% of teachers and 4% of vocalists showed medium or high voice disability in relation to the Voice Handicap Index (VHI) scale and among teachers this indicator was correlated with aging and specific chronic disorders. People with high VHI (VHI > 30), there was at least one coexisting disorder such as endocrine disorder, hearing disorder, allergy/asthma or obesity. The average indicator among teachers was 15.2 and among vocalists 11.7.

12% of teachers and 25% of vocalists used the support of a physiotherapist in the field of rehabilitation of the voice organ and 32% of teachers vs. 21% of vocalists surveyed are not aware of the possibility of working with a physiotherapist in the field of voice rehabilitation.

CONCLUSIONS

Significant differences in the awareness of voice functioning, emission and therapy were noticed between teachers and vocalists. It can be stated that among teachers the deteriorating voice correlates with the increase in age. On the other hand, among vocalists, the level of perceived voice fatigue remains relatively constant with aging. Teachers show significantly less awareness of the principles of proper voice emission and hygiene. Almost 20% of the surveyed teachers have little, medium or high voice disability as demonstrated by the Voice Handicap Index. The most negative effects of long-term improper voice use can be seen among retired teachers and most often these effects are periodic dysphonies or chronic pain and dry throat.

In the study, both with statistical methods and with the use of artificial intelligence methods, no significant connections were found between problems related to voice and factors that could seem to favor the occurrence of disorders within it, such as: addiction to tobacco or alcohol or well above average number of hours of voice effort during the day or week. As many as 32% of teachers and 21% of vocalists surveyed are not aware of voice physiotherapy.

REFERENCES

1. Gundermann H.: Die Berufsdysphonie. Thieme, Leipzig 1970.
2. Śliwińska-Kowalska M., Niebudek-Bogusz E., Fiszler M., i wsp.: "The prevalence and risk factors for occupational voice disorders in teachers". *Folia Phoniatica et Logopaedica* 2006, 58(2), pp. 85-101.
3. Roy N., Merrill R.M., Thibeault S. et al.: Prevalence of Voice Disorders in Teachers and the General Population, American Speech-Language-Hearing Association April 2004 Volume 47, Issue 2, pp. 281-293.
4. Angelillo I.F., Di Maio G., Costa G. et al.: "Prevalence of occupational voice disorders in teachers". *Journal of Preventive Medicine and Hygiene* 2009, Vol 50, No 1, pp. 26-32.
5. Pruszewicz A.: „Foniatria kliniczna”. PZWL, Warszawa 1992.
6. Garcia Martins H., Abrantesdo Amaral H., Mendes Tavares E. L.: Voice Disorders: "Etiology and Diagnosis". *Journal of Voice* 2016; Vol. 30(6), pp. 761.e1-761.e9.
7. Gębska M., Weber-Nowakowska K., Żyżniewska-Banaszak E.: „Zastosowanie techniki fonacyjno-oddechowo-artykulacyjnej – jako formy profilaktyki i rehabilitacji zaburzeń emisji głosu u nauczycieli”. *Hygeia Public Health* 2014, 49(2), pp. 209-214.
8. Gębska M., Wojciechowska A., Żyżniewska-Banaszak E.: „Zasady i metody rehabilitacji chorych z zawodowymi zaburzeniami głosu”. *Annales Academiae Medicae Stetinensis* 2011, 57(2), pp. 78-84.
9. Obrębowski A.: „Postępowanie lecznicze i rehabilitacyjne w chorobach narządu głosu u nauczycieli”. *Otolaryngologia* 2003, 2, 1.
10. Zalesska-Kręcicka, Kręcicki T, Wierzbicka E.: „Głos i jego zaburzenia. Zagadnienia higieny i emisji głosu”. *Polskie Towarzystwo Pedagogów Śpiewu*, Wrocław 2004.
11. Gilman M., Johns M. M.: "The Effect of Head Position and/or Stance on the Self-perception of Phonatory Effort". *Journal of Voice* 2017 Jan; 31(1), pp. 131.e1-131.e4.