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Association between readiness for behavior change and complaints of vocal problems in teachers

Associação entre prontidão para mudanças de comportamento e queixa de disfonia em professores

ABSTRACT

Purpose: To verify the association between readiness to behavioral change and self-reported vocal problems of teachers in schools from the municipal education network of Montes Claros, Minas Gerais, Brazil. **Methods:** The URICA-VOICE scale was used to measure the motivational stages of 138 teachers. Readiness to change was the variable outcome, whereas the independent variables referred to sociodemographic, economic, occupational, lifestyle, general health, and teacher's own voice factors. **Results:** The majority (59.4%) of teachers were in the pre-contemplation stage of the URICA-VOICE scale. The variables use of medication, perception of voice failure, and demand for speech and language therapy were retained for the final model. **Conclusion:** The low readiness to change showed the need for increased awareness of the risks and benefits related to the voice and general health. The results can provide public health intervention strategies that deal with individuals at various stages in the decision-making process.

RESUMO

Objetivo: Verificar a associação entre prontidão para mudanças de comportamento e queixa de disfonia autorreferida pelas professoras da rede municipal de ensino de Montes Claros, Minas Gerais, Brasil. **Métodos:** Foi aplicada a escala URICA-VOZ para a mensuração dos estágios motivacionais em 138 professoras. A prontidão para mudança constituiu a variável desfecho e as variáveis independentes se referiram a questões sociodemográficas, econômicas, ocupacionais, estilo de vida, saúde geral e sobre a própria voz. **Resultados:** A maioria (59,4%) se encontrava no estágio de pré-contemplação da escala avaliada. As variáveis que permaneceram associadas à mudança comportamental quanto à voz foram o uso de medicamento, a percepção de falha na voz e a procura por tratamento fonoaudiológico. **Conclusão:** A baixa prontidão para mudança sugere a necessidade de conscientização quanto aos riscos do mau uso e abuso da voz e benefícios em relação à saúde geral e vocal. Os resultados obtidos poderão fornecer estratégias para intervenções de saúde pública ao lidar com as pessoas em diferentes estágios do processo de tomada de decisão.

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INTRODUCTION

Health promotion is a process that aims to increase the capacity of individuals and communities to control and improve their own health, which is essential for building a culture of wellness, self-care, and quality of life⁽¹⁾. There are several health promotion theories, and the majority come from behavioral and social sciences because of the practice of focusing on the behavior of individuals and how society is organized⁽²⁾. The most commonly used theories between 2000 and 2005 were Transtheoretical Model, Social Cognitive Theory and the Belief Model in Health⁽³⁾.

The Transtheoretical Model, or Model of Change Phases, came up in the late 1970s and is based on the concept of stages of change to integrate processes and change principles resulting from the main intervention theories⁽⁴⁻⁶⁾. The Transtheoretical Model can be considered an important tool to help understand the health-related behavior change⁽⁴⁾.

On the basis of the Transtheoretical Model, scales were created to measure motivational stages, including University Rhode Island Change Assessment (URICA). This is a self-report scale measure used generally for all types of problems^(5,7), and it is based on the stages of change containing four subscales: pre-contemplation, contemplation, action, and maintenance (Chart 1). The first two steps describe the development of intention to act, and the last two steps describe the process of putting the intention to change into practice⁽⁸⁾.

Important to remember that one cannot consider this model as linear and static because people do not go through stages sequentially; they can skip them or relapse, going in and out of stages⁽⁹⁾, which leads to a dynamic evolution in spiral. Relapse is normal and expected when one is seeking a long-term behavior change⁽⁵⁾.

There is already an adapted version of URICA for people with dysphonia in Brazil, which is a questionnaire containing 32 items⁽⁷⁾. Clinical and research utility of URICA is unquestionable⁽¹⁰⁾ as it helps understand the motivation of individuals regarding their capacity of changing health-related behavior⁽⁴⁾.

Among voice professionals, the category of teachers is the most vulnerable to the onset of dysphonia⁽¹¹⁾. Therefore, the perception that a teacher has on his voice problem may be an important tool for the early detection of vocal problems⁽¹²⁾. Moreover, the speech therapist must value the patient's needs considering their own perspective, and it is essential to know about their sociodemographic status, individual characteristics, beliefs, and values⁽¹³⁾.

The literature lacks studies relating the Transtheoretical Model to speech disorders, which shows the importance of further research. So, the objective of this study was to assess the readiness for behavior change among teachers in the municipal school Montes Claros, Minas Gerais, who had complaints of dysphonia, and the association with sociodemographic, economic, occupational, lifestyle, general health, and other variables related to voice.

METHODS

This epidemiological, cross-sectional, analytical study was conducted in Montes Claros, northern Minas Gerais, Brazil. The city has about 370,000 inhabitants and is the main regional urban center in the State. The target population consisted of teachers of the first 5 years of primary education in municipal schools. According to data from the Municipal Department of Education, the network is composed of 640 teachers.

First, the sample calculation was performed by simple random sampling to estimate the prevalence of voice disorders. Calculation was set with a confidence level of 99%, accuracy of 5%, and estimated prevalence of self-reported voice alteration of 11.6%⁽¹¹⁾, so it was concluded that 196 teachers from municipal schools should be allocated in the study, considering possible losses. Male teachers were excluded due to their small number in the municipal network and anatomical differences of the larynx. Teachers not currently acting in the field and those of physical education were also excluded.

The data were collected in visits to schools. During recess time, the teachers were informed about the research

Chart 1. Stages of change, according to the Transtheoretical Model

Concept	Definition	Possible strategies	Example
Intention to act			
1. Pre-contemplation	Resistance: do not consider the behavior change hypothesis	Increase awareness of the need for change and customize information about risks and benefits	Do not intend to solve the problem
2. Contemplation	Awareness of the problem	Motivate or encourage to make specific plans	Thinking about solving the problem
Intention to change			
3. Action	Determination to change behavior or develop new ones.	Help with feedback, solving problems, social support, and reinforcement	In process of solving the problem
4. Maintenance	Maintain behavior change over time; prevention to relapse; consolidate the gains	Help with coping, reminders, find alternative avoiding slips, and relapse	Trying to get rid of the problem

Source: Adapted from the National Institutes of Health⁽⁹⁾

and the voluntary and anonymous character of participation. The self-administered questionnaire was structured and delivered in individual envelopes to teachers randomly chosen, and a date was set to collect it and clarify any doubts. Those who had vocal complaints were instructed to fill the URICA-VOICE questionnaire.

Application of URICA-VOICE questionnaire

We used the adapted version of the URICA-VOICE questionnaire with 32 items, whose questions concerning stages (pre-contemplation, contemplation, action, and maintenance) have possibilities of answers in scales such as five-point Likert scale, as oriented by the Health and Addictive Behaviors: Investigating Transtheoretical Solutions (HABITS) at the University of Maryland, Baltimore⁽¹⁴⁾. As recommended, the Yesple sum of statements was applied corresponding to each stage of change divided by the number of questions; later on the results of contemplation stages, action, and maintenance were summed up and then subtracted from the result of the pre-contemplation stage. Scores lower than or equal to 8.0 indicates that the individual is in pre-contemplation stage; 8.1–11.0, in contemplation stage; 11.1–14.0, in action stage; and equal to or greater than 14.1, in maintenance stage^(7,14).

Data analysis

The result of URICA-VOICE questionnaire was considered as dependent variable, which as dichotomized into pre-contemplation and contemplation stages.

Independent variables were divided into blocks:

- Block 1 – demographic and economic data: age, education, marital status, number of children, and income;
- Block 2 – occupational data: teaching experience, work shifts, average number of students per class, perception of noise in classroom, school, out of school, and ventilation;
- Block 3 – lifestyle: hydration during lessons, water intake per day, fruit juice intake, amount of juice per day, physical activity, frequency of alcohol intake, alcoholic doses when drinking, and smoking;
- Block 4 – health: treatment for gastroesophageal reflux, medical diagnosis of respiratory allergy, perception of breathing problem, and use of medication for diseases (hypertension, diabetes, depression or anxiety, sleep disturbances, rheumatism, etc.);
- Block 5 – voice: voice changes (hoarseness, dry throat, vocal fatigue, throat clearing, voice fails, vocal effort, pain when speaking, sore throat, etc.), voice use in daily life, sick leave for vocal problems, and default due to voice problems; and
- Block 6 – health care: medical consultations due to voice problems and speech therapy.

Statistical analysis was made with the Predictive Analytics SoftWare application (PASW® STATISTIC), version 18.0. Afterward, the bivariate analysis was done using the χ^2 -test of all dichotomized independent variables and the outcome variable. Those presenting descriptive level $p \leq 0.20$ were selected

for the logistic regression, which identified the variables associated with readiness to change.

This research was approved by the Research Ethics Committee of Universidade Estadual de Montes Claros (Unimontes) under Number 2889/11. All participants signed the informed consent before answering the questionnaire.

RESULTS

At first, a prevalence of self-reported voice problems was verified. In total, 226 teachers answered the questionnaire and 61.1% reported having voice problems. Of the 138 who provided affirmative answers, 58.0% had a change starting in up to 3 weeks before acute problem and 42.0%, a change over 3 weeks before chronic problem. As stated in the guideline of the American Academy of Otolaryngology-Head and Neck Surgery Foundation⁽¹⁵⁾, acute changes are those lasting less than 3 weeks.

Age of all 138 participants ranged from 26 to 54 years, with mean age of 41.4 years and standard deviation (SD) of 5.6. Number of children varied from 0 to 5, with mean of 1.9 (SD±1.1). The number of family members varied from 1 to 10, with mean of 4.0 (SD±1.3). Teaching experience varied from 1 year and 6 months to 29 years, with mean of 16 years and 5 months (SD±6 years and 4 months). The minimum number of students per classroom was 17 and the maximum was 40, with mean of 25.9 (SD±4.0). Main characteristics of the sample are shown in Tables 1 and 2.

With respect to teachers' distribution according to readiness to change, based on URICA-VOICE scale, 59.4% were in pre-contemplation stage; 37.0% in contemplation stage; 3.6% in action stage; and no one was in the maintenance stage. The level of readiness to change was in the score ranging from 1.4 to 12.5, with mean of 7.4 points (SD±2.1).

Considering that only five teachers were in the action stage, they were excluded from other statistical analyses. They reported voice problems for over a month, and three of them said they had sought speech therapy. One of them mentioned not having sought a speech therapist because the only symptom was sore throat and she believed it was a result of hypothyroidism.

The variable outcome was considered in two categories: pre-contemplation and contemplation. 65.0% of teachers with acute voice problems were in the pre-contemplation stage and 35.0% were in the contemplation stage; among those with chronic voice problem, 56.6% were in the pre-contemplation stage and 43.4% in the contemplation stage ($p=0.330$).

The bivariate analysis between the main group characteristics and the two stages for behavioral change by URICA-VOICE scale is presented in Table 3.

Table 4 shows the variables in the final model of statistical multivariate analysis. Those who reported using medication, failed to realize voice problems, or did/were doing speech therapy are more likely to present readiness for behavior change.

Table 1. Sociodemographic, economic, occupational, and lifestyle data of 138 teachers with voice problems allocated in public schools, Montes Claros, Minas Gerais, 2013

Variáveis	n	%
Age group		
26–29	4	2.9
30–39	44	31.9
40–49	81	58.7
50–54	9	6.5
Marital status		
Single	20	14.5
Married	98	71.0
Divorced	17	12.3
Widow	3	2.2
School		
Higher education and postgraduation	62	44.9
Higher education without postgraduation	73	52.9
Secondary school	3	2.2
Number of children		
None	20	14.5
One or more	118	85.5
Family income		
≥R\$ 2,500.00	44	31.9
<R\$ 2,500.00	94	68.1
Teaching experience (years)		
≤16	48	34.8
>16	90	65.2
Number of students in class		
≤25	75	54.3
>25	63	45.7
Noise in class		
Not important	3	2.2
Tolerable	88	63.8
Uncomfortable	44	31.8
Unbearable	3	2.2
Noise in school		
Not important	7	5.1
Tolerable	83	60.1
Uncomfortable	43	31.2
Unbearable	5	3.6
Noise out of school		
Not important	46	33.3
Tolerable	75	54.3
Uncomfortable	16	11.6
Unbearable	1	0.8
Ventilation in class		
Satisfactory	14	10.1
Reasonable	58	42.0
Poor	46	33.3
Very poor	20	14.6
Water intake during classes		
Yes	100	72.5
No	38	27.5
Amount of water/day		
≥4 glasses	75	54.3
1–3 glasses	63	45.7
Alcohol intake		
Never	67	48.6
Monthly or less	37	26.8
2–4 times per month	29	21.0
2–3 times per week	5	3.6
Smoking		
Nonsmoker	123	89.1
Former smoker	10	7.2
Smoker	5	3.6
Physical activity		
Yes	49	35.5
No	89	64.5

Table 2. Health and vocal problems of 138 teachers with vocal disorders from the municipal network, Montes Claros, Minas Gerais, 2013

Variables	n	%
Gastroesophageal reflux		
No	127	92.0
Yes	11	8.0
Diagnosis of respiratory allergy		
No	89	64.5
Yes	49	35.5
Perception of respiratory disorder		
No	75	54.3
Yes	63	45.7
Use of medication		
No	98	71.0
Yes	40	29.0
Hypertension		
No	123	89.1
Yes	15	10.9
Diabetes		
No	137	99.3
Yes	1	0.7
Sleep disorders		
No	129	93.5
Yes	9	6.5
Hoarseness		
No	47	34.1
Yes	91	65.9
Sore throat		
No	61	44.2
Yes	77	55.8
Fatigue when speaking		
No	66	47.8
Yes	72	52.2
Presence of catarrh		
No	67	48.6
Yes	71	51.4
Voice failure		
No	86	62.3
Yes	52	37.7
Vocal effort		
No	98	71.0
Yes	40	29.0
Pain when speaking		
No	129	93.5
Yes	9	6.5
Vocal signs and symptoms		
<4 symptoms	75	54.3
≥4 symptoms	63	45.7
Use of voice in daily routine		
Speaks little	1	0.7
Speaks moderately	13	9.4
Speaks a lot	83	60.2
Speaks too much	41	29.7
Leave by vocal disorder		
No	109	79.0
Yes	29	21.0
Default due to vocal disorder		
No	94	68.1
Yes	44	31.9
Medical assistance due to vocal disorder		
No	69	50.0
Yes	69	50.0
Speech therapy		
No	108	78.3
Yes	30	21.7

DISCUSSION

The prevalence of self-reported voice disorders was similar to those found in other studies (60.0 and 64.8%)^(16,17), but above the prevalences of 11.6% to the national extent⁽¹¹⁾ and 47.6% in Florianopolis, Santa Catarina⁽¹⁸⁾, and below a study conducted in Maceio, Alagoas, whose prevalence of dysphonia was 87.3%⁽¹⁹⁾. This variation is probably due to differences in methodology between these studies.

In this study, the readiness for behavior change among teachers of municipal schools who reported dysphonia was proved low in relation to voice care. At first, a rating was not found that quantifies how much the observed result in Transtheoretical Model studies is satisfactory in the literature. However, a larger number of people in more advanced stages in URICA-VOICE stage were expected due to the high prevalence of dysphonia among teachers. Low readiness to change may result from two factors:

Table 3. Association between stages of pre-contemplation and contemplation according to URICA-VOICE scale and independent variables

Variables	Stages		p-value*
	Pre-contemplation n (%)	Contemplation n (%)	
Sociodemographic, economic, occupational data			
Age (years)			
<40	28 (60.9)	18 (39.1)	0.892
≥40	54 (62.1)	33 (37.9)	
Marital status			
With partner	59 (62.8)	35 (37.2)	0.682
Without partner	23 (59.0)	16 (41.0)	
Children			
None	12 (60.0)	8 (40.0)	0.864
One or more	70 (61.9)	43 (38.1)	
Income			
≥R\$ 2,500.00	24 (54.5)	20 (45.5)	0.236
<R\$ 2,500.00	58 (65.2)	31 (34.8)	
Schooling			
Postgraduation	37 (62.7)	22 (37.3)	0.823
No postgraduation	45 (60.8)	29 (39.2)	
Teaching experience (years)			
≤16	29 (63.0)	17 (37.0)	0.811
>16	53 (60.9)	34 (39.1)	
Number of students			
≤25	48 (65.8)	25 (34.2)	0.284
>25	34 (56.7)	26 (43.3)	
Noise in class			
Not important to tolerable	58 (65.9)	30 (34.1)	0.158*
Uncomfortable to unbearable	24 (53.3)	21 (46.7)	
Noise out of school			
Not important to tolerable	73 (61.3)	46 (38.7)	0.830
Uncomfortable to unbearable	9 (64.3)	5 (35.7)	
Ventilation in class			
Satisfactory to reasonable	48 (67.3)	23 (32.4)	0.131*
Poor to very poor	34 (54.8)	28 (45.2)	
Lifestyle			
Water intake/day			
≥4 glasses	40 (55.6)	32 (44.4)	0.116*
<4 glasses	42 (68.9)	19 (31.1)	
Smoking			
Nonsmoker	69 (58.5)	49 (41.5)	0.034*
Smoker/former smoker	13 (86.7)	2 (13.3)	
Physical activities			
Yes	28 (58.7)	20 (41.7)	0.554
No	54 (63.5)	31 (36.5)	

Table 3. Continuation

Variables	Stages		p-value*
	Pre-contemplation n (%)	Contemplation n (%)	
Health			
Gastroesophageal reflux			
No	79 (64.8)	43 (35.2)	0.014*
Yes	3 (27.3)	8 (72.7)	
Diagnosis of respiratory allergy			
No	57 (66.3)	29 (33.7)	0.138*
Yes	25 (53.2)	22 (46.8)	
Use of medication			
No	65 (68.4)	30 (31.6)	0.011*
Yes	17 (44.7)	21 (55.3)	
Hypertension			
No	77 (64.7)	42 (35.3)	0.035*
Yes	5 (35.7)	9 (64.3)	
Diabetes			
No	82 (62.1)	50 (37.9)	0.203
Yes	0 (0.0)	1 (100.0)	
Sleep disorders			
No	79 (63.2)	46 (36.8)	0.147*
Yes	3 (37.5)	5 (62.5)	
Voice			
Hoarseness			
No	29 (63.0)	17 (37.0)	0.811
Yes	53 (60.9)	34 (39.1)	
Failure			
No	59 (69.4)	26 (30.6)	0.014*
Yes	31 (62.0)	19 (38.0)	
Presence of catarrh			
No	43 (68.3)	20 (31.7)	0.138*
Yes	39 (55.7)	31 (44.3)	
Fatigue when speaking			
No	43 (68.3)	20 (31.7)	0.138*
Yes	39 (55.7)	31 (44.3)	
Effort to speak			
No	63 (85.6)	33 (34.4)	0.129*
Yes	19 (51.4)	18 (48.6)	
Pain when speaking			
No	71 (65.7)	37 (34.3)	0.044*
Yes	11 (44.0)	14 (56.0)	
Ardor in throat			
No	58 (64.4)	32 (35.6)	0.338
Yes	24 (55.8)	19 (44.2)	
Self-reported voice disorder			
<4	52 (70.3)	22 (29.7)	0.022*
≥4	30 (50.8)	29 (49.2)	
Use of voice in daily routine			
Speaks little/moderately	9 (64.3)	5 (35.7)	0.830
Speaks a lot/too much	73 (61.3)	46 (38.7)	
Health assistance due to voice problems			
Medical appointment due to voice problems			
Yes	33 (50.0)	33 (50.0)	0.006*
No	49 (73.1)	18 (26.9)	
Speech therapy			
Yes	11 (40.7)	16 (59.3)	0.012*
No	71 (67.0)	35 (33.0)	

* χ^2 -test

Table 4. Multivariate analysis for factor associated with readiness to change behavior among teachers with complaint of dysphonia, Montes Claros, Minas Gerais, 2013

Variables	p-value	Adjusted OR (95%CI)*
Use of medication	0.006	3.30 (1.40–7.74)
Voice failure	0.048	2.23 (1.01–4.96)
Speech therapy	0.015	3.25 (1.25–8.43)

*Backward logistic regression: LR

Caption: OR = odds ratio; 95%CI = 95% confidence interval

1. participants are aware of the existence of a problem to be faced, but are not well oriented to the consequences of this behavior; and
2. participants are trying to change behavior, but have no ability or support to do so⁽²⁰⁾.

Individuals in the pre-contemplation stage are often characterized as resistant to change, unmotivated, and not ready to attend therapeutic or health-promotion programs. A possible explanation for this attitude is that traditional health-promotion programs are probably not good motivators to meet their needs⁽³⁾.

Some teachers were in the contemplation stage, which means that they intended to change behavior, perhaps because they recognize the positive aspects of such action. Five teachers with chronic dysphonia were in the action stage, that is, they were developing new behaviors.

Study conducted with 66 patients under dysphonia treatment in University hospitals of voice clinics at two educational institutions of Speech Therapy found 30.3% of patients in the pre-contemplation stage, 57.6% in the contemplation stage, 12.1% in stage action, and none in the maintenance stage⁽⁷⁾. This difference related to this study, or higher percentage in the stages of contemplation and action, can be attributed to the fact that individuals were under speech therapy; therefore, they presented higher levels of motivation.

In the analysis of this study, comparing the two stages, the variables associated with a greater predisposition/awareness (contemplation stage) for behavior change as to the voice were: use of medication, perception of voice failures, and demand for speech therapy. Conceivably, such factors may contribute to the vocal problem awareness, interfering in readiness to behavior change, reaching the contemplation stage.

The search for treatment was associated with voice complaint, although most participants were in the pre-contemplation stage and search for assistance usually occurs in more advanced readiness stages, when the individual considered solving his vocal problem already. Therefore, further studies are needed for a better understanding of these results.

Information about the patients' perception of their own voice help guide the therapy and can help increase the awareness of behavior change necessity. A possible strategy for individuals in the pre-contemplation stage would be to customize information about the negative impacts of dysphonia in quality of life and the benefits of speech therapy. Educational

programs are basic conditions whose main purpose should be the empowerment of the individual and the community.

For those who are in the contemplation stage, they should motivate them, encouraging them to make specific plans⁽⁹⁾. Note that many can remain in this stage for long periods of time, the so-called chronic contemplation⁽²⁰⁾. An activity for patients with vocal problems who are undergoing treatment would be voice recording during speech therapy process, which could be a valuable resource to encourage the patient, because this would motivate them to realize the progressive improvement of their voice. Due to lack of resources in outpatient public services, such recordings are limited to the beginning or end of treatment⁽⁷⁾.

The transition from a behavioral change stage to another depends on appropriate strategies and interventions in each specific moment. The Transtheoretical Model has ten change processes applicable to specific stages, and focuses on these activities so that progress can occur⁽³⁾.

It must be noted that the results of this study should be interpreted based on some of their limitations. Some of these limitations refer to the target audience, which were restricted to teachers in municipal public education, teaching from first to fifth grade. Others refer to be highlighted as concerned to the detection of voice problems, for they were measured by self-reported vocal complaints. It is important to note that the group was not made up of individuals enrolled in therapy programs, and the Transtheoretical Model has been mainly used to measure the dimensions of readiness to change in individuals under treatment.

Despite limitations, the importance of the topic and the lack of literature on the subject highlight the magnitude of the problem and the need for studies in the area. Results should motivate health-promotion activities to improve quality of life as to voice care and general health, which is a commitment of the speech therapist⁽²¹⁾. The Transtheoretical Model is an opportunity for the professional to work with health-promotion habits and to verify that each stage requires specific actions for adherence to vocal care.

CONCLUSION

Most teachers with vocal complaints are in the pre-contemplation stage in URICA-VOICE scale. This shows the need for an education process aimed to the risks of voice misuse and abuse, and to presenting the benefits of general and vocal health. Variables associated with readiness for behavior change are related to medication use, perceived voice failure, and the search for speech therapy. These results may support public health interventions involving people at different stages of the decision-making process as to behavioral change for vocal health.

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