

## Original articles

# Vocal hydration in voice professionals and in future voice professionals

## *Hidratação vocal em profissionais e futuros profissionais da voz*

Márcia do Amaral Siqueira<sup>(1)</sup>

Gabriele Rodrigues Bastilha<sup>(1)</sup>

Joziane Padilha de Moraes Lima<sup>(1)</sup>

Carla Aparecida Cielo<sup>(1)</sup>

<sup>(1)</sup> Universidade Federal de Santa Maria – UFSM – Santa Maria RS, Brasil.

Source of aid: CAPES; CNPq

Conflict of interest: non-existent

### ABSTRACT

**Purpose:** to characterize and to relate the quantity and hydration status, the voice use time and the dryness of complaints of professionals and future voice professionals.

**Methods:** cross-sectional study, non-experimental, retrospective and quantitative, using database. There were analyzed records of 105 subjects of both genders, professionals and / or students future voice professionals at the age between 19:0-42:6 years. There were used data about age, profession, gender, quantity and hydration status, voice use time and dryness of complaints. There were used: Hypothesis test for Proportion, Chi-Square test and Fisher's exact test.

**Results:** significant frequency of available water in the workplace and voice use less than eight hours. The intake of less than seven glasses of water daily was percentage higher than the intake of more than seven cups. There are significant associations between intake less water quantity and use the voice for less time and between having water at work and intake more than seven glasses of water every day. There was not significance in relation to dryness complaint.

**Conclusion:** most of the voice professionals and future professionals used it for less than eight hours and had water available at work. Those who intake less than seven glasses of water daily a present daily time vocal use less than eight hours and those who drank more than seven cups of water a day had water available at work.

**Keywords:** Fluid Therapy; Voice; Vocal Cords; Dysphonia; Voice Quality

### RESUMO

**Objetivo:** caracterizar e relacionar a quantidade e condições de hidratação, o tempo diário de uso vocal e as queixas de ressecamento de profissionais e futuros profissionais da voz.

**Métodos:** pesquisa transversal, não-experimental, retrospectiva e quantitativa, com utilização de banco de dados. Analisaram-se 105 registros de sujeitos de ambos os gêneros, profissionais e/ou estudantes futuros profissionais da voz na faixa etária de 19:0 a 42:6 anos. Foram utilizados dados relativos à idade, profissão, gênero, quantidade e condições de hidratação, tempo de uso da voz e queixas de ressecamento. Foram utilizados: Teste de Hipótese para Proporção, Teste Qui-Quadrado e Teste exato de Fisher.

**Resultados:** frequência significante de água disponível no ambiente de trabalho e de uso da voz menos de oito horas diárias. A ingestão de menos de sete copos diários de água foi percentualmente maior do que a ingestão de mais de sete copos. Houve associação significante entre ingerir menor quantidade de água e usar a voz por menor tempo e entre ter água no trabalho e ingerir mais de sete copos de água diários. Não houve qualquer significância em relação à queixa de ressecamento.

**Conclusão:** a maioria dos profissionais e futuros profissionais da voz a utilizava por menos de oito horas diárias e possuía água disponível no trabalho. Aqueles que ingeriam menos de sete copos de água diários apresentavam tempo diário de uso vocal menor do que oito horas e aqueles que ingeriam mais de sete copos de água por dia tinham água disponível no trabalho.

**Descritores:** Hidratação; Voz; Pregas Vocais; Disfonia; Qualidade da Voz

Received on: October 26, 2015  
Accepted on: April 14, 2016

#### Mailing address:

Gabriele Rodrigues Bastilha  
Rua Francisco Manoel, 32, apto 201  
Bairro: Centro - Santa Maria – RS  
CEP: 97015-260  
E-mail: fonogabriele@gmail.com

## INTRODUCTION

Voice improves the quality of the transmission of the word, message or feeling, both socially and professionally. Therefore, it is expected that the professionals who use it as a working tool have a well-projected voice with precise articulation, pneumophonoarticulatory coordination, good sonority, rhythm and adequate speed, showing clear ideas. Additionally, it becomes important the integrity of the laryngeal muscle and the vocal folds mucosa<sup>1-3</sup>.

The "Professional Voice" expression applies to those ones who use it on an ongoing basis and try, through an elaborate mode of expression, reach a specific audience<sup>3-5</sup>. In the professional performance, it is common to appear symptoms of voice disorder or dysphonia, because of which the voice cannot fulfill its basic role of transmission of verbal and emotional message of a subject<sup>6</sup>. Thus, preventive action is essential, since many professionals have little or no knowledge about their own voice<sup>5,7-9</sup>.

Dysphonia is defined as a disorder that is characterized by changes in vocal quality, pitch or loudness, which restrict communication or cause a negative impact on quality of life related to voice. A limitation in communication is characterized by loss or reduction in the skill of interacting vocally<sup>6,10</sup>. Some studies point out that vocal disorders may be more common among the people who need to use their voice professionally, because of the great vocal demand and exposure to different risk factors<sup>1,2,9,10-12</sup>.

Some factors that are inherent to the own subject are considered biological enemies of the voice, as the changes caused by aging, allergies, upper respiratory infections, hormonal influences, medications, alcohol use, smoking and lack of hydration<sup>5,13,14</sup>.

In order to preserve the organic and functional laryngeal health, it is necessary, among other things, to keep the body hydrated, which contributes to the reduction of vocal complaints and, consequently, to the improvement of vocal production, especially in voice professional. Besides, the hydration is considered important in relation to prevention and treatment of vocal disorders<sup>4,13,15-22</sup>. A dehydration, in turn, alters the viscoelastic properties of the vocal folds, which may contribute to the development of dysphonia and worsening of vocal performance<sup>19,22</sup>.

Regarding the hydration procedures, there is the internal or systemic (intake of water or electrolyte) and external (inhalation of water or saline)<sup>14,16,19,23</sup>, being the water intake the way used in the present study.

Recent research verified that the almost immediate improvement of dysphagia after water intake is due to a reduction in mucus viscosity along the vocal folds, or due to increased fluidization<sup>23</sup>.

It is believed that voice professionals need access to water in the workplace and knowledge of its benefits, so thus the professionals use hydration as a preventive factor of dysphonia, preventing the occurrence of vocal complaints that interfere with their professional performance.

Given the above, the aim of this study was to characterize the quantity and hydration conditions, the daily time of use of voice and complaints of dryness of voice professional and future voice professionals, relating these variables.

## METHODS

This is a cross-sectional, non-experimental, retrospective and quantitative study, with the use of Reference Center database on Occupational Health (CEREST/Central Region/RS), which was previously approved by the Ethics Committee in Research of Universidade Federal de Santa Maria (UFSM) with the number 23081.016945/2010-76.

For the inclusion of subjects, the following criteria were adopted: being voice professional and/or future voice professional (students) - being considered voice professionals subjects who make use of their voices to achieve some professional success<sup>18</sup>; being in the adult age group – from 19 to 44 years (according to the Descriptors in Health Sciences, 2014) and presenting the Consent Form signed, authorizing the use of information provided, as soon as the secrecy about the identity was maintained, as established by the regulation 466/12 of the National Research Ethics Commission. Consequently, all incomplete records were considered as exclusion criteria.

From a total of 180 records, 75 did not meet the criteria, 41 because they presented the age inferior to 19 years or superior to 44 years, and 34 records contained incomplete data.

Thus, the sample consisted of 105 subjects records of both genders, aged from 19:0 to 42:6 years, with a mean age of 25:6 years, who had the following occupations: students who were in college or in a technical course, in which it is required professional use of spoken and/or sung voice for their professional performance; teachers; concierge agents; musicians; broadcasters; receptionists; waiters; sales promoters;

police officers; militar people; porters; janitors; actors and advertisers.

From the records of sample, it was only used the data related to the daily quantity of hydration, availability of water, daily time of use of voice and complaints of dryness.

The literature varies in relation to the water consumption recommendation: from 2.5 to 3L of water per day, which corresponds to ten to 12 glasses of 250ml<sup>6</sup>, seven to eight glasses of water per day<sup>17</sup>. Based on these data, it was considered the intake of more than seven glasses of water a day as a sufficient hydration. The daily time of use of voice was classified as up to eight hours or more than eight hours, being considered appropriate the use of voice for a maximum of eight hours a day<sup>24-26</sup>.

For comparison of the proportion of each analyzed variable, the Hypothesis Test for Proportion was used, through the distribution of Binomial probability, with the approximation by the Normal and using the correction continuity of Fleiss. For comparative analysis between the variables, the Chi-Square Test and the Fisher Exact Test were used. The significance level for the statistical tests was 5% ( $p < 0.05$ ).

## RESULTS

Table 1 shows the frequency and proportion of variables such as water available in the workplace, glasses of water consumed per day, daily use of voice and complaint of dryness.

Table 2 shows the relationship between the variables such as intake and water availability, complaint of dryness and daily use of voice.

**Table 1.** Composition of the proportion of variables such as water available in the workplace, glasses of water consumed per day, daily use of voice and complaint of dryness

Water available in the workplace			p-value
	n	%	
Yes	84	80,00	0,001*
No	21	20,00	
Glasses of water consumed per day			p-value
	n	%	
< seven	57	54,29	0,380
> seven	48	45,71	
Daily use of voice (in hours)			p-value
	n	%	
< eight	85	80,95	0,001*
> eight	20	19,05	
Complaint of Dryness			p-value
	n	%	
Yes	53	50,48	0,922
No	52	49,52	

Legend: > superior to; < inferior to.  
Hypothesis Test for Proportion  $p < 0.05$   
\* statistically significant values

**Table 2.** Relationship between variables such as intake and water availability, complaint of dryness of daily use of voice

		Complaint of dryness (n / %)		p-value
		No	Yes	
<b>Water at the workplace (n / %)</b>	No	12 / 57,14	9 / 42,86	0,435
	Yes	40 / 47,62	44 / 52,38	
		Complaint of dryness (n / %)		p-value
		No	Yes	
<b>Consumption &gt; seven glasses a day (n / %)</b>	No	29 / 50,88	28 / 49,12	0,763
	Yes	23 / 47,92	25 / 52,08	
		Complaint of dryness (n / %)		p-value
		No	Yes	
<b>Daily use of the voice &gt; eight hours (n / %)</b>	No	41 / 48,24	44 / 41,72	0,586
	Yes	11 / 55,00	9 / 45,00	
		Daily use of the voice > eight hours (n / %)		p-value
		No	Yes	
<b>Consumption &gt; seven glasses a day (n / %)</b>	No	51 / 89,47	6 / 10,53	0,015*
	Yes	34 / 70,83	14 / 29,17	
		Consumption > seven glasses a day (n / %)		p-value
		No	Yes	
<b>Water at the workplace (n / %)</b>	No	17 / 80,95	4 / 19,05	0,006*
	Yes	40 / 47,62	44 / 52,38	
		Daily use of the voice > eight hours (n / %)		p-value
		No	Yes	
<b>Water at the workplace (n / %)</b>	No	18 / 85,71	3 / 14,29	0,758
	Yes	67 / 79,76	17 / 20,24	

Legend: &gt; superior to.

Chi-Square Test p &lt;0.05

Fisher's Exact test p &lt;0.05

\* statistically significant values

## DISCUSSION

Hydration is one of the factors that contribute to the good organic and functional conditions of the larynx, being an important health habit in maintaining voice quality, especially for voice professionals who have great vocal demand<sup>6,14</sup>. The benefits of hydration for good voice production are described in studies that point out that one of the important factors in the reduction of vocal complaints and, consequently, in the improvement of vocal production<sup>4,15</sup>. Systemic and superficial hydration modifies the viscoelastic properties of the vocal folds mucosa so that insufficient hydration might cause negative impacts on aerodynamic and acoustic measurements of voice. Some studies have found that greater quantity of fluid in the vocal folds requires less air pressure to start phonation, which reduce the level of phonation pressure and vocal fatigue. However, the quantity to be ingested per day is not yet proven in the literature<sup>14,19,21,27</sup>.

Authors tried to evaluate the changes in the mucosal wave vibration of the vocal folds by using the videokymography after internal and external hydration in voice professionals. Six voice professional were evaluated before and after being subjected to internal laryngeal hydration with intake of 300ml of aqueous electrolyte, at room temperature, and external saline inhalation to 0.9% during 10 minutes, after six hours of work without fluid intake for a period of four hours. A reduction in the open phase time/closed phase time quotient after hydration, concluding that videokymography was able to detect differences in vibration features in the mucosal wave of vocal folds after hydration of the larynx. In hydrated mucosa, the cycle presents greater time of closed phase, since amplitude of the excursion is increased due to higher flexibility<sup>16</sup>.

In addition to the benefits of vibration of the vocal folds and vocal quality, hydration also prevents the abuse resulting from phlegm and cough, since it provides the lubrication of the vocal folds through

a hydrous and less dense mucus, which reduces the friction between the folds during phonation. For future voice professionals, hydration can be used as a preventive measure<sup>27</sup>.

From empiric observations<sup>15</sup>, it was reported that the treatment of hydration may contribute to the regression of vocal cord disorders, leading to an improvement of dysphonia and greater ease of phonation.

Research on the influence of systemic hydration on voice quality of choristers with and without vocal warm-up, verified that the subjects who did not perform warm-up, but drank 2l of water (female) and 3l (male) one day before the evaluations, presented reduction of the fundamental frequency and pitch, improved shimmer and auditory-perceptive aspects of roughness, breathiness and tension<sup>14</sup>. In agreement with these results, the authors concluded that systemic hydration produced improvement in acoustic, auditory and perceptive parameters of future voice professionals, students of singing<sup>27</sup>.

A study verified changes in vocal quality in systemic hydration status in 13 male subjects. The three moments of evaluations were hydrated (intake 3l of water the day before the evaluation and 1.5l at the morning of the evaluating), dehydrated (no water intake from 10pm at the day before the evaluation until the morning of the evaluation) and dehydration by exercise (with no water intake from 10pm of the day before the evaluation until the morning of the day of the evaluation they were subjected to 40 minutes of treadmill exercise). There was an increase of jitter in dehydration before and after continuous use of speech and before reading the dehydration and there was an increase of the fundamental frequency after reading for the dehydration. In auditory-perceptive voice evaluation, there was improvement after reading the hydration<sup>19</sup>.

A recent study also investigated the voice quality before and after continuous use of voice in hydration status (3l of water at the day before the recording and 1.5 liters of water before recording) and dehydration (no water intake from 10pm at the day before the recording and 200ml intake on the day of recording). The subjects were evaluated from the sustained vowel / a / before and after reading a text aloud, lasting 30 minutes. There was a significant reduction in the tension of the voices of hydrated subjects after continuous use of voice<sup>20</sup>.

The voice professional usually presents high weekly workload of vocal use and it favors the increase of voice and laryngeal disorders complaints, especially when hydration is not enough because, when appropriate,

it provides improved voice quality and it reduces the vocal symptoms<sup>5,13,27</sup>. A study verified that teachers who feel tired to speak did not drink water during the vocal use and they also speak loudly, a lot or making their voices heard<sup>28</sup>.

However, in this study, the majority of voice professionals and future voice professionals presented daily hours of vocal use less than eight hours (Table 1), that is, they do not make excessive use of voice<sup>24-26</sup>. And those who used to drink less than seven glasses of water a day, had daily workload of vocal use inferior to eight hours (Table 2).

The effectiveness of hydration for good vocal production is described as one of the important factors in reducing vocal complaints and, consequently, in improving vocal production<sup>14,16</sup>. However, in the literature there is no scientific proof of the ideal quantity of water that needs to be ingested daily in order to maintain the vocal folds hydrated, preventing complaints and vocal changes<sup>14,27</sup>.

In the present study, it was verified significant frequency of water available in the workplace (Table 1). Still, there was a significant association between the subjects who drank more than seven glasses of water a day and had water available in the workplace (Table 2), which confirms the importance of access to water, especially for voice professionals.

From these results, it seems that professionals and future voice professionals have knowledge of the beneficial effects of hydration, which encourages them to keep water in the work environment or the presence of water can be justified by the possible dryness caused in the oral cavity and pharyngeal during speech or even the concern of employers with the welfare of their employees. The voice professionals and future voice professionals with a workload of vocal use inferior to eight hours showed less quantity of hydration, but they did not fail to drink water and, perhaps, thereby they obtained a good result, showing no need for hydration increase.

Research that analyzed the vocal knowledge and its importance as a teaching resource in 112 professors, found that, in times of perceived voice problems, 45.5% of professors chose for hydration with the aim of improving the vocal quality<sup>12</sup>. The availability of water in the workplace can stimulate this habit.

Students of the theater major, future voice professionals responded, mostly, that they used to drink water to improve voice when it was bad, and 50% drank usually less than 2 liters of water per day<sup>5</sup>. Another

research carried out with teachers found that the majority of them (76.52%) reported drinking water, but a few drank more than 1 liter of water a day<sup>28</sup>. Although no statistical significance was verified, it was found that 54.29% of voice professionals and future voice professionals also had insufficient daily hydration, even having water during working hours (Table 1).

Hydration was reported by most subjects as an important habit to be followed and its consumption has been pointed out by almost all of them, in research carried out with voice professionals<sup>4</sup>. Furthermore, research with aquarobics teachers, it was found that most subjects used to drink water during classes<sup>29</sup>. However, in none of these studies it is specified the quantity of water that was consumed.

In a group of 422 teachers, 253, 60% reported in the present or past the perception of vocal symptoms, and among the above symptoms, in greater numbers were recorded the dry throat, hoarseness and fatigue to speak<sup>28</sup>. In this research, however, there was no predominance in relation to the complaint of dryness, and such result is justified by the fact that these professionals and future voice professionals have access to water and do not use the voice in an excessive way (Table 1).

Future research should be carried out in order to establish the quantity of water to be drunk with a view to effective hydration for voice professionals and future voice professionals, so that way the speech therapists could act and guide based on scientific evidence.

## CONCLUSION

Most voice professionals and future voice professionals of the present study used the voice for time inferior to eight hours and they had water available in the workplace. Those individuals who consumed less than seven glasses of water per day presented daily time of vocal use inferior to eight hours and those who drank more than seven glasses of water a day had water available in the workplace. There was no significance in relation to the complaint of dryness. It is highlighted the need for easy access to water in the workplace so that the professional has this habit as a preventive factor of dysphonia.

## REFERENCES

1. Fabrício MZ, Kasama ST, Martinez EZ. Qualidade de vida relacionada à voz de professores universitários. *Rev. CEFAC*. 2010;12(2):280-7.
2. Christmann MK, Scherer TM, Cielo CA, Hoffmann CF. Tempo máximo de fonação de futuros profissionais da voz. *Rev. CEFAC*. 2013;15(3):622-30.
3. Cielo CA, Christmann MK, Scherer TM, Hoffmann CF. Fluxo aéreo adaptado e coeficientes fônicos de futuros profissionais da voz. *Rev. CEFAC*. 2014;16(2):546-53.
4. Ueda KH, Santos LZ, Oliveira IB. 25 anos de cuidados com a voz profissional: avaliando ações. *Rev. CEFAC*. 2008;10(4):557-65.
5. Miranda IC, Ladeira AC, Gouveia VL, Costa VR. Auto-análise vocal de alunos do curso de teatro. *Disturb Comun*. 2012;24(3):369-78.
6. Behlau M. *Voz: O livro do especialista*. Vol 1. 3ª ed. Rio de Janeiro: Revinter; 2013.
7. Ferreira LP, Akutsu CM, Luciano P, Viviano NDAG. Condições de produção vocal de teleoperadores: correlação entre questões de saúde, hábitos e sintomas vocais. *Rev Soc Bras Fonoaudiol*. 2008;13(4):307-15.
8. Ribeiro VV, Santos AB, Bonki E, Prestes T, Dassie-Leite AP. Identificação de problemas vocais enfrentados por cantores de igreja. *Rev. CEFAC*. 2012;14(1):90-6.
9. Cielo CA, Ribeiro VV, Hoffmann CF. Sintomas vocais de futuros profissionais da voz. *Rev. CEFAC*. 2015;17(1):34-43.
10. Cielo CA, Hoffmann CF, Scherer TM, Christmann MK. Tipo e modo respiratório de futuros profissionais da voz. *Rev Saude*. 2013; 39(1):121-30.
11. Provenzano LCFA, Sampaio TMM. Prevalência de disфонia em professores do ensino público estadual afastados de sala de aula. *Rev. CEFAC*. 2010;12(1):97-108.
12. Servilha EAM, Costa ATF. Conhecimento vocal e a importância da voz como recurso pedagógico na perspectiva de professores universitários. *Rev. CEFAC*. 2015;17(1):13-26.
13. Ferreira LP, Servilha EAM, Masson MLV, Reinaldi MBFM. Políticas públicas e voz do professor: caracterização das leis brasileiras. *Rev Soc Bras Fonoaudiol*. 2009;14(1):1-7.
14. Xavier CMS. A influência da hidratação sistêmica na voz de coristas sem e com aquecimento vocal [dissertação]. Bauru (SP): Universidade de São Paulo; 2013.

15. Verdolini K, Min Y, Titze IR, Lemke J, Brown K, Mersbergen M *et al.* Biological mechanisms underlying voice changes due to dehydration. *J Speech Lang Hear Res.* 2002;45(2):268-81.
16. Fujita R, Ferreira AE, Sarkovas C. Avaliação videoquimográfica da vibração de pregas vocais no pré e pós hidratação. *Rev Bras Otorrinolaringol.* 2004;70(6):742-6.
17. Pinho SMR. Hidratação do organismo. In: Pinho SMR. Manual de higiene vocal para profissionais da voz. São Paulo: Pró-Fono; 2007. p.4-6.
18. Andrews ML. Distúrbios em adultos e seu tratamento. In: Andrews ML. Manual de tratamento da voz: da pediatria à geriatria. São Paulo: Cenage Learning; 2009. p.237-92.
19. Esteves DC. A influência da hidratação sistêmica na qualidade vocal. [dissertação]. São Carlos (SP): Universidade de São Paulo; 2011.
20. Teles LCS, Araújo YJP. Speech intelligibility in individuals hydrated and non-hydrated before and after continuous speech. The Voice Foundation 43rd Annual Symposium; 2014 May 28-Jun1. Philadelphia, Pennsylvania, USA. Philadelphia: The Voice Foundation. 2014.
21. Hartley NA, Thibeault SL. Systemic hydration: relating science to clinical practice in vocal health. *J Voice.* 2014;28(5):652.e1-652.e20.
22. Costa MMB, Maliska C. A new hypothesis for fluidification of vocal-fold mucus: scintigraphic study. *J Voice.* 2012;26(3):276-9.
23. Miri AK, Barthelat F, Mongeau L. Effects of dehydration on the viscoelastic properties of vocal folds in large deformations. *J Voice.* 2012;26(6):688-97.
24. Spina AL, Maunsell R, Sandalo K, Gusmão R, Crespo A. Correlação da qualidade de vida e voz com atividade profissional. *Braz J Otorhinolaryngol.* 2009;75(2):275-9.
25. Silva MSB. Considerações periciais acerca da voz enquanto instrumento de trabalho. *Revista IPOG [periódico na Internet].* Jan 2013 [acesso em Jun 2015]; 13 p. Disponível em: <http://www.ipog.edu.br/download-arquivo-site.sp?arquivo=consideracoes-periciais-acerca-da-voz-enquanto-instrumento-de-trabalho-179416.pdf>.
26. Korn GP, Pontes AAL, Abranches D, Pontes PAL. Hoarseness and risk factors in university teachers. *J Voice.* 2014;29(4):518.e21-8.
27. Wyk LV, Cloete M, Hattingh D, Linde JVD, Geertsema S. The effect of hydration on the voice quality of future professional vocal performers. *J Voice.* Ahead of print. 2016.
28. Ferreira, LP, Latorre, MRDO, Giannini SPP, Ghirardi ACAM, Karmann DF, Silva EE *et al.* Influence of abusive vocal habits, hydration, mastication, and sleep in the occurrence of vocal symptoms in teachers. *J Voice.* 2010; 24(1):86-92.
29. Machado PG, Hammes MH, Cielo CA, Rodrigues AL. Os hábitos posturais e o comportamento vocal de profissionais de educação física na modalidade de hidroginástica. *Rev CEFAC.* 2011;13(2):299-313.