



# New Trends and Issues Proceedings on Humanities and Social Sciences



Volume 4, Issue 1 (2017) 247-254

ISSN 2421-8030

[www.prosoc.eu](http://www.prosoc.eu)

Selected Papers of 9th World Conference on Educational Sciences (WCES-2017) 01-04 February 2017 Hotel Aston La Scala Convention Center, Nice, France

## Primary school teachers are at risk to suffer from dysphonia

**Esther Rishma Sundram** <sup>a\*</sup>, Department Community Medicine, Faculty of Medical Sciences, USM Health Campus, University of Malaysia, 16150, Kelantan, Malaysia.

**Norsa Adah Bachok** <sup>b</sup>, Department Community Medicine, Faculty of Medical Sciences, USM Health Campus, University of Malaysia, 16150, Kelantan, Malaysia.

**Mohd Ismail Ibrahim** <sup>c</sup>, Department Community Medicine, Faculty of Medical Sciences, USM Health Campus, University of Malaysia, 16150, Kelantan, Malaysia.

**Nik Rosmawati Nik Husain** <sup>d</sup>, Department Community Medicine, Faculty of Medical Sciences, USM Health Campus, University of Malaysia, 16150, Kelantan, Malaysia.

**Hazama Mohamad** <sup>e</sup>, Department Community Medicine, Faculty of Medical Sciences, USM Health Campus, University of Malaysia, 16150, Kelantan, Malaysia.

**Foong Ming Moy** <sup>f</sup>, Department Community Medicine, Faculty of Medical Sciences, USM Health Campus, University of Malaysia, 16150, Kelantan, Malaysia.

**Mohd Nazri Shafei** <sup>g</sup>, Department Community Medicine, Faculty of Medical Sciences, USM Health Campus, University of Malaysia, 16150, Kelantan, Malaysia.

### Suggested Citation:

Sundram, R. E., Bachok, A. N., Ibrahim, I. M., Husain, N. R. N., Mohamad, H., Moy, M. F. & Shafei, N. M. (2017). Primary school teachers are at risk to suffer from dysphonia. *New Trends and Issues Proceedings on Humanities and Social Sciences*. [Online]. 4(1), pp 247-254. Available from: [www.prosoc.eu](http://www.prosoc.eu)

Selection and peer review under responsibility of Prof. Dr. Jesus Garcia Laborda, University of Alcala, Spain.

©2017 SciencePark Research, Organization & Counseling. All rights reserved.

### Abstract

Occupational voice users such as teachers may have symptoms of voice soreness, hoarseness, weakness, sorethroat and aphonia resulting in a reduction in job functioning and performance. The aim of our study was to determine the prevalence of dysphonia and its associated factors among primary school teachers in a district in Northeastern Malaysia. This cross sectional study evaluated 331 teachers from eight primary schools that were randomly sampled. A questionnaire which included the translated and validated malay-Voice Handicap Index 10 (m-VHI-10) as well as sociodemographic and occupational characteristics was distributed and self-administered. Participants who had m-VHI-10 score of 12 or more were classified as having dysphonia. It was found that the prevalence of dysphonia among primary school teachers was 7.9 percent. Hours of teaching per week [OR: 1.04 (95% CI 1.01, 1.08): p=0.028] and having more than four children [OR: 2.38 (95% CI 1.03, 5.51) p=0.042] were significantly associated with dysphonia among primary school teachers. In conclusion, the prevalence of dysphonia among primary school teachers in our population was relatively low as compared to other countries. However, this established occupational health problem should not be undermined but need more awareness and interventional efforts in order to prevent an escalation in the magnitude of this disorder.

Keywords: Dysphonia; voice handicap index; primary school teachers.

\* ADDRESS FOR CORRESPONDENCE: **Esther Rishma Sundram**, Department Community Medicine, Faculty of Medical Sciences, USM Health Campus, University of Malaysia, 16150, Kelantan, Malaysia.

E-mail address: [drnazri@usm.my](mailto:drnazri@usm.my) / Tel.: (6) 09 767 6825

## 1. Introduction

Occupational or professional voice users are individuals who rely on their voice as their main tool at work (Akinbode, Lam, Ayres & Sadhra, 2014). These individuals include singers, lawyers, telemarketers, tour guides, clergy, actors and teachers (Angelillo, Di Maio, Costa & Barillari, 2009; Arffa, Krishna, Gartner-Schmidt & Rosen, 2012). Teachers have been identified as the high volume occupation with the greatest risk for developing dysphonia as compared to any other occupation (Chavez & de Bartelt, 2001; Dysphonia, 2005).

Dysphonia is a descriptive medical term meaning disorder (dys-) of voice (-phonia) (Martins, Pereira, Hidalgo & Tavares, 2014). Dysphonia refers to voice changes characterized by abnormality of pitch, volume, resonance and/or quality which can be inconsistent or constant, ranging from mild to severe and which may be inappropriate for the speaker (Moy et al., 2015). In short, dysphonia is expressed as any difficulty in vocal emission that interferes with natural voice (Munier & Kinsella, 2007). In this paper, the term dysphonia and voice disorders shall be used interchangeably.

The prevalence of dysphonia varies across countries and differs based on study definitions and methodology. In a large study conducted across secondary schools in Malaysia, the validated Malay-Voice Handicap Index-10 questionnaire was self-administered among 6039 teachers and reported a prevalence of dysphonia of 10.4% [12]. In the Naples District in Italy, Angelillo et al. (2009) conducted a study on 504 teachers using a questionnaire which included details on self reported voice problems and revealed that current voice problems was significantly greater in teachers compared to non-teachers (8.7% vs 2.9%). Sliwinska et al. (2006) analyzed a group of 425 female teachers in Poland and discovered that 32.7% of them experienced occupational voice disorders (Preciado-Lopez, Pérez-Fernández, Calzada-Uriondo & Preciado-Ruiz, 2008). In Dublin, a research carried out in 42 schools involving 550 primary school teachers established that 27% suffered a voice problem and 53% experienced intermittent voice problems (Roy, Merrill, Thibeault, Parsa, Gray & Smith, 2004).

Vocal abuse or excessive vocal load can lead to symptoms of voice soreness, hoarseness, weakness, sorethroat and aphonia (Sampaio, dos Reis, Carvalho, Porto & Araújo, 2012). Literature findings suggest that female teachers are more likely to develop dysphonia as compared to their male counterparts (Tavares & Martins, 2007). Duration of employment and age, daily smokers and teachers who drank several cups of coffee a day were associated with voice problems. Risk factors such as long working hours, excessive number of students per classroom, environmental noise and inappropriate classroom facilities were also determinants for dysphonia (Timmermans, De Bodt, Wuyts, Boudewijns, Clement, Peeters & Van de Heyning, 2002).

Consequences of voice disorders among teachers include limitation of job performance and satisfaction, absenteeism and laryngeal injury. Additionally, dysphonia results in a reduction in communicative, social, psychological, emotional and physical functioning. Two studies revealed that job absenteeism was seen in 18.3% and 20% of teachers respectively that missed at least one day of work during the past year due to problems (Van Houtte, Claeys, Wuyts & Van Lierde, 2011). Estimates based on empirical data suggest that, considering only lost work days and treatment expenses, the societal cost of voice problems in teachers alone may be about \$2.5 billion annually in the United States of America (Van Houtte, Claeys, Wuyts & Van Lierde, 2011). This exposes that the magnitude of this occupational problem and its impacts are substantial and consequential. The aim of this study was to

Sundram, R. E., Bachok, A. N., Ibrahim, I. M., Husain, N. R. N., Mohamad, H., Moy, M. F. & Shafei, N. M. (2017). Primary school teachers are at risk to suffer from dysphonia. *New Trends and Issues Proceedings on Humanities and Social Sciences*. [Online]. 4(1), pp 247-254. Available from: [www.prosoc.eu](http://www.prosoc.eu)

determine the prevalence and risk factors of dysphonia among primary school teachers in a district in Northeastern Malaysia.

## 2. Material and Methods

This cross sectional study evaluated 331 teachers from eight primary schools in the district that were randomly selected. All teachers who were permanent staff from these schools were invited to participate in the study. Contract or trainee teachers were excluded from the study.

A questionnaire which included the translated and validated Malay-Voice Handicap Index 10 (M-VHI-10) as well as socio-demographic and occupational characteristics was distributed and self-administered. The M-VHI-10 was used to indicate the severity of the voice disorders based on individual self perception, where the score ranged between 0-40. Participants who had a M-VHI-10 score of 12 or more were classified as having dysphonia. Socio-demographic details included age, sex, marital status, number of children and questions on occupational characteristics such as years of employment, hours of teaching per week, no of subjects and standards taught were included in the questionnaire.

Data analysis was performed using SPSS Version 22. The prevalence of dysphonia among primary school teachers was calculated by the proportion of primary school teachers who scored 12 or more based on the M-VHI-10 questionnaire. Multiple logistic regression was performed to identify associations between dysphonia and socio-demographic as well as occupational characteristics. The level of significance was set at  $p < 0.05$ .

Research approval was obtained from the Universiti Sains Malaysia (USM) Human Research Ethics Committee (Reference Code: USM/JEPeM/15040149). Additional approvals to conduct our study in the primary school setting in the district was granted by the Malaysian Ministry of Education and State Education Department. All school headmasters from the selected schools were briefed on the study procedures. Teachers who voluntarily agreed to participate and signed the written informed consent were included in data collection.

## 3. Results

There were 331 respondents with an age range between 27 and 60 years (mean: 45.24), most teachers were female (240 females, 90 males) and predominantly of Malay ethnicity. The majority of teachers in our study population was married and had an average of 4 children. The mean duration of employment was about 20 years with each teacher teaching approximately 2 subjects to 3 different standards or grades in their schools. The mean (SD) M-VHI-10 score reported was 3.65(5.19). The prevalence of dysphonia among primary school teachers in this district was 7.9% (Table 1)

**Table 1: Prevalence of Dysphonia and Characteristics Of The respondents (n=331)**

Variables	Mean (SD)	Frequency (%)
Age (years)	45.2 (7.11)	
Sex:		
Male		90 (27.2)
Female		240 (72.5)
Ethnicity:		
Malay		327 (98.8)
Non-Malay		4 (1.2)
Marital status:		
Married		312 (94.3)
Single/Divorced/Widowed		19 (5.7)
Number of children	3.9 (2.06)	
Teaching hours per week	15.2 (8.44)	

Sundram, R. E., Bachok, A. N., Ibrahim, I. M., Husain, N. R. N., Mohamad, H., Moy, M. F. & Shafei, N. M. (2017). Primary school teachers are at risk to suffer from dysphonia. *New Trends and Issues Proceedings on Humanities and Social Sciences*. [Online]. 4(1), pp 247-254. Available from: [www.prosoc.eu](http://www.prosoc.eu)

Duration of employment	19.7 (8.20)
Number of subjects taught	2.5 (2.50)
Number of standards taught	2.6 (1.15)
Mean M-VHI-10 score	3.6 (5.19)
Dysphonia (M-VHI-10 score $\geq 12$ ):	
Yes	26 (7.9)
No	305 (92.1)

**Table 2: Descriptive characteristics of possible associated factors by dysphonia and non-dysphonia groups (n=331)**

Variables	Dysphonia (M-VHI-10 score $\geq 12$ )		Non-Dysphonia (M-VHI-10 score $< 12$ )	
	n (%)	Mean (SD)	n (%)	Mean (SD)
Age		43.7 (7.16)		45.1 (7.06)
Sex:				
Male	5(19.2)		85 (27.9)	
Female	21(80.8)		219 (71.8)	
Number of children		4.3 (1.94)		3.8 (2.03)
Duration of employment		17.4 (8.76)		19.6 (8.13)
Teaching hours per week		19.9 (16.62)		14.9 (7.49)
Number of subjects taught		2.1 (1.08)		2.6 (2.83)
Number of standards taught		2.6 (1.11)		2.7 (1.17)
M-VHI-10 score		17.3 (5.85)		2.3 (2.62)

Table 2 portrays the socio-demography, occupational characteristics and mean M-VHI-10 score of both groups in our study. The mean (SD) M-VHI-10 score of the dysphonia and the non-dysphonia groups were 17.30 (5.85) and 2.26 (2.62) respectively. Teachers in the non-dysphonia group had a higher mean age and duration of employment compared to their counterparts with dysphonia. The average number of subjects and standards taught by both groups were almost similar. Teachers with scores of 12 and more were assigned to longer teaching hours per week and possessed more children.

Table 3 demonstrates the association between socio-demographic and occupational characteristics with dysphonia. In simple logistic regression analysis, only variables such as number of children, duration of employment and number of teaching hours per week with a  $p$ -value  $< 0.25$  were selected to

Sundram, R. E., Bachok, A. N., Ibrahim, I. M., Husain, N. R. N., Mohamad, H., Moy, M. F. & Shafei, N. M. (2017). Primary school teachers are at risk to suffer from dysphonia. *New Trends and Issues Proceedings on Humanities and Social Sciences*. [Online]. 4(1), pp 247-254. Available from: [www.prosoc.eu](http://www.prosoc.eu)

be included in the multiple logistic regression model. Factors such as age, sex, number of subjects and standards taught were not significant.

**Table 3: Association between sociodemographic and occupational factors with dysphonia among primary school teachers in a northeastern district in Malaysia (n=331)**

Variables	Crude OR (95% CI)	Wald stat(df)	p-value
Age	0.98 (0.93, 1.04)	0.45(1)	0.503
Sex:			
Male	1.00		
Female	1.63 (0.60, 4.46)	0.91(1)	0.342
Number of children:			
0-4	1.00		
>4	2.38 (1.06, 5.37)	4.39(1)	0.030
Duration of employment	0.97 (0.92, 1.02)	1.41(1)	0.234
Teaching hours per week	1.04 (1.01,1.08)	5.43(1)	0.020
Number of subjects taught	0.83 (0.59,1.16)	1.19(1)	0.275
Number of standards taught	0.94 (0.66, 1.34)	0.12(1)	0.734

**Table 4: Associated factors of dysphonia among primary school teachers in a district in northeastern Malaysia using multiple logistic regression (n=331)**

Variables	Adjusted OR (95% CI)	Wald stat(df)	p-value
Number of children:			
0-4	1.00		
>4	2.38(1.03, 5.51)	4.13(1)	0.042
Teaching hours per week	1.04(1.01, 1.08)	4.83(1)	0.028

Classification table: 92.4%  
 Hosmer-Lemeshow: 8.218 (Chi square), p=0.412  
 Area under ROC: 66.9%, p=0.005

The results of multiple logistic regression exhibited in Table 4 shows that teachers who possessed more than 4 children had more than 2 times the odds of dysphonia as compared to their counterparts with 4 children or less [Adjusted OR(95%CI): 2.38 (1.03, 5.51)]. Teachers who taught longer hours per week were also observed to be more predisposed to developing voice disorders. Findings indicated that with each additional teaching hour per week, the odds of developing dysphonia increased by 4% [Adjusted OR (95%CI): 1.04 (1.01, 1.08)].

#### 4. Discussion

The prevalence of self reported dysphonia in our study of 7.9% was relatively low as compared to other studies. In a recent research conducted among secondary schools teachers in Malaysia, Moy et al., (2015) found a higher prevalence of voice disorders (10.4%) utilizing the similar research tool, which makes this a good point of comparison. The higher prevalence may be explained by the disproportion

Sundram, R. E., Bachok, A. N., Ibrahim, I. M., Husain, N. R. N., Mohamad, H., Moy, M. F. & Shafei, N. M. (2017). Primary school teachers are at risk to suffer from dysphonia. *New Trends and Issues Proceedings on Humanities and Social Sciences*. [Online]. 4(1), pp 247-254. Available from: [www.prosoc.eu](http://www.prosoc.eu)

in the number of students in secondary compared to primary schools. There were 95 primary schools and only 40 secondary schools in the district, resulting in a larger volume of students in the secondary school setting. This could have intensified vocal demands and placed a heavier vocal burden on the secondary school teachers resulting in this higher prevalence.

Additionally, Malaysia is a tropical country where its climate is characterized by its warm uniformed temperature, high humidity and copious rainfall. In our study setting, the temperature ranged between 23-33 degrees Celsius. The low prevalence as compared to other countries may be justified by the warmer temperature and higher humidity. Chavez et al., (2001) conducted a study in Mexico and revealed that teachers reported a lower rate of dysphonia during warmer temperatures (Voice Overview. 2016). Constant exposure to dry conditions (humidity of less than 20%) has the capability of drying out the larynx due to poor lubrication. The average relative humidity documented in 2016 in this district was more than 80% (Williams, 2003) that most likely acted as a protective factor to the teachers in this study. All classrooms were ventilated by fans and had open windows.

The normative value for the M-VHI-10 index for subjects without voice complaints was 2.83 [20]. Our study respondents had a mean (SD) M-VHI-10 score of 3.65 (5.19). This higher handicap index indicates that despite the low prevalence, teachers still did report more voice symptoms and complaints. In summary, comparison between prevalence data of dysphonia documented by numerous studies should be performed judiciously and not as face value due to the differences in definition, research tools, methodology and variability of results.

In various findings, female teachers had significantly greater risk in developing voice problems as compared to their male colleagues. In contrary, our study revealed that the gender determinant had no significant association, which was supported by the similar findings by Moy et al. (2015) in Malaysia among secondary school teachers.

Our study was conducted in a state that comprised of a vast Malay Muslim majority where culturally the female teachers may have been weary of a negative perception towards them if they were to shout or scold in public. Some women may also have been shy to speak with a loud voice, as most girls are taught to be spoken and respectful in their upbringing at home and school. This scenario indirectly minimized the harmful vocal habits and therefore also contributed to the relatively low prevalence of dysphonia.

Age (Munier & Kinsella, 2007; Special Care for Voice Users, 2014) and years of teaching were not significantly associated with dysphonia among our respondents which are comparable with other researches. This could be because over the years and decades, the teachers got accustomed to their vocal difficulties and developed coping mechanisms to compensate. This subsequently led to a greater threshold for reporting voice disorders and a new normal in their perception. De Medeiros et al. (2008) and Akinbode et al. (2014) explained the possibility of this non-association due to the "healthy worker effect" where the occurrence and severity of the voice disorder cause workers to change or abandon their profession or to retire early. Therefore, this group of individuals was not captured in our study.

The average number of children among primary school teachers in this district was four. It was observed that teachers with more than 4 children, had more than 2 times the odds of developing dysphonia as compared to their counterparts. Teaching in the classroom in the daytime, and speaking to family members after work further exerts the vocal apparatus. There was a high likelihood that these teachers also tutored their own children and assisted them with their schoolwork at home. Therefore, with more children, there is a higher vocal demand in terms of duration and output. As teachers, maintaining optimal vocal health while balancing work and a big family, poses as a great feat. It is challenging both socially and professionally to minimize communication for this sole reason. There was a paucity of literature regarding the influence of this risk factor and its effects.

In the present study, it was found that Teachers with longer teaching hours had higher odds of developing dysphonia. This similar finding was also described by William [15]. The mean (SD) teaching hours per week was 15.24 (8.44). The odds of voice disorders increased by 4% with each additional hour

Sundram, R. E., Bachok, A. N., Ibrahim, I. M., Husain, N. R. N., Mohamad, H., Moy, M. F. & Shafei, N. M. (2017). Primary school teachers are at risk to suffer from dysphonia. *New Trends and Issues Proceedings on Humanities and Social Sciences*. [Online]. 4(1), pp 247-254. Available from: [www.prosoc.eu](http://www.prosoc.eu)

per week. Longer classroom hours and the lack of rest in between lessons, compounded with speaking over background noise and yelling result in vocal fatigue and dysphonia as a sequelae

We were not able to demonstrate a significant association between the number of subjects and grades taught with dysphonia. Malaysian public primary schools consist of a preschool and standards 1 to 6. A teacher may be assigned to tutor more than one standard and subject. The [mean (SD)] number of subjects and standards taught were 2.46 (2.50) and 2.61 (1.15) respectively. However, the total number of classroom hours had no correlation by the number of subjects and standards taught by a teacher. In simple terms, a teacher who taught more standards or subjects not necessarily had longer teaching hours per week. Nerriere et al. (2009) and Chen et al. (2010) reported significant association with grade level and subjects taught.

The limitation of the cross sectional nature of this study, was not being able to establish causality based on cause and effect time sequence, as the voice symptoms and possible factors were appraised simultaneously. Those two associated factors however have a plausible explanation as how they contribute to the development of dysphonia. From the public health perspective, the risk factor such as the number of children, is a personal decision and should be respected. Teachers however, should be aware of the increased risk and coached on proper vocal techniques. The occupational effect of longer hours of work per week and voice disorders can be diminished by ways such as ensuring adequate breaks in between lessons or increasing the number of teaching staff.

## **5. Conclusion**

The prevalence of dysphonia among primary school teachers in the district in northeastern Malaysia was relatively low as compared to various other countries. We suggest that future studies explore the health seeking behavior and effective methods of intervention in the Malaysian setting. Recognition of this occupational health problem is the first step to an effective solution. It is imperative that awareness and interventional efforts such as voice hygiene and techniques, usage of voice amplifiers, modification of occupational and environmental factors and various methods are implemented in order to prevent an escalation in the magnitude of this disorder.

## **Acknowledgement**

The authors would like to express our gratitude to the Ministry of Education Malaysia for their approval. We thank all school administrators, teachers and support staff for their participation in this study. This work was supported by Universiti Sains Malaysia (Grant no: 304/PPSP/61313199).

Sundram, R. E., Bachok, A. N., Ibrahim, I. M., Husain, N. R. N., Mohamad, H., Moy, M. F. & Shafei, N. M. (2017). Primary school teachers are at risk to suffer from dysphonia. *New Trends and Issues Proceedings on Humanities and Social Sciences*. [Online]. 4(1), pp 247-254. Available from: [www.prosoc.eu](http://www.prosoc.eu)

## References

- Akinbode, R., Lam, K. B. H., Ayres, J. G. & Sadhra, S. (2014). Voice disorders in Nigerian primary school teachers. *Occupational Medicine*, 64(5), 382-386.
- Angelillo, I. F., Di Maio, G., Costa, G. & Barillari, U. (2009). Prevalence of occupational voice disorders in teachers. *Journal of Preventive Medicine and Hygiene*, 50(1), 26-32.
- Arffa, R. E., Krishna, P., Gartner-Schmidt, J. & Rosen, C. A. (2012). Normative values for the voice handicap index-10. *Journal of Voice*, 26(4), 462-465.
- Chavez, R. E., & de Bartelt, C. (2001). Air pollution and environmental factors: their importance in the etiology of occupational voice disorders. Dejonckere (ed): *Occupational Voice: Care and Cure*. The Hague, Kugler Publications, 71-79.
- Chen, S. H., Chiang, S. C., Chung, Y. M., Hsiao, L. C. & Hsiao, T. Y. (2010). Risk factors and effects of voice problems for teachers. *Journal of Voice*, 24(2), 183-192.
- De Medeiros, A. M., Barreto, S. M., & Assunção, A. Á. (2008). Voice disorders (dysphonia) in public school female teachers working in Belo Horizonte: prevalence and associated factors. *Journal of Voice*, 22(6), 676-687.
- Dysphonia (Voice disorder). (2005). Netdoctor. Retrieved from: <http://www.netdoctor.co.uk/conditions/ear-nose-and-throat/a147/dysphonia-voice-disorder> 7 September 2016.
- Martins, R. H. G., Pereira, E. R. B. N., Hidalgo, C. B. & Tavares, E. L. M. (2014). Voice disorders in teachers. A review. *Journal of Voice*, 28(6), 716-724.
- Moy, F. M., Hoe, V. C. W., Hairi, N. N., Chu, A. H. Y., Bulgiba, A. & Koh, D. (2015). Determinants and effects of voice disorders among secondary school teachers in peninsular Malaysia using a validated Malay version of VHI-10. *PloS one*, 10(11), 1-10.
- Munier, C. & Kinsella, R. (2007). The prevalence and impact of voice problems in primary school teachers. *Occupational Medicine*, 58(1), 74-76.
- Preciado-Lopez, J., Pérez-Fernández, C., Calzada-Uriondo, M. & Preciado-Ruiz, P. (2008). Epidemiological study of voice disorders among teaching professionals of La Rioja, Spain. *Journal of Voice*, 22(4), 489-508.
- Roy, N., Merrill, R. M., Thibeault, S., Parsa, R. A., Gray, S. D., & Smith, E. M. (2004). Prevalence of voice disorders in teachers and the general population. *Journal of Speech, Language, and Hearing Research*, 47(2), 281-293.
- Sampaio, M. C., dos Reis, E. J. F. B., Carvalho, F. M., Porto, L. A. & Araujo, T. M. (2012). Vocal effort and voice handicap among teachers. *Journal of Voice*, 26(6), 820-824.
- Sliwiska-Kowalska, M., Niebudek-Bogusz, E., Fiszer, M., Los-Spychalska, T., Kotylo, P., Sznurowska-Przygocka, B., & Modrzewska, M. (2006). The prevalence and risk factors for occupational voice disorders in teachers. *Folia Phoniatria et Logopaedica*, 58(2), 85-101.
- Special Care for Voice Users. (2014). American academy of otolaryngology-head neck surgery. Retrieved from <http://www.entnet.org/content/special-care-voice-users> 7 October 2016.
- Tavares, E. L. & Martins, R. H. (2007). Vocal evaluation in teachers with or without symptoms. *Journal of Voice*, 21(4), 407-414.
- Timmermans, B., De Bodt, M. S., Wuyts, F. L., Boudewijns, A., Clement, G., Peeters, A. & Van de Heyning, P. H. (2002). Poor voice quality in future elite vocal performers and professional voice users. *Journal of Voice*, 16(3), 372-382.
- Van Houtte, E., Claeys, S., Wuyts, F. & Van Lierde, K. (2011). The impact of voice disorders among teachers: vocal complaints, treatment-seeking behavior, knowledge of vocal care, and voice-related absenteeism. *Journal of Voice*, 25(5), 570-575.
- Voice: Overview. (2016). RCSLT clinical guidelines. Royal college of speech and language therapists. Retrieved from [https://www.rcslt.org/clinical\\_resources/voice/overview](https://www.rcslt.org/clinical_resources/voice/overview) on 8 September 2016.
- Williams, N. R. (2003). Occupational groups at risk of voice disorders: A review of the literature. *Occupational Medicine*, 53(7), 456-460.