

# Perceived vocal complaint and self- assessment of the vocal problem impact in professional theater actors

## Percepção de queixa vocal e autoavaliação do impacto de um problema de voz em atores profissionais de teatro

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### ABSTRACT

**Purpose:** To investigate the occurrence of self-reported vocal complaints in the professional use of the voice in professional theater actors; analyze the correlation between the presence of vocal complaint and three self-assessment protocols of the vocal problem impact; The Voice Symptom Scale (VoiSS), the Vocal Tract Discomfort (VTD) scale and the Voice Handicap Index -10 (VHI -10); verify the most robust protocols to identify dysphonia in this population. **Methods:** The participants were 75 professional theater actors, men and women, between 18 and 64 years old. They answered to a questioner informing presence or absence of vocal complaint and to three self-assessment protocols: VoiSS, VTD and VHI-10. **Results:** 25% of the actors presented vocal complaints. The group with vocal complaint (GwVC) had more voice symptoms and higher frequency and intensity of vocal tract discomfort than the group with no vocal complaint (GnVC). No group presented voice handicap considering the VHI-10 and a very high correlation between the VTD frequency and intensity scores. The GnVC presented moderate correlation between the VoiSS and the VTD, moderate correlation between the VoiSS and the VHI-10 and, a very high correlation between the VTD frequency and intensity scores. **Conclusion:** In this study, 25% of professional theater actors presented vocal complaints. The correlation between vocal complaints and protocols was positive and ranged from moderate to strong. The VoiSS and the VTD were more robust identify dysphonia in the GwVC.

**Keywords:** Voice; Voice disorders; Signs and symptoms; Speech, language and hearing sciences; Health promotion; Art; Suvery and questionnaires

### RESUMO

**Objetivo:** investigar a ocorrência de queixa vocal autorreferida no uso profissional da voz em atores profissionais de teatro; correlacionar presença de queixa vocal com três protocolos de autoavaliação do impacto de uma alteração vocal: Escala de Sintomas Vocais (ESV), Escala de Desconforto do Trato Vocal (EDTV) e Índice de Desvantagem Vocal -10 (IDV-10); verificar quais protocolos são mais robustos à detecção do impacto de possível disfonia nessa população. **Métodos:** Participaram 75 atores profissionais de teatro, ambos os gêneros, 18 a 64 anos. Os atores informaram a presença ou ausência de queixa vocal e responderam a três protocolos de autoavaliação: Escala de Sintomas Vocais (ESV), Escala de Desconforto do Trato Vocal (EDTV) e Índice de Desvantagem Vocal-10 (IDV-10). **Resultados:** constatou-se que 25% dos atores apresentaram queixa vocal. O grupo com queixa (GCQ) apresentou maior número de sintomas vocais e maior frequência e intensidade de desconforto de trato vocal, quando comparado ao grupo sem queixa (GSQ). IDV-10 não identificou desvantagem vocal nos grupos. No GCQ, houve correlação forte entre ESV e IDV-10 e correlação muito forte entre os escores de frequência e intensidade da EDTV. No GSQ, houve correlação moderada entre ESV e EDTV, ESV e IDV-10 e correlação muito forte entre os escores de frequência e intensidade da EDTV. **Conclusão:** neste estudo, 25% dos atores profissionais de teatro apresentaram queixa vocal. A correlação entre a queixa vocal e os protocolos foi positiva e variou de moderada à forte. No GCQ, a ESV e a EDTV foram instrumentos mais robustos na detecção do impacto de uma possível disfonia.

**Palavras-chave:** Voz; Distúrbios da voz; Sintomas; Fonoaudiologia; Promoção da saúde; Arte; Questionários

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## INTRODUCTION

The theater is considered one of humanity's oldest forms of artistic expression. The development of the voice, associated with the improvement of bodily awareness is a fundamental element for theater actors during the characterization of a role<sup>(1)</sup>.

In the theater, the idea that the show must go on leads actors to perform under adverse conditions, which can damage their general health, including emotional, generating laryngeal alterations and a reduction in acting performance<sup>(2,3)</sup>.

Actors require ample vocal plasticity for the psychophysical and timbral characteristics to be transmitted, thereby expressing the range of human emotions of each character<sup>(4)</sup>. Rehearsals and performances frequently involve emotionally charged moments, often producing vocalizations accompanied by extreme physical movements, such as simulated fights, or sudden emotional explosions, such as screams or groans for example<sup>(5)</sup>. These violent vocal expressions seem to involve extremes of frequency and intensity of sound, an increase in muscular tension in the perilaryngeal region and explosions of air, through partially closed vocal folds. The vocal activities of theater actors suggest that they fit into a group at risk of developing vocal problems, due to the extremely high vocal demands and vocal abuse, which can contribute to injuries to the vocal folds and vocal alterations<sup>(5,6)</sup>. However, data regarding the prevalence of vocal disorders in this group of vocal professionals are still scarce<sup>(7,8)</sup>. Only 8.25% of studies regarding voice professionals, in audiology, consider the voice of the theater actor<sup>(9)</sup>.

Even given the limited information regarding vocal complaints in actors, vocal fatigue is considered a common occurrence for the artistic population (actors and singers)<sup>(8,10,11)</sup>. A study realized using a self-evaluation questionnaire showed that 40% of the actors interviewed reported presenting vocal fatigue after shows, with complaints of worsened projection and sustaining of the voice<sup>(10)</sup>. Another study, that used the Vocal Tract Discomfort Scale (VTDS), showed that theater actors more frequently present all the symptoms of vocal tract discomfort, in comparison with a population of 333 individuals without perceived vocal problems<sup>(12)</sup>, suggesting, therefore, that theater actors are a risk group for developing vocal disorders<sup>(8)</sup>.

The literature also references environmental and socio-occupational aspects of voice use for professional theater actors. In this context, one study investigated complaints and vocal symptoms of 48 professional theater actors. The results showed that 83.3% of the interviewees carried out some vocal training for acting, and 35% reported difficulties to maintain vocal quality during day-to-day activities. In total, 29.2% reported difficulties for coordination of speaking and breathing during performances. The study also highlighted a greater incidence of vocal complaints during performances, than during day-to-day activities involving vocal use, suggesting that this difference is generated by the demands on the phonatory system during theater performances<sup>(1)</sup>.

In clinical practice, generally, the most common complaints of actors are related to the presence of disagreeable physical sensations, associated with vocal production. In many cases, they are the physical symptoms that motivated them to seek out a doctor or audiologist/speech therapist for evaluation of their voice<sup>(13,14)</sup>.

Vocal self-evaluation questionnaires are known both in the clinical and scientific communities. They are used as a standard reference in screening procedures, investigating the extent of the vocal problem in the life of the client and helping in the evaluation of the efficacy of the treatment applied<sup>(15)</sup>.

Amongst these instruments, the Vocal Symptom Scale (VSS) evaluates the self-perception of vocal symptoms and the impact produced by the vocal disorder. It is considered a robust questionnaire for use in clinical procedures and for research<sup>(16,17)</sup>. Additionally, it can be used as a reference standard to identify individuals with and without self-referred vocal issues<sup>(18)</sup>. The Vocal Tract Discomfort Scale (VTDS) is a self-evaluation instrument that seeks to identify the sensory perception of discomfort in the vocal tract, according to the frequency and intensity of the symptoms. Eight qualitative descriptors are used: burning, tightness, dryness, sore throat, itching, sensitive throat, irritated throat, and lump in the throat. It is the only vocal self-evaluation instrument that specifically investigates the symptoms of vocal tract discomfort<sup>(18,19)</sup>. The Vocal-Disadvantage Index-10 (VDI-10), validated for Brazilian Portuguese, is composed of ten questions that analyze the possible disadvantages related to the vocal problems of participants in their day-to-day activities<sup>(20,21)</sup>.

Thus, it is worth noting that the significant vocal demands of professional theater actors frequently associated with the unfavorable conditions of vocal production can trigger possible vocal problems that will have a negative impact both on their health as well as on the artistic performance of these individuals. It becomes fundamental, therefore, to seek forms of early detection for complaints, with the aim of preventing the appearance of vocal disorders. Given that the self-evaluation protocols can be used to this end and are easily applicable instruments, it seems worthwhile to investigate their application on the population described in this study.

Therefore, this research aims to investigate the perception of vocal complaints in professional actors in the professional use of the voice in the theater; correlate the presence of vocal complaints with three self-evaluation protocols for the impact of vocal alterations: Vocal Symptom Scale (VSS), Vocal Tract Discomfort Scale (VTDS) and the Vocal Disadvantage Index-10 (VDI-10); verify which of these protocols is more robust for the detection of the impact of possible dysphonia on this population.

## METHODS

This is a descriptive, transversal, and observational study. This research was firstly approved by the Ethics Committee for Research of the Universidade de Taubaté – CEP-UNITAU, under the protocol 2.191.729. All participants read and signed the Free and Informed Consent Form.

The inclusion criteria applied were minimum age of 18 years, registered with the Regional Work Center – RW; both genders, with or without vocal complaints, professional engagement in theater pieces for at least one year, being in theaters during the data collection period and the dysphonia impact self-evaluation questionnaires fully completed. The exclusion criteria were younger than 18 years, exclusively involved in television or musical theater.

The subjects were recruited via social networks, the internet and an online google form, over a period of 60 days. The actors who satisfied the inclusion criteria came from the Artists and

Technicians in Entertainment Union of São Paulo (SATÉD-SP), Secretary of Culture of Osasco, Macunaíma Theater School, Theater Commune and the Autonomous Theater Group of Maceió.

A questionnaire of sociodemographic data was used to characterize the participants and contained information regarding the professional activity of the theater actor, if they undertook other employment activities, time working in professional theater, and if they presented a perception of vocal complaints in the professional use of the speaking voice (Annex 1).

Based on the inclusion criteria adopted, the research sample included 75 participants, 37 women and 38 men, aged between 18 and 64 years, and with a time of acting in professional theater of between two to 45 years. The participants were divided into two groups, according to the presence or absence of vocal complaints: group with vocal complaints – GwVC and group no vocal complaints – GnVC. The GwVC was made up of 19 actors with self-referred complaints, 11 women and eight men, aged from 19 to 61 years with an average of 39 years of age. The time for professional work in theater varied from two to 45 years. In this group, two of the subjects (10.5%) worked from two to five years, five (26.3%) from six to ten years, six (31.6%) from 11 to 20 years, three (15.8%) from 21 to 30 years and three (15.8%) from 30 to 45 years. In terms of professional activity, three (15.78%) worked exclusively as theater actors, two (10.52%) as theater and television actors and 14 (73.68%) as theater actors and other employment activities, such as dubbing, hosting, and teaching.

The GnVC was made up of 56 actors, 26 women and 30 men, aged from 18 to 64 years, average age of 38. The duration of professional activity in the theater varied from two to 45 years. In this group, ten (17.9%) individuals worked from two to five years, eight (14.3%) from six to ten years, 20 (35.7%) from 11 to 20 years, 15 (26.8%) from 21 to 30 years and three (5.4%) from 30 to 45 years. In terms of professional activity, 11 (19.64%) worked exclusively as theater actors, four (8.77%) worked as theater and television actors and 41 (73.21%) as theater actors and other employment activities, such as dubbing, director's assistant, artisan, theater director, journalist, presenter, storyteller, marketing, entrepreneur, and teacher.

To verify the presence of vocal symptoms and (A) vocal handicap in professional theater actors, the scores of the total score from the (B) Voice Symptom Scale (VoiSS) and from the (C) Voice handicap Index-10 (VHI-10) were used, in both groups. Subsequently, each score was compared with their respective cut-off scores, 16 points for the VSS and 7.5 for the VDI-10<sup>(17)</sup>.

The result for the total score for the VTDS, did not present a cut-off score, due to being a non-validated instrument. Therefore, the presence of vocal tract discomfort perceived in actors with and without self-referred vocal complaints is given by the absolute and relative frequencies of the collected data.

### Self-evaluation protocols for the impact of dysphonia

The three self-evaluation protocols for the impact of dysphonia used were: Vocal Symptom Scale – VSS<sup>(16)</sup>, Vocal Tract Discomfort Scale – VTDS<sup>(19)</sup> and the Vocal Disadvantage Index-10 - VDI-10<sup>(21)</sup>.

The Vocal Symptom Scale – VSS<sup>(16)</sup> is a self-evaluation instrument with 30 affirmatives that are analyzed according to the frequency of occurrence. The subjects were instructed to indicate the frequency with which each symptom occurred, on

a Likert scale, which varies from 0 to 4, with 0 corresponding to never and 4 to constantly. The total score was arrived at through simple addition.

The Vocal Tract Discomfort Scale – VTDS<sup>(19)</sup> is made up of eight qualitative descriptors (symptoms), with each one having seven frequency and intensity variations. The subjects were instructed to indicate the frequency of sensation of the discomfort on a Likert scale, which varied from 0 to 6, with 0 corresponding to never and 6 to always. On the same scale, the participants were instructed to indicate the intensity of the sensation of discomfort, on a Likert scale, which varied from 0 to 6, with 0 corresponding to never and 6 to extreme intensity. The objective of this scale is to determine the frequency and the intensity with which these symptoms appear.

The Vocal Disadvantage Index-10 – VDI-10<sup>(21)</sup> is made up of ten questions with the aim of showing how vocal problems can interfere with day-to-day activities, understanding that, the higher the score, the greater the vocal disadvantage. Individuals were instructed to indicate the answer that best described their voice and its effect on their day-to-day life, between never and always, on a Likert scale, which varied from 0 to 4, with 0 corresponding to never and 4, always. The total domain score for the protocol was calculated via simple addition.

### Statistical analysis

Data from the questionnaires were entered into an MS-Excel® (Microsoft Corporation, São Paulo, SP, 2010, Brazil) spreadsheet and subsequently the descriptive statistical analysis was carried out.

Based on the data collected, we performed the correlation between the presence or absence of vocal complaints self-referred by the actors and the three self-evaluation protocols. To this end, the Spearman Correlation Test was used.

For both the GwVC and GnVC groups, the correlations between the total score of the VSS with that of the VTDS, in frequency and intensity, of the VSS with that of the VDI-10, of the VDI-10 with that of the VTDS, in frequency and intensity, and of the VTDS with the VTDS in frequency and intensity, were carried out.

The degree of correlation reflected the following classification: 0.1 – 0.2, very low correlation; 0.2– 0.4, low correlation, 0.4 – 0.6, moderate correlation; 0.6 – 0.8, strong correlation and > 0.8, high correlation between the variables<sup>(22)</sup>.

The descriptive and inferential statistical analysis was realized using JMP/SAS, version 14 and STATA, version 15.1 software. For all the statistical tests, the level of significance established (alpha) was 5%.

For the categorical variables, the absolute and relative frequencies were calculated. For the numerical variables, the central tendency and variability elements were calculated, with the normal distributions being evaluated using the Shapiro-Wilk test. This showed that the sample data did not present normal distribution. Therefore, non-parametric tests were used. The data were described using medians and quartiles.

For the realization of the statistical inferences, depending on the evaluation and on the association, correlation or comparison, Fischer's Exact test, Spearman Correlation or Wilcoxon test, were used respectively. When the categorical variables only had two categories each, we opted for Fischer's Exact test. When the two variables in the association study were numerical, we opted

for the Spearman Correlation. The comparison of the scores between the groups was performed using the Wilcoxon test.

## RESULTS

### Self-referred vocal complaints

The perception of self-referred vocal complaints was present in 19 of the 75 actors who participated in the study. Based on this finding, the GwVc was made up of 19 (25.33%) actors and the GnVC by 56 (74.67%) participants (Table 1).

### Self-evaluation protocols for the impact of dysphonia

The median Vocal Symptom Scale – VSS in the GwVc was 27 points, while that of the GnVC was 13.5 points. Therefore, the GwVC presented more vocal symptoms than the GnVC.

On the Vocal Tract Discomfort Scale (VTDS), the GwVC presented a median score of 10 points for frequency and 12 points for intensity of symptoms. In the GnVC, the median score was 4 points for frequency and 5 points for intensity of symptoms, a statistically significant difference between the groups.

In the Vocal Disadvantage Index-10 (VDI-10), the GwVC presented an average score of 4 points while the GnVC was 2.5 points. (Table 2)

**Table 1.** Self-referred vocal complaint of theater actors during professional performance

Perception of vocal complaint	N	%
GwVC	19	25,33
GnVC	56	74,67
Total	75	100

**Subtitle:** N = number of participants; % = percentage; GwVC = group with self-referred vocal complaints; GnVC = group without self-referred vocal complaints

**Table 2.** Scores for the Vocal Symptom Scale, the Vocal Tract Discomfort Scale and of the Vocal Disadvantage Index-10, in the groups of actors with and without self-referred vocal complaints

Protocol	Group	Cases	Minimum	1st Quartile	Median	2nd Quartile	Maximum	p Value	
VSS	GwVC	19	12	16	27	35	52	<0,0001*	
	GnVC	56	1	7	13,5	20	31		
VTDS	Frequency	GwVC	19	1	10	10	16	24	<0,0001*
		GnVC	56	0	2	4	8,75	21	
	Intensity	GwVC	19	3	6	12	18	28	0,0004*
		GnVC	56	0	2	5	9,75	25	
VDI-10	GwVC	19	0	2	4	11	15	0,0149*	
	GnVC	56	0	1	2,5	4	10		

\*Statistically significant values ( $p \leq 0.05$ ) – Wilcoxon Test

**Subtitle:** VSS = Vocal Symptom Scale; VTDS = Vocal tract discomfort scale (frequency and intensity); VDI-10 = Vocal disadvantage index -10; GwVC= group with self-referred vocal complaint; GnVC = group without self-referred vocal complaint

### Correlations between the self-evaluation protocols according to the groups with and without vocal complaints.

For the group of theater actors with self-reported vocal complaints – GwVC, a strong positive correlation between VSS and VDI-10 (0.7737,  $p=0.0001^*$ ) and high correlation between VTDS frequency and VTDS intensity (0.912,  $p<0.0001$ ) were observed. In terms of the group of theater actors without vocal complaint – GnVC, a moderate correlation between VSS and VTDS frequency (0.5714;  $p=0.000$ ) and VTDS intensity (0.5704;  $p=0.000$ ) was observed; moderate correlation between VSS and VDI-10 (0.4331;  $p=0.0009$ ) and high correlation between VTDS frequency and VTDS intensity (0.9123;  $p=<0.0001$ ) were also observed, as Table 3 shows.

## DISCUSSION

The voice alterations identified by audiologists or doctors are not always noticed in the same manner by voice professionals. The use of self-evaluation protocols allows the clinician to understand the impact of a vocal problem from the perspective of the patient.

In this context, our study aims to investigate the perception of vocal complaints by theater actors, correlate this perception with three important self-evaluation protocols – VSS<sup>(16)</sup>, VTDS<sup>(19)</sup>, and VDI-10<sup>(21)</sup> and verify the most robust protocols to detect the impact of possible vocal alterations in this population.

We opted for three protocols for self-evaluation of the impact of dysphonia, that are commonly used in clinical practice and in research. They are easily applicable and useful for the objectives that we sought to evaluate in this study<sup>(16,19,21)</sup>.

Therefore, to investigate vocal symptoms, the Vocal Symptom Scale (VSS), which evaluates self-perception of vocal symptoms and is considered a perfect classifier<sup>(16,17)</sup> was selected. For vocal discomfort, the Vocal Tract Discomfort Scale (VTDS) was selected, which seeks to identify the sensory perception of vocal tract discomfort<sup>(19)</sup>. For the vocal disadvantage, the VDI-10 was chosen, which is a questionnaire that provides

**Table 3.** Correlations between Vocal Symptom Scale, Vocal Tract Discomfort Scale and Vocal Disadvantage Index-10 in professional theater actors with and without self-referred complaints

Group	Protocols	Correlation	p Value
GwVC	VSS x VTDS		
	Frequency	0,3311	0,1661
	Intensity	0,3563	0,1343
	VSS x VDI-10	0,7737	0,0001*
	VDI-10 x VTDS		
	Frequency	0,3751	0,1135
	Intensity	0,3435	0,1498
GnVC	VTDS x VTDS		
	Frequency x Intensity	0,9123	<0,0001*
	VSS x VTDS		
	Frequency	0,5714	<0,0001*
	Intensity	0,5704	<0,0001*
	VSS x VDI -10	0,4331	0,0009*
	VDI-10 x VTDS		
GnVC	Frequency	0,0804	0,5557
	Intensity	0,1619	0,2332
	VTDS x VTDS		
GnVC	Frequency x Intensity	0,9123	<0,0001*

\*Statistically significant values ( $p \leq 0.05$ ) – Wilcoxon Test and Spearman correlation  
**Subtitle:** VSS = Vocal symptom scale; VTDS = Vocal Tract Discomfort Scale; VDI -10 = Vocal disadvantage index -10; GwVC = group with self-referred vocal complaint; GnVC = group without self-referred vocal complaint

information regarding vocal production and the impact of the voice on day-to-day life<sup>(20,21)</sup>.

Given that no other study evaluates the relation between these three self-evaluation protocols in professional theater actors, the discussion of this study is based on the research results that used the self-evaluation instruments for the impacts of dysphonia. Studies carried out using the results of the correlations between VSS with VTDS in dysphonic patients were also considered. Additionally, we found no studies that correlated VSS with VDI-10 in the literature.

We found that 25.33% of professional theater actors, currently working, presented professional vocal complaints. The data show a lower percentage of vocal complaints among theater actors, than in the study conducted by D'haeseleer et al.<sup>(8)</sup> who, in analyzing 33 professional theater actors in Flanders (Belgium), found that 34.6% of actors presented vocal complaints<sup>(8)</sup>.

Our results suggest that the presence of vocal complaints did not stop professional performance of the theater actor. However, monitoring by an audiologist specialized in voice can help to improve the voice, maximizing the performance during theatrical shows. It is also possible to infer that the audiologist who works with this public can help them to stay more attentive to the health of one of their work tools, the voice. In this manner, the actor should be attentive to any vocal difficulty and seek guidance, or, where necessary, treatment, before a problem in fact becomes chronic.

In relation to the VSS (Table 2), we observed that the median score was 27 points for the self-evaluation of vocal symptoms in the GwVC. In the group of actors without self-referred vocal complaints (GnVC) the median score was 13.5 points. The results referent to the GwVC reaffirmed the findings from the mapping of vocal risk in amateur choristers, with 51.5% of the sample presenting 16 points in the VSS<sup>(23)</sup>. Our data showed that

the GwVC presents risk of dysphonia, given that it presented a score higher than the cutoff score of 16 points, recommended for the VSS. On this scale, a total score higher than 16 points separated individuals with dysphonia from vocally healthy subjects<sup>(17)</sup>. Therefore, at least 50% of the participants in this research, with self-referred vocal complaints, present vocal risk, although they continue to act. This fact could undermine both their performance, and the vocal health of these artists and suggests the need to invest in vocal care throughout the professional trajectory.

The GwVC presented a median value of 10 points in the VTDS frequency and 12 points for the VTDS intensity. The respective data diverge from the study related to the symptoms of vocal tract discomfort in patients with different vocal disorders, in which the results presented an average of 4.1 for vocal tract discomfort symptoms in individuals with vocal disorders with different etiologies<sup>(14)</sup>. The elevated score observed in this study could be related to the use of the voice during professional activity, generated by the high demand imposed by the profession. Additionally, theater actors frequently present an intensive use of the laryngeal and perilaryngeal<sup>(5,6)</sup> musculature region and, therefore, can damage their vocal tract and vocal health, which suggests that this group can present a risk of developing dysphonia due to musculoskeletal tension.

The GnVC presented a median score of 4 points for VTDS frequency and 5 for VTDS intensity (Table 2), a result that was close to the study into the voice of professional theater actors, which observed a value of 4.5 for discomfort in the vocal tract in the population studied<sup>(8)</sup>. Therefore, due to the vocal demands involved in being a professional theater actor, it is suggested that the symptoms related to the vocal tract receive attention more specific to this professional category.

In relation to the VDI-10 (Table 2) the GwVC presented a median value of 4 points from the total score. In relation to the GnVC, the median score was 2.5 points ( $p=0.0149$ ). In our study, both groups presented a median score of VDI-10 below the cutoff value established by the literature, 7.5 points<sup>(17)</sup>. These data are related to the study into professional theater actors, in which 96% of the sample obtained a score below the cutoff score for the Vocal Disadvantage Index-10 – VDI-10<sup>(8,17)</sup> and did not recognize the vocal disadvantage, even with a high prevalence of complaints. This suggested that the VDI-10 is not sufficiently sensitive for this specific group of elite vocal artists<sup>(8)</sup>. Additionally, our study showed a statistically significant difference between the median scores of the groups with the same vocal complaint, indicating that the values of the cutoff score differed between the groups. Therefore, it is suggested that, although the median value for the VDI-10 is below the cutoff score in both groups, even so the difference between them was significant.

The correlation between VSS and VDI-10 was found to be strong and significant in the GwVC and moderate in the GnVC groups (Table 3). These data confirmed the findings of the research that compared the VSS with the VDI-10, pre- and post-removal of lesions from the vocal folds in patients with benign alteration of the larynx<sup>(24)</sup> with a reduction in the scores of the instruments being observed post-intervention. The results encountered in the literature indicate the presence of a positive correlation between the instruments used<sup>(24)</sup>. Our data suggest that the VSS is more robust for the identification of vocal complaints in this population of professional theater actors.

Very strong and significant correlations in the VTDS frequency and VTDS intensity, in both the GwVC and GnVC were observed (Table 3). These data agree with those of a study into the applicability of the Vocal Tract Discomfort Scale, in which the results obtained showed a strong correlation in the VTDS in frequency and intensity, in the pre- and post-treatment in individuals who use their voice professionally, indicating that the VTDS is a useful tool for monitoring patients with occupational dysphonia<sup>(25)</sup>. Therefore, the data suggests that the more intense the vocal symptom, the more frequent its occurrence. Given this, the data obtained in this study confirm the importance of investigating qualitative elements in research into self-evaluation for the impact of vocal disorders. Additionally, the statistical analysis highlighted a strong similarity in the VTDS frequency and intensity scales for both groups, its being possible to opt for the use of one of them, either VTDS frequency or VTDS intensity.

The correlation between VSS and VTDS (frequency and intensity) in the GwVC was not significant (Table 3), a result that is in agreement with the study that analyzed the correlation between the VSS and the VTDS in the behavioral and organic dysphonia, in which there was no correlation between the instruments<sup>(26)</sup>.

There was a moderate correlation between VSS and VTDS (frequency and intensity) in the GnVC (Table 3), however other studies that investigated these correlations in elite vocal populations, without voice complaints were not identified. Given this, the study that correlated the Vocal Tract Discomfort Scale-VTDS and the Vocal Symptoms Scale-VSS in the evaluation of dysphonic patients<sup>(18)</sup> was used as the basis. This study concluded that the VSS is a robust instrument and that there is a moderate and positive correlation between the VSS and the VTDS in dysphonic patients<sup>(18)</sup>. Considering the characteristics of each instrument, the correlation between them suggests the possibility of using the VTDS to evaluate and monitor the discomfort symptoms in voice professionals with high vocal performance. Additionally, the moderately positive correlation between the total VSS and VTDS scores indicates that the prevalence of these symptoms can affect the self-perception of the impact of the vocal disorder in different aspects of the life of this population.

Our results suggest that the VSS is the most robust self-evaluation protocol for theater actors. It also recommends the use of the VTDS protocol for clinical evaluation in research using qualitative data in the voice area for professional theater actors, due to the strong correlation between frequency and intensity in the vocal tract discomfort scale in the groups studied.

The data found in this research were obtained from protocols that were not originally elaborated specifically for application with voice professionals. However, they offer information that can be related to audiological interventions for this public, highlighting forms of investigation and directions to be taken when working with voice professionals.

Our study design presents some limitations, given that variables related to gender, age and time of professional involvement were not discussed. Additionally, it is important to note that 73% of participants of the sample worked as professional theater actors and undertook additional employment. In this context, the literature<sup>(1,6,7,9)</sup> recommends that voice professionals need to take greater care in relation to the use of their voice, in light of the general population.

For future research, an increase in the number of participants in the sample is recommended, as well as the establishment of age brackets and the investigation of demands imposed on vocal use, so that the consistency of answers can be maintained. It is also recommended that participants who presented some organofunctional vocal disorder be considered in the exclusion criteria.

## CONCLUSION

In our study, 25% of professional theater actors presented vocal complaints. The correlation between the presence of vocal complaints and the self-evaluation protocols was positive and varied from moderate to strong. For the group with vocal complaints, the VSS and the VTDS were the most robust instruments for the detection of the impact of possible dysphonia.

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**Annex 1.** Sociodemographic questionnaire for self-referred vocal evaluation

## SOCIODEMOGRAPHIC QUESTIONNAIRE FOR SELF-REFERRED VOCAL EVALUATION

## A) Identification data

Name: \_\_\_\_\_

Birthdate: \_\_\_\_\_ Current age: \_\_\_\_\_

Sex: Female ( ) Male ( )

Do you have a DRT? Yes ( ) No ( )

## QUESTIONNAIRE

## B) Professional activities

 Theater actor Musical theater actor Television actor Musical theater and theater actor Television and theater actor Theater actor and other employment activities

In addition to theater actor, what other employment activities do you undertake? \_\_\_\_\_

## C) Time of professional activity in theater

 One year or longer – How long have you been professionally engaged in theater? \_\_\_\_\_ Less than one year

## D) Self-referred vocal complaint

Do you present vocal complaints when using your professional speaking voice? Yes ( ) No ( )

**Subtitle:** DRT = professional registration emitted by the Regional Delegacy for Labor