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Economic consequences of functional voice disorders and possibilities of their prevention – overview

Ekonomske posledice funkcionalnih glasovnih motenj in možnosti njihovega preprečevanja – pregled

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Abstract

Voice disorders are common and can have a significant impact on quality of life and work ability. Although many voice disorders are not life threatening, they have significant societal implications. Voice disorders are particularly problematic for teachers, because of intense vocal demands. In some countries, voice disorders are recognized as an occupational disease in certain conditions. Voice disorders can also be a major burden for society and entail high costs and financial losses. There is a need for primary prevention among professions with a higher risk of developing voice disorders. For better illustration of the financial burden of voice disorders we have estimated direct medical costs for patients that were seeking help in tertiary care for functional voice disorders in the year 2017. The estimated healthcare costs (SFM) of voice disorders in year 2017 amounted to €273.249. Women caused 63.7% of healthcare costs; 51.6% of healthcare costs were attributable to outpatient healthcare , 39.3% to inpatient healthcare and the rest, 9.1%, to general practice healthcare costs. From 1 January 2017 to 31 December 2017, there were 3052 medical sessions performed at the Department of Otorhinolaryngology and Cervicofacial Surgery of the University Medical Centre Ljubljana; 12.1% of those were general ENT examinations and 51.7% phoniatric examinations. Another 21.6% were sessions in voice therapy and 14.6% sessions in psychological therapy. Our estimation of voice-disorders-related healthcare costs is only partial. For a comprehensive economic burden assessment, an estimation of the costs of drugs, indirect costs and lost productivity costs should also be taken into account. Voice has an important role in work ability. Voice disorders negatively affect work productivity and quality of life. Functional voice disorders result from behavioural misuse or overuse, so they can be prevented. In our opinion, prevention programs of vocal hygiene and vocal techniques, especially among professions with high vocal demands, could lower the healthcare costs.

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Izvleček

Glasovne motnje (GM) so pogoste in imajo lahko velik vpliv na kakovost življenja in delovno zmožnost. Čeprav veliko glasovnih motenj ne predstavlja nevarnosti za življenje, pa imajo velike družbene posledice. Najbolj problematične so glasovne motnje za učitelje, ki se soočajo z velikimi glasovnimi obremenitvami. V nekaterih državah so priznane kot poklicna bolezen. Glasovne motnje so lahko tudi veliko breme za celotno družbo. Z njimi so povezani veliki stroški in ekonomska izguba. Kažejo se potrebe po primarni preventivi v poklicih z višjo stopnjo tveganja za nastanek glasovnih motenj. Za ilustracijo obsega ekonomskega bremena glasovnih motenj smo ocenili neposredne stroške zdravljenja oseb, ki so v letu 2017 poiskale pomoč v terciarni ustanovi zaradi funkcionalnih GM in njihovih posledic. Stroški glasovnih motenj (SFM) so v letu 2017 znašali 273.249 €. Kar 63,7 % vseh stroškov glasovnih motenj so ustvarile ženske. Več kot polovica stroškov, 51,6 %, so stroški specialistične zunajbolnišnične zdravstvene dejavnosti, 39,3 % so stroški bolnišnične zdravstvene dejavnosti, preostalih 9,1 % pa zajemajo stroške splošne zunajbolnišnične dejavnosti. Na Kliniki za otorinolaringologijo in cervikofacialno kirurgijo v Univerzitetnem kliničnem centru Ljubljana je bilo med 1. 1. 2017 in 31. 12. 2017 izvedenih 3.052 obravnav, od tega 12,1 % v splošni otorinolaringološki ambulanti, 51,7 % v foniatrični, 21,6 % v kliničnologopedski in 14,6 % v kliničnopsihološki ambulanti. Rezultati pomenijo le del ocene stroškov, ki so posledica zdravljenja glasovnih motenj. Za celovito oceno bremena bi bilo smiselno oceniti tudi stroške zdravil, posredne zdravstvene stroške ter stroške zaradi zmanjšane in izgubljene produktivnosti. Glas igra pomembno vlogo pri zmožnosti opravljanja poklica. Glasovne motnje negativno vplivajo na delovno produktivnost in kakovost življenja. Vzrok funkcionalnih GM je napačna ali čezmerna raba glasu, zato bi jih torej lahko preprečili. Menimo, da bi s preventivnimi programi glasovne higiene in vokalne tehnike, predvsem pri osebah, ki so glasovno obremenjene na delovnem mestu, te stroške bistveno zmanjšali.

1 Introduction

Voice disorder is any negative change in voice that can be detected by hearing. Voice disorders are divided into organic and functional. With organic voice disorders we can detect a structural impairment that causes hoarseness during an otorhinolaryngological examination. Functional voice disorders are those caused by overuse, wrong use or even abuse of apparently anatomically and functionally normal vocal apparatus. Organic voice disorders and functional voice disorders are tightly connected. Functional voice disorders can result in an organic alteration in the throat. Any organic alteration to the vocal chords that disturbs their normal movement results in compensation manoeuvres of the apparatus of phonation, which is a functional disorder (1).

1.1 Voice disorders in professional voice users

By conservative estimates 25% or even more professionally active people list their voice as one of the key elements for performing their job (2). Studies from the US show that 49–53% of patients seeking medical help because of voice disorders state that voice disorders have a negative effect on their work performance (3). Approximately 7.2% of the population are absent from work for one day or more per year because of voice disorders (3-5). Voice disorders affect work satisfaction, the quality of work performed and workplace presence (4). People suffering from dysphonia more frequently change or consider changing jobs than those not suffering from dysphonia (4). The general impact of voice disorders on the quality of life is the same as with chronic diseases, such as sciatic nerve irritation, sinusitis, chronic heart failure and chronic obstructive pulmonary disease (COPD) (4).

The most frequent professions in which disorders of the voice occur are teachers, singers, social workers, solicitors, priests, actors, aerobics instructors, telesales agents, bidders and military personnel (2,6-8). We refer to them as professional voice users or elite voice users (singers, actors) (9). Possible factors for voice disorders in the scope of their career are the nature of their work and a lack of knowledge on the proper care for their voice (vocal hygiene) and a lack of training in voice technique (10).

The most frequent voice disorders in professional voice users are benign changes to the vocal chords, laryngitis, oedema and functional voice disorders that have not yet caused an organic change in the throat. Some organic changes are the result of functional voice disorders, namely nodules, polyps, cysts, Reinke's oedema, vocal cord haemorrhage and granuloma (11). All functional voice disorders manifest an abnormal, generally enlarged tension of the throat muscles with poorly coordinated interaction.

1.2 Voice disorder – Occupational disease

European Union recommendations place voice disorders on the list of occupational diseases (12). The Official Gazette of the Republic of Slovenia does not list voice disorders among occupational diseases (13,14). In Poland, where voice disorders are recognized as an occupational disease, their share amounted to 1.9% in 1977, while in 2003 they reached 25% of all reported occupational diseases in the country (15). Voice disorders are also a recognized occupational disease in France, Russia (13) and Israel, where they represent 9.8% of all occupational diseases (16).

1.3 Economic consequences of voice disorders

Voice disorders can be a major burden for the society. Therapy, impact on the quality of life, and reduced ability to perform work do not only represent a burden on the individual, but on the whole society (3,17). Voice disorder therapy and reduced and lost productivity from voice disorders also contribute to high costs and economic loss (2,13,18).

A traditional analysis of the costs of the burden of functional voice disorders shows the financial burden by evaluating total costs that can be attributed to a functional voice disorder. These costs in monetary units are used to assess the impact of the financial problem that functional voice disorders have on society. This monetary basis also makes it possible to estimate the potential savings if functional voice disorders could be reduced, which also makes such cost analyses interesting for healthcare and public policy.

In financial burden analyses the costs are divided into three groups: direct, indirect and intangible. Direct costs of functional voice disorders are the cost of therapy, medication and other medical equipment required to treat medical issues caused by functional voice disorders. Indirect costs are the costs related to reduced or lost productivity resulting from functional voice disorders. Intangible costs are costs that can be attributed to suffering from functional voice disorders and therapy, and include both the patient's suffering and that of their family. Because it is difficult to express these costs in monetary units, they are generally not included in the assessment of the financial burden. However, their impact is not negligible, and they are therefore occasionally defined and expressed in non-monetary units (19).

1.4 Studies on the economic consequences of voice disorders from around the world

A few interesting studies have been conducted on the economic consequences of voice disorders on society. In Colombia, the costs of treating voice disorders in teachers amount to approximately 37% of their average monthly salary. Of these, approximately 3% of the costs fell to direct medical costs, while 97% of costs were caused from reduced productivity (20).

In Australia, the cost of a substitute teacher amounts to AUD 250 per day. The cost estimation for a one-day absence of all the teachers amounts to approximately AUD 17.6 million per year. The approximate annual estimation of the costs of teachers' sick leave resulting from voice disorders in the US amounts to USD 638 million. In New Zealand, the costs of sick leave related to voice disorders is estimated to be between NZD 4 million and 27.5 million (21).

In the US, the costs of therapy and work absence from voice disorders have amounted to USD 2.5 billion annually just for teachers (2,16). According to some estimates, direct medical costs from voice disorders in the US are about USD 5 billion annually (22,23). These costs are comparable to the costs of treating chronic pulmonary disease, asthma, diabetes and allergic rhinitis (3). The majority of these costs fall to diagnostics procedures, operations, potential radiation treatment and costs of medicines, especially antibiotics and proton pump inhibitors (3). Costs of reduced productivity from voice disorders and the number of days of absence from the workplace due to voice disorders are comparable with the costs of chronic diseases, such as asthma, depression and acute coronary syndrome (4).

Studies show that another factor in the costs is the duration between the examination by a family physician and the examination by an otorhinolaryngologist. The total costs of patients who were examined by the otorhinolaryngologist later were higher than the costs of those patients who received their otorhinolaryngological examination sooner (22). The duration of therapy of patients who were referred to an otorhinolaryngological examination after thirty days or more following the onset of a voice disorder was significantly longer. They required more referrals to specialists, more procedures and more medication therapy (23).

A US study has shown that among the patients with a short incapacity for work from voice disorders, 43.7% had benign alterations to their vocal chords. Those with benign alterations were absent from work for a shorter time than those who were absent because of non-specific dysphonias or chronic laryngitis (4). Alterations to the vocal chords can result in establishing the diagnosis faster, shorter treatment and therefore an earlier return to work. Patients with dysphonia from functional causes are often treated with voice therapy. About 38% of patients refuse voice therapy, which has a negative effect on their

recuperation and ability to return to work (4).

1.5 Preventing voice disorders

Considering the high frequency of voice disorders in professional voice users and the effect of voice disorders on the quality of life from the medical, professional and personal perspective (2,3,4,19,20) and the related costs, many authors emphasize the importance of prevention programmes and early response (11).

Preventing problems is much more effective than therapy (24). Preventing the onset of dysphonia prevents negative effects on the quality of life and professional work (25) and related economic costs for the whole society.

There are three levels of prevention. The first level of prevention is good practice before a problem occurs. The second level is recognizing the problem. The third level is eliminating the obstruction from the voice disorder (24).

Timmermans et al. recommend several approaches for preventing voice disorders. The first is voice therapy. The approach is individual. The goal is to heal the voice, and it focuses on long-term effects (26). The second is voice training. The goal is to improve the operation of the voice and prevent voice issues, with a focus on long-term effects. Voice training should take place in smaller groups. The third is prevention programmes whose goal is to prevent voice problems. These take place in larger groups.

A number of authors list the teaching profession as a high-risk factor for the onset of voice disorders (2,5,8,13,16-18,21,25-32). Unexpected absences of teachers, their substitutions with other teachers and also the teacher's raspy voice also have a negative impact on the students, their success and how much they are able to learn (21). Those working in teaching are especially important for research, clinical work and prevention programmes (2).

Basic prevention knowledge of professional voice users means knowing the factors that have a negative impact on the voice, and avoiding these factors. The results of studies on how knowing vocal hygiene impacts the quality of voice and voice problems differ. Some authors report that even obtaining information on vocal hygiene led to voice improvement and reduced voice problems, while other authors did not list any positive effect of new information on care for the voice or voice behaviour and characteristics (30,32). Even short-term direct and indirect voice training reduced the sensation of voice problems and influenced good voice habits in customer consultation call centre agents. The positive effect on the voice was noticeable for up to a year and a half after the training (33). Knowing vocal hygiene and performing the practices for improving voice performance had a positive effect on reducing inappropriate speech-voice behaviour and voice abuse, and reduced the signs of voice problems in teachers (30).

Even research-based effective prevention programmes tailored to teachers have been developed (32). A comparison between a group of teachers who only obtained the information on normal voice formation, the amount and methods for voice formation, harmful voice behaviour, the importance of hydration, lifestyle and diet factors that can have a positive or a negative impact on a good and healthy voice, and a group of teachers who attended training for proper position, breathing, reducing tension in the voice apparatus, resonance and voice projection showed that the second group – i.e. the one that performed exercises –achieved a significant improvement of measured voice acoustic characteristics (24). Pizolata reached similar results of improvement of voice versions after three-months of voice training; however, the effects were not long term (25).

Educational programmes on voice health also had a positive effect on the quality of life of teachers from the psycho-emotional perspective, besides also improving the functionality of their voice (31). Voice therapy can assist dysphonic teachers to maintain their ability to work. Early referral for treatment has proven to be especially important (22). Merely a long voice rest (1–3 months) did not have a positive effect on working dysphonic teachers (16).

Preventive should begin during education for professions with a voice burden. A Belgian study has shown positive effects of voice training in future teachers. The authors recommend that it would be sensible to include indirect voice training in education for teachers. They also recommend obligatory direct training (practice for correct phonation, vocal breathing, reducing tension in the vocal apparatus, etc.) for students with voice disorders or limited voice capabilities (26). A 2016 Egyptian study also showed positive effects of preventive programmes and raising awareness on proper vocal hygiene in teachers. The authors emphasize the importance of regular screening programmes and programmes raising awareness of proper vocal hygiene (28). A New Zealand study reports on the connection between a small number of hours of voice training and education and a high frequency of reported voice disorders. The authors deduce from this that voice training can be effective in reducing voice disorders (21).

An Italian study showed that a primary preventive

group voice therapy programme of performing vocal exercises and vocal hygiene is doable and cost efficient for a homogeneous and motivated group of teachers (32). Clinical experience and studies also show that teachers most often want to participate in voice disorder prevention programmes. They want to learn more about how to care for their voice, breathing exercises and voice production techniques (29). Voice problems in teachers who have obtained knowledge on correct and sensible voice use can be improved subjectively and objectively (13).

Some authors even point out that good preventive care should include all the factors that impact voice disorders (8). The following groups of factors can affect the onset of a voice disorder: environmental factors (surrounding noise, other unsuitable acoustic conditions, unsuitable microclimate conditions, inappropriate posture because of the nature of work), lifestyle factors (excessive voice use, poor vocal hygiene, smoking, excessive alcohol consumption), medical factors (gastroesophageal reflux, structural deviations and injuries of the respiratory path, infection of the respiratory apparatus or the apparatus of phonation, asthma and taking certain medication), and psychological factors (anxiety and tension) (8).

1.6 Voice disorders in professional voice users in Slovenia and their prevention

In Slovenia several studies have been conducted on voice disorders in different professional voice users (teachers, physicians, priests, telesales workers, speech therapists, nurses). The meta-analysis of these studies has shown that 82% of the total 2,347 participants had significant voice problems in the course of their career (34). Teachers most frequently listed voice problems. The prevalence of voice disorders among pedagogical workers in Slovenia is high. The cross-sectional study showed that during the 2002/2003 school year 66% of pedagogical workers had voice problems; however, only 40% of those with a raspy throat sought medical assistance. For teachers, the voice effort was the most frequent cause for a voice disorder (27,34).

During their studies only speech therapists learn about the need to care for one's voice, while none of those participating in the study had had a preventive examination before the study commenced (34). The importance of a preventive otorhinolaryngological and speech therapy examination for preventing voice problems was demonstrated in the study on the prevalence of GM among professional singers and actors in Slovenia, who must be examined by a phoniatrician before beginning their studies for an elite voice user, while actors also have to visit a speech therapist in order to establish whether their vocal apparatus is healthy, and whether their phonation and speech technique is properly developed (35). Frequent voice problems only occurred with 12.3% of the participating actors and 20.3% with singers, which is much less than global media reports (35-37).

1.7 Economic consequences of voice disorders in Slovenia

So far, no study has yet been conducted that attempts to evaluate the economic impact voice disorders have on Slovenian society. It would be especially interesting to have information on the costs incurred by voice disorders resulting from incorrect use, excessive use or abuse of voice, i.e. voice disorders that could be prevented with vocal hygiene and vocal technique programmes

In order to show the economic burden of voice disorders on our society, we financially assessed the direct healthcare costs of functional voice disorders of those patients in Slovenia who sought help at a tertiary centre in 2017, which is only a minor part of the costs of functional voice disorders in Slovenia in 2017. Direct healthcare costs are the costs of using healthcare services for prevention, discovery or treatment of functional voice disorders. These are divided into three components of healthcare services: the costs of hospital activity, the cost of outpatient clinic activity (primary level, specialist outpatient activity) and costs of medication costs.

2 Methods

Our study included the data on the costs of treating functional voice disorders for persons who were treated at the Department of Otorhinolaryngology and Cervicofacial Surgery of the University Medical Centre Ljubljana (ORL Department) because of functional voice disorders or because of resulting organic changes on vocal

Table 1: Diagnoses of voice disorders, resulting from the functional voice disorder, coded according to the 10th revision of the International Classification of Diseases (ICD-10).

Diagnosis	ICD-10
Polyp of the vocal chords and the throat	J38.1
Vocal nodules	J38.2
Larynx endema	J38.4
Dysphonia (change to voice)	R49.0
Aphonia	R49.1

cords (diagnoses according to MKB-10 are listed in Table 1). From the hospital information system, we obtained the data on these persons' sex, age, type and number of treatments at the specialist outpatient healthcare service in the tertiary centre and the type and number of treatments at a hospital healthcare service. We assumed that each person was also treated at least once at the primary level before being referred to the tertiary centre.

Direct healthcare services can be estimated according to two different approaches: the top-down approach and the bottom-up approach. We opted for the first approach. The financial burden of direct healthcare costs was expressed as the sum of all established costs. The healthcare cost of functional voice disorders (SGM) were divided into three components: costs of specialist outpatient healthcare services at the secondary or tertiary level (S_O; *O – outpatient*), the costs of hospital healthcare (S_I; *I – inpatient*), and the cost of general outpatient healthcare treatment at the primary level (S_{GP}; *GP – general practice*).

2.1 Costs of treating functional voice disorders in specialist outpatient healthcare (S_o)

Treatment at the ORL Department was divided into four groups according to the expert who treated the patient: general otorhinolaryngological (ORL) clinic, phoniatrician, speech therapist and psychologist. We also listed which services were provided to patients with functional voice disorders by each individual expert. From the list of services of specialist outpatient otorhinolaryngology healthcare services, published on the website of ZZZS databases, we obtained the data on the code, measurement unit and the number of units for each individual service in 2017. The measurement unit was a point, which was valued at EUR 2.51 in 2017. The value of otorhinolaryngologist/phoniatrician services were between 1.14 and 12.9 points, the values of speech therapist services were between 6.9 and 16.8 points, and the values of psychologist services were between 3 and 13.8 points.

By taking into account the evaluated codes for services, the price per point and the number of individual services, we were able to calculate the S_O costs and establish the share of S_O costs for each individual expert who treated persons with functional voice disorders in 2017.

2.2 Costs of treating functional voice disorders in hospital healthcare (S_I)

People with functional voice disorders require hospital therapy when they require a surgical procedure – microlaryngoscopy. The costs of hospital healthcare are financed by groups of comparable cases (SPP). Microlaryngoscopy has the SPP code D09Z (Various procedures on the ear, nose, mouth or throat). From the database of the National Institute for Public Health we obtained the information on the weight for this code (0.74 weight) and the value of 1 weight unit in euros (EUR 1,600.00). Based on this data, we were able to calculate the S_I for people who received hospital treatment in 2017.

2.3 Costs of treating functional voice disorders in outpatient healthcare at the primary level of health care (S_{GP})

We assumed that every person with a functional voice disorder who received treatment from a phoniatrician or at the general ORL clinic at the ORL Department required at least one curative procedure at the general outpatient healthcare clinic. From the list of services at general clinics, paediatricians and emergency rooms of the ZZZS database we obtained the data on the code, measurement unit and number of units for the first curative procedure at the general clinic at the primary level, and of the value of the measurement unit in 2017. The measurement unit is the quota: the first curative examination is valued at 3.6 quota, and the value of the quota is EUR 4.58. We used the obtained data to estimate S_{GP}.

To estimate the total healthcare costs of patients treated for functional voice disorders at the ORL Department in 2017 we added S_O, S_I and S_{GP}.

3 Results

Between 1 January 2017 and 31 December 2017, the number of people with functional voice disorders who were treated at least once at the ORL Department was 1,552, of which 63.9% were women, and 36.1% were men. The average age was 43.3 years (standard deviation of 22.3 years, range of 1–96 years).

At examination most of them, i.e. 823 (53%), were diagnosed with dysphoenia, 272 (17.5%) were diagnosed with vocal nodules, 260 (16.8%) were diagnosed with swollen throat, 181 (11.7%) were diagnosed with a throat polyp, and 16 (1.0%) were diagnosed with aphonia.

281 (18.1%) required speech therapy, 111 (7.2%) required psychological therapy, 1,290 (83.1%) were referred to a phoniatrician, and 217 (14.0%) to the general ORL clinic.

The total number of treatments in outpatient health care was 3,052, of which 1,557 (51.7%) treatments were with a phoniatrician, 660 (21.6%) were with a speech therapist, 445 (14.6%) were with a psychologist, and 370

(12.1%) were in the general ORL clinic.

The total S_O for persons with functional voice disorders for 2017 amounted to EUR 141,356. The majority of S_O was created by women, namely 70.3%. All included costs contributed to the S_O costs.

By type of treatment more than a half of S_O are costs of treatment with a phoniatrician (52.9%). These are followed by speech therapy, which represents 28.5% of S_O, and the costs of treatment with a psychologist, which represent 15.6% of S_O. The costs of treatment in the general ORL clinic represent only 3.0% of S_O.

Some 91 people were surgically treated in the hospital in 2017. The total S_I for these 91 people stood at EUR 107,744. Women accounted for 54.9% of SFMI.

The total S_{GP} costs for persons with functional voice disorders who were referred to outpatient or hospital therapy at the ORL Department amounted to EUR 24,847. With S_{GP} the majority of the costs was also created by women (63.6%). All people included in the study contributed to the S_{GP} costs.

The total costs for treating people with functional voice disorders who were treated at the ORL Department in 2017 amounted to EUR 273,247. Women created 63.7% of these costs. More than half, i.e. 51.6%, of the total costs fall to S_O, 39.3% fall to S_I and the remaining 9.1% to S_{GP}. Hospital surgical therapy was therefore the most expensive, as only 91 people (5.9% of all patients treated) created 39.9% of total direct costs of outpatient and hospital therapy of functional voice disorders.

4 Discussion

The total costs for treating people with functional voice disorders, who were treated at the ORL Department in 2017 amounted to EUR 273,247. Our estimation of voice-disorder-related healthcare costs is only partial. For a comprehensive economic burden assessment, an estimation of the costs of drugs, indirect costs and lost productivity costs should also be taken into account.

We were only able to estimate a small share of the direct costs for treating functional voice disorders in Slovenia, as we only had the access to the data for the tertiary centre of one hospital; however, it is the only one in Slovenia with a full team for treating functional voice disorders (phoniatrician, clinical speech therapist, clinical psychologist), so most people with functional voice disorders are referred to this centre. A significant number of patients with organic alterations to their vocal chords resulting from functional voice disorders are also receiving treatment at other ORL departments across Slovenia. Unfortunately, we were not able to obtain the data on the costs of medicines that were required for the therapy of people with functional voice disorders, nor the exact number of treatments received from personal physicians before being referred to the tertiary centre. Considering the studies conducted abroad, these direct costs of treatment represent less than 10% the total costs of voice disorders, with the majority falling to work absences and lower work efficiency (20). We could, therefore, estimate that the costs of outpatient and hospital treatment of people with functional voice disorders reach a value close to EUR 3 million.

Because functional voice disorders are the result of excessive and incorrect voice use, they could be reduced or prevented. Numerous authors report on the importance of prevention, and some studies also point to the success of prevention programmes and voice training in reducing and preventing the onset of voice disorders (8,11,21,24,25,26,28,32). An important group for research and for inclusion in preventive programmes are teachers, as their profession has a high risk level for the onset of a voice disorder (2,5,8,13,16-18,21,25-32).

5 Conclusion

At least one quarter of the working population performs a job with a high level of voice burden, and therefore the onset of a voice disorder is a significant obstacle in their ability to work. Because of the nature of their work, the result is absence from work, which can also be long term. In some countries, a voice disorder is recognized as an occupational disease if it stems from an occupational burden and if the voice apparatus of the person was healthy before they began this job (15). In Slovenia, an otorhinolaryngological/phoniatrical and speech therapy examination is obligatory before starting studies for future elite voice users. Only two faculties provide their students with information on proper voice care. Voice disorders are also not classified among occupational diseases. We believe that appropriate screening programmes before the start of studies (e.g. a focused questionnaire on voice issues in relation to voice use), compulsory indirect and direct voice therapy for those who already manifest voice disorders during their studies, and compulsory refresher courses on vocal hygiene and correct voice and speech technique for all professional voice users could prevent a significant share of functional voice disorders, thereby reducing the economic burden of treating functional voice disorders.

Conflict of interest

None declared.

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