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Voice Disorders in Teachers: A Quantitative Assessment Using the Voice Symptom Scale in a Saudi Arabian Town

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Abstract

The human voice is an essential tool for communication, particularly in teaching, one of the most vocally demanding professions. Persistent voice use can lead to vocal strain and hoarseness, impacting teachers' professional performance and quality of life. This study aimed to assess the prevalence of hoarseness of voice and identify associated risk factors among school teachers in Bisha, Saudi Arabia, using the Voice Symptom Scale (VoiSS).A cross-sectional study was conducted in 15 schools across Bisha, in Saudi Arabia involving 101 randomly selected school teachers. Data were collected using a pre-tested, validated questionnaire that included demographic details, voice usage patterns, lifestyle habits, and the VoiSS. Descriptive and bivariate analyses were conducted using SPSS version 27 to identify associations between hoarseness and various risk factors. The prevalence of hoarseness of voice among participants was 63.4%. Female teachers and those with less than 20 years of teaching experience were significantly more affected (P = 0.003). Coffee consumption showed a statistically significant association with increased VoiSS scores (P = 0.041), while other factors such as age, smoking, and voice amplification usage were not significantly associated. Hoarseness of voice is highly prevalent among school teachers in Bisha, particularly among females and those with shorter teaching experience. Lifestyle factors such as coffee intake may exacerbate voice symptoms. These findings underscore the need for preventive measures, including vocal health education, voice amplification tools, and access to medical care, to reduce the burden of voice disorders in educators.

Keywords: Hoarseness of voice, School Teachers, Voice Symptom Scale (VoiSS), Risk Factors

1. Introduction

The human voice is an essential tool for communication with others particularly in professions that rely on verbal interaction. Among these, teaching stands out as one of the most vocally demanded occupation. Teachers, whose profession demands to use their voice at high intensities with long duration, can lead to vocal strain and eventually hoarseness of voice (1). Hoarseness of voice is characterized by change in voice quality, pitch, volume that adversely affects communication or voice related quality of life (2). Hoarseness of voice may influence daily life, affecting various aspects of an individual's personal and professional activities.

Studies have shown that teachers are more susceptible to voice problems, with reported prevalence rates ranging from 8% to 81% (3). When comparing the prevalence of voice problems between teachers and non-teachers, studies have found that prevalence is higher in the teaching population. Several risk factors such as socio-demographic factors, life style factors, voice usage and perception, psycho-emotional factors, occupational and environmental factors contribute to voice problems among teachers (3). Studies have shown that 70% of teachers were exposed to an unfavorable environment whereas 65% to loud background noise

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contribute to hoarseness of voice (4). The higher prevalence of voice disorders 57.1 % among teachers which revealed higher than in general population in Saudi Arabia (5).

The study aims to assess the prevalence of hoarseness of voice among teachers by using Voice Symptom Scale (VoiSS). The VoiSS is a widely used, validated multidimensional tool for assessing the impact of voice disorders on an individual's quality of life (6). It divided into three scales; impairment, emotional and physical symptoms, which investigates the frequency of occurrence of hoarseness of voice among teachers. By employing the VoiSS, the study seeks to provide objective measure of hoarseness of voice affecting school teachers and proposed interventions that could alleviate these issues.

Voice disorders can considerably impact teachers' professional effectiveness, quality of life, and overall health. While global interest in this topic is increasing, there is still a scarcity of localized research addressing the prevalence and underlying causes of hoarseness among school teachers in Saudi Arabia. With the rapid expansion of the educational sector and a growing influx of new educators, the need to understand voice-related challenges in this profession is more pressing than ever. Given the country's linguistic diversity and varied teaching environments, assessing the extent of voice disorders and identifying their risk factors is essential. As research in this domain continues to evolve, gaining insights into the issue within the Saudi context is critical for developing evidence-based interventions aimed at the prevention and effective management of voice disorders in the teaching profession. The objective of our study was to evaluate the prevalence and investigate potential risk factors contributing to hoarseness of voice among school teachers in Bisha, Saudi Arabia.

2. Materials and Method

This cross sectional study was conducted at schools of Bisha, Asir Region Saudi Arabia, following the approval of Institutional Review Board of Asir Region, Ministry of Health, Saudi Arabia.

A total of 15 schools were selected by stratified sampling technique to select primary and secondary schools respectively by obtaining data from Ministry of education by the principle investigator. A total of 101 school teachers were randomly selected and interviewed immediately after their consultation in the selected Schools. A serial number will assign to each participant before their consultation and will be randomly chosen. Data collectors wait outside the class rooms for the randomly assign participant to exit. Weighted samples were taken from each selected school. Part time school teachers or who are involved in active teaching less than one year or involved in administrative activities were excluded. After ethical review committee approval data collector explained the nature and purpose of the study to all selected study participants. Data collectors were hired and trained by principle investigator. Written informed consent was obtained and data was collected from study participants by conducting face to face interviews until the required sample size was achieved.

Pre-tested, self-administered, validated questionnaires were filled by the data collectors which include socio-demographic characteristics, voice usage and perception, life style and medical history and Voice Symptom Scale (VoiSS). The questionnaires were based on previous studies by researchers is used as a survey tool to addresses hoarseness of voice in relation to three aspects including impairment, emotional and physical symptoms. This patient-reported self-assessment tool comprises 30 items, each with a score ranging from 0 (Never) to 4 (All of the time). These items are evenly distributed throughout three domains (Appendix I). The primary objective of the VoiSS is to evaluate perceived impact of handicap on daily life. Each aspect rated in a 5-point scale: never (0); occasionally (1); some of the time (2); most of the time (3); and all of the time (4). The total score ranges from 0 to 120. Scores ≤ than 16 indicate normal voice and > 16 abnormal voice (7).

Data were analyzed using software of Statistical package of Social Sciences (SPSS version 27). Data were initially imported from Microsoft Excel into the SPSS software. Appropriate coding was applied to variables within the variable view. Some continuous variables will categorize into new variables for purpose of analysis. Descriptive statistics was run to determine frequency and percentage of dependent variable (i.e. hoarseness of voice) and categorized them into mild, moderate and severe hoarseness of voice according to assigned scoring criteria. Descriptive statistics was run to determine mean and standard deviation for continuous independent variables (Age, year of teaching experience and income) and frequency and percentage for nominal independent variables (gender, nationality,

level of education, level of school and average class size). A separate descriptive statistic was run to determine mean and standard deviation or frequency and percentages of variables includes in voice usage and perception and life style and medical history.

Bivariate analysis was done to determine the relationship of dependent variable (i.e. hoarseness of voice) and independent variables (i.e. Age, year of teaching experience, income, gender, nationality, level of education, level of school and average class size). It was assessed by chi-square test at a 95% confidence level and P-value ≤0.05 was taken as significant.

3. Results

Table 1 showed the socio-demographic characteristics of school teachers in Bisha, Saudi Arabia. A total of 101 interviews were performed during data collection period. Mean age of the participants was (42.56±7.9) years. Majority of the respondents were males (62.4%) having bachelor degree (79.2%) belong to Saudi nationality (90.1%). Regarding type of schools, (51.5%) teaching in Pre-Kindergarden, Kindergarden, Primary schools having teaching experienced more than 20 years was (59.4%). Mean income of the teachers were (12800.59±6086.92) SR means more than or equal to 10000 SR (66.3%). Majority of teachers had 15-30 students in class (58.4%) and having less than 5 siblings (58.4%).

Table 2 showed Voice Usage, Perceptions and life style of school teachers in Bisha Saudi Arabia. Among 101 teachers, (77.2%) of teachers spending time less than 5 hours in teaching and (79.2%) raised their voices during teaching and (92.1%) not used any kind of amplification devices. Only (7.9%) of teachers smoked while (84.2%) took coffee daily, including (84.2%) teachers having had coffee less than or equal to 2 cups.

Table 3 showed bivariate analysis of socio-demographic characteristics versus Degree of Voice Symptom Scale. The degree of Voice Symptom Scale was more prevalent among younger age group as compare to older. However, difference was not statistically significant (P=0.26). Significant difference was observed in the prevalence of degree of Voice Symptom Scale among females' teachers as compared to male teachers (P=0.003).

Table 1: Socio-Demographic Characteristics of school teachers in Bisha, Saudi Arabia (N=101)

Variables	N	%
Age (42.56±7.9)		
≤ 40 years	40	39.6
> 40 years	61	60.4
Gender		
Male	63	62.4
Female	38	37.6
Nationality		
Saudi	91	90.1
Non-Saudi	10	9.9
Level of education		
Less than bachelor	5	5.0
Bachelor	80	79.2
More than bachelor	16	15.8
Years of teaching experienced (17.98±7.9)		
< 20 years	60	59.4
≥ 20 years	41	40.6
Types of School		
Pre-Kindergarden, Kindergarden, Primary	52	51.5
Stage One Intermediate/Junior High	26	25.7
Stage Two Secondary	23	22.8
Average Class Size		
<15 students	7	6.9
15-30 students	59	58.4
31-45 students	27	26.7
>45 students	8	7.9
Income (12800.59±6086.92)		
< 10000 SR	34	33.7
≥10000 SR	67	66.3
Number of Siblings at home		
< 5	59	58.4
≥ 5	42	41.6

Table 2: Voice Usage, Perceptions and life style of school teachers in Bisha, Saudi Arabia (N=101)

Variables	N	%
How many hours /day you spend teaching		
< 5 hours	78	77.2
≥ 5 hours	23	22.8
Do you use any amplification device		
Yes	9	8.9
No	92	91.1
Do you frequently raise your voice while teaching to get attention or control the class?		
Yes	80	79.2
No	21	20.8
How often do you have breaks during your teaching day (Lasting more than 10 minutes)		
Frequently	27	26.7
Sometimes	67	66.3
Rarely	6	5.9
Never	1	1.0
Do you smoke?		
Yes	8	7.9
No	93	92.1
Do you take coffee?		
Yes	85	84.2
No	16	15.8
How much caffeine do you consumed per day?		
≤ 2 Cups	85	84.2
> 2 Cups	16	15.8

Table 3: Bivariate analysis of socio-demographic characteristics versus Degree of Voice Symptoms Scale (N101)

Variable		Normal (N=37) N(%)	Abnormal (N=64) N(%)	X^2	P-Value
Age					
	≤ 40 years	**12(30%)**	**28(70%)**	**1.256**	**0.263**
	> 40 years	**25(41%)**	**36(59%)**		
Gender					
	Female	**7(18.4%)**	**31(81.6%)**	**8.705**	**0.003***
	Male	**30(47.6%)**	**33(52.4%)**		
Nationality					
	Saudi	**31(34.1%)**	**60(65.9%)**	**2.501**	**0.114**
	Non-Saudi	**6(60%)**	**4(40%)**		
Level of education					
	Less than bachelor	**0(0%)**	**5(100%)**		
	Bachelor	**31(38.8%)**	**49(61.3%)**	**4.721**	**0.094**
	More than bachelor	**6(37.5%)**	**10(62.5%)**		
Years of teaching experienced					
	< 20 years	**15(25%)**	**45(75%)**	**8.618**	**0.003***
	≥ 20 years	**22(53.7%)**	**19(46.3%)**		
Type of schools					
Pre-Kindergarden, Kindergarden, Primary		**15(28.8%)**	**37(71.2%)**		
Stage One Intermediate/Junior High		**12(46.2%)**	**14(53.8%)**	**2.838**	**0.242**
Stage Two Secondary		**10(43.5%)**	**13(56.5%)**		
Average Class Size					
	<15 students	**1(14.3%)**	**6(85.7%)**		
	15-30 students	**21(35.6%)**	**38(64.4%)**	**2.556**	**0.465**
	31-45 students	**11(40.7%)**	**16(59.3%)**		
	> 45 students	**4(50%)**	**4(50%)**		
Income					
	< 10000 SR	**11(32.4%)**	**23(67.6%)**	**0.405**	**0.525**
	≥ 10000 SR	**26(38.8%)**	**41(61.2%)**		
Number of Siblings					
	< 5	**20(33.9%)**	**39(66.1%)**	**0.457**	**0.499**
	≥ 5	**17(40.5%)**	**25(59.5%)**		

The used test was chi-squared test
****Significant at level 0.05***

Similarly, the degree of Voice Symptom Scale was more prevalent in teachers who have had experienced less than 20 years as compared to more than or equal to 20 years and found statistically significant difference (P=0.003). The degree of voice handicap index was more prevalent among Saudi nationals, bachelor's degree holders, decreasing class size and decreasing number of siblings but difference was not statistically significant with the degree of Voice Symptom Scale.

Table 4 showed bivariate analysis of voice usage, perceptions and life style versus degree of Voice Symptom Scale (N=101). Non-significant difference was observed in the prevalence of degree of voice handicap index among those teachers who frequently raise your voice while teaching to get attention or control the class (P=0.723). The degree of voice handicap index was more prevalent among non-smokers as compare to smokers. However, difference was not statistically significant (P=0.421). Drinking coffee was also significant associated with degree of Voice Symptom Scale (P=0.041). The degree of voice handicap index was more prevalent among teachers who spend more than 5 hours in class, who used amplification device, who took break sometimes but difference was not statistically significant with the degree of Voice Symptom Scale.

Table 4: Bivariate analysis of Voice Usage, Perceptions and life style versus Degree of Voice Symptom Scale (N101)

Variable	Normal (N=37) N(%)	Abnormal (64) N(%)	X^2	P-Value
How many hours /day you spend teaching in classroom				
< 5 hours	29(37.2%)	49(62.8%)	0.044	0.833
≥ 5 hours	8(34.8%)	15(65.2%)		
Do you use any amplification device				
Yes	3(33.3%)	6(66.7%)	0.047	0.828
No	34(37.0%)	58(63.0%)		
Do you frequently raise your voice while teaching to get attention or control the class?				
Yes	30(37.5%)	50(62.5%)	0.126	0.723
No	7(33.3%)	14(66.7%)		
How often do you have breaks during your teaching day (Lasting more than 10 minutes)				
Frequently	13(48.1%)	14(51.9%)	3.722	0.293
Sometimes	23(34.3%)	44(65.7%)		
Rarely	1(16.7%)	5(83.3%)		
Never	0(0%)	1(100%)		
Do you smoke?				
Yes	4(50%)	4(50%)	0.646	0.421
No	33(35.5%)	60(64.5%)		
Do you take coffee?				
Yes	28(32.9%)	57(67.1%)	3.152	0.041*
No	9(56.3%)	7(43.8%)		
How much coffee do you consumed per day?				
≤ 2 Cups	32(37.6%)	53(62.4%)	0.237	0.626
> 2 Cups	5(31.3%)	11(68.8%)		

The used test was chi-squared test
****Significant at level 0.05***

4. Discussion

Teachers primarily depend on their voice as a key tool for communication, so experiencing hoarseness of voice can significantly impact both their professional effectiveness and every day activities. Due to their vocal demands of their job, school teachers are particularly at a higher risk of developing hoarseness of voice (8).

This research aimed to determine the prevalence of hoarseness of voice among teachers in Saudi Arabia using Voice Symptom Scale. It also sought to explore related socio-demographic, voice usage, voice perception and life style factors. The results showed that 63.4% of teachers reported experiencing hoarseness. These findings align with previous studies. For instance, earlier research conducted in Saudi Arabia reported a notable prevalence rate of 37.9% among school teachers (4). Similarly, a study from Iran found a 27.2% prevalence of hoarseness (9). In Spain, research showed 59% prevalence among teachers, while a study in China reported a rate of 47.9% (8).

This study found that a greater proportion of female teachers (81.6%) were likely to experience moderate to severe hoarseness of voice compared to their male counterparts. A statistically significant difference between genders was observed (P = 0.031). This trend is consistent with previous research, which has reported that female teachers are more likely than males to suffer from current or recent self-reported voice problems (10). Several factors may contribute to this higher prevalence among women. Biological differences, as well as a greater tendency among females to report health-related symptoms, could both play a role. Anatomically, women have higher fundamental frequency due to their shorter and thinner vocal folds. This result the vocal folds to vibrate more frequently, thereby increasing the risk of collision and subsequent vocal fold damage (11).

The findings of this study indicated that as age increases, the likelihood of developing moderate to severe hoarseness of voice also rises, with 59%% of older teachers affected. However, when comparing Voice Symptom Scale across different age groups, the results did not show a statistically significant difference (P = 0.263). These results are consistent with a study conducted in Taiwan, which investigated risk factors for voice disorders and similarly found no significant association between age and the occurrence of voice problems (12). Although age did not show a significant statistical impact in this study, voice issues may become more common with advancing age due to structural changes in the vocal mechanism. Such changes include the ossification of laryngeal cartilage and a decline in the protective features of the larynx, both of which can negatively affect vocal function (13-14).

This study also identified several factors that are linked to the severity of hoarseness in voice. Notably, a significant correlation was found between the degree of hoarseness and coffee consumption (P = 0.041). These findings align with those of earlier research. For example, a study conducted in Saudi Arabia highlighted various risk factors contributing to higher Voice Symptom Scale scores, including smoking, longer teaching experience, and increased weekly teaching hours (4). Similarly, research from Korea reported significant associations between hoarseness and several variables such as gender, coffee intake, raising one's voice while teaching, and extended teaching durations (15).

Overall, the findings of this study highlight the high prevalence of hoarseness of voice among school teachers in Saudi Arabia and point to several contributing factors. The consistent application of the Voice Symptoms scale offers a dependable tool for evaluating how voice issues affect teachers' quality of life. Based on the results, there is a clear need for targeted interventions, such as vocal health training, the use of electronic voice amplification devices during teaching, and improved access to specialized medical care, in order to reduce the burden of voice disorders among educators.

However, this study has certain limitations. Due to its cross-sectional design, it does not allow for establishing causal relationships between the identified factors and voice hoarseness. Data were collected using a self-administered questionnaire (VoiSS), which may be subject to recall bias or social desirability bias. Teachers might have over or under-reported their symptoms. No clinical evaluation, such as laryngoscopy or voice examination by a specialist, was conducted to confirm the presence or severity of voice disorders. This limits the clinical accuracy of the findings. The study included a relatively small sample (n=101) from one geographic region (Bisha), which may not be representative of all school teachers in Saudi Arabia. Results should be interpreted with caution when generalizing to other regions or populations.

5. Conclusion

Hoarseness of voice is a common condition among school teachers, significantly influenced by factors such as teaching environment, lifestyle habits, health status, and work-related stress. The application of the Voice Symptom Scale provided important insight into how voice disorders affect teachers' well-being and job performance. Given the vital role of vocal communication in teaching, these findings stress the importance of preventive measures, including vocal health training, the use of voice amplification tools, and regular medical assessments. Enhancing teacher awareness and support systems is essential in reducing the prevalence and severity of voice problems. Future longitudinal studies are recommended to further explore causal relationships and assess the effectiveness of targeted interventions.

Conflict of interest The author declares no conflict of interest.

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Appendix I

Voice Symptoms Scale (VoiSS)

0-Never 1-Occasionally 2-Some of the time 3- Most of the time 4- All of the time

My voice makes it difficult for people to hear me	0	1	2	3	4
I run out of air when I talk	0	1	2	3	4
People have difficulty understanding me in a noisy room	0	1	2	3	4
The sound of my voice varies throughout the day	0	1	2	3	4
My family has difficulty hearing me when I call throughout the house	0	1	2	3	4
I use the phone less often than I would like	0	1	2	3	4
I'm tense when talking with others because of my voice	0	1	2	3	4
I tend to avoid groups of people because of my voice	0	1	2	3	4
People seem irritated with my voice	0	1	2	3	4
People ask, "What's wrong with your voice?"	0	1	2	3	4
I speak with friends, neighbors or relatives less because of my voice	0	1	2	3	4
People ask me to repeat myself when speaking face to face	0	1	2	3	4
My voice sounds creaky and dry	0	1	2	3	4
I feel as though I have to strain to produce my voice	0	1	2	3	4
I find other people don't understand my voice problem	0	1	2	3	4
My voice difficulties restrict my personal and social life	0	1	2	3	4
The clarity of my voice is unpredictable	0	1	2	3	4
I try to change my voice to sound different	0	1	2	3	4
I feel left out of my conversation because of my voice	0	1	2	3	4

I use a great deal of effort to speak	0	1	2	3	4
My voice is worse in the evening	0	1	2	3	4
My voice problem causes me to lose income	0	1	2	3	4
My voice problem upsets me	0	1	2	3	4
I am less outgoing because of my voice problem	0	1	2	3	4
My voice makes me feel handicapped	0	1	2	3	4
My voice 'gives out on me' in the middle of speaking	0	1	2	3	4
I feel annoyed when people ask me to repeat myself	0	1	2	3	4
I am embarrassed when people ask me to repeat myself	0	1	2	3	4
My voice makes me feel incompetent	0	1	2	3	4
I'm ashamed of my voice problem	0	1	2	3	4