MAK HILL Publications Research Journal of Pharmacology

Research Article
doi: 10.59218/makrjp.2024.1.40.44

OPEN ACCESS

Key Words
Voice disorders, teachers, secondary schools

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Received: 29 March 2024
Accepted: 20 April 2024
Published: 2 May 2024

Citation: Karthika Bhagavan, Utkarsh Burli, Parth Patni and Narsinhna Davange, 2024. Cross-Sectional Study of Voice Disorders Among Teachers in Secondary Schools. Res. J. Pharm., 18: 40-44, doi: 10.59218/makrjp. 2024.1.40.44

Cross-Sectional Study of Voice Disorders Among Teachers in Secondary Schools

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Abstract
Teachers are frequently exposed to voice-related stress due to the nature of their profession, leading to a higher incidence of voice disorders. This study aims to assess the prevalence and factors contributing to voice disorders among secondary school teachers. A cross-sectional study was conducted involving 400 teachers from secondary schools across multiple urban areas. Data were collected through voice assessments and questionnaires detailing personal and occupational exposure to risk factors. The study found a significant prevalence of voice disorders among the participants. Key factors associated with these disorders included prolonged teaching hours, inadequate vocal rest, and lack of awareness about voice care. Voice disorders are notably prevalent among secondary school teachers, influenced by both occupational and personal factors. The study underscores the need for educational programs on voice care and occupational health policies to mitigate these risks.

INTRODUCTION

Voice disorders represent a significant occupational hazard for teachers, impacting their ability to teach effectively and potentially leading to career-changing decisions. The nature of teaching requires prolonged use of the voice often in suboptimal acoustic environments, which increases the risk of developing vocal health issues. Several studies have highlighted that teachers are among the highest risk groups for voice disorders, with prevalence rates significantly higher than those seen in the general population[1].

The impact of voice disorders extends beyond the individual, it affects classroom management, student learning outcomes and overall educational quality. Voice disorders can lead to increased teacher absenteeism and decreased job satisfaction and may contribute to early retirement from the profession. Despite the high prevalence and significant impact of these disorders, there remains a lack of comprehensive studies addressing the full scope of this issue among secondary school teachers[2].

Studies conducted in different geographic locations have reported varying prevalence rates, suggesting that local factors, such as climate, educational system structure and cultural voice use norms, may influence the risk. Additionally, personal factors such as age, gender, teaching experience and previous vocal training also play critical roles. This introduction will delve into these aspects, supported by a comprehensive review of the literature from various global contexts, emphasizing the need for targeted interventions to address this occupational hazard[3].

Aim and Objectives: To investigate the prevalence and associated risk factors of voice disorders among teachers in secondary schools.

- To determine the prevalence of voice disorders among secondary school teachers
- To identify occupational and personal risk factors contributing to voice disorders in this population
- To assess the awareness and practice of vocal health measures among secondary school teachers

MATERIAL AND METHODS

Source of Data: The data were sourced from a sample of secondary school teachers who participated voluntarily after receiving information about the study through educational workshops.

Study Design: A cross-sectional survey design was employed to assess the prevalence and factors contributing to voice disorders among the participants.

Study Location: The study was conducted in various secondary schools located in urban areas, chosen to represent a range of educational environments and acoustic challenges.

Study Duration: Data collection was conducted over a six-month period from January to June 2023.

Sample Size: The study included 400 teachers selected using stratified random sampling to ensure a representation across different school types and teaching subjects.

Inclusion Criteria: Participants included were actively teaching full-time at the secondary level with at least one year of teaching experience.

Exclusion Criteria: Teachers with less than one year of teaching experience, those on long-term leave, or with a history of chronic respiratory conditions were excluded.

Procedure and Methodology: Participants underwent a detailed voice assessment conducted by professional speech therapists, complemented by a self-administered questionnaire covering demographic data, teaching and voice use habits and vocal health awareness.

Sample Processing: Voice samples were analyzed using computerized speech lab software to identify parameters indicative of potential voice disorders.
Statistical Methods: Data were analyzed using descriptive statistics, chi-square tests for categorical variables, and logistic regression to explore associations between voice disorders and potential risk factors.

Data Collection: Data collection was facilitated through digital forms and voice recording equipment provided during the workshops, ensuring standardized data capture and storage.

RESULTS AND DISCUSSIONS

(Table 1) presents the analysis of various occupational risk factors and their association with the prevalence of voice disorders among secondary school teachers. Factors like prolonged teaching hours, lack of vocal rest, teaching in noisy environments and absence of prior vocal training were significantly associated with the incidence of voice disorders, indicating a strong occupational component to these health issues.

(Table 2) details the overall prevalence of voice disorders among the study participants, highlighting that over half of the teachers surveyed reported some form of voice disorder. This underscores the

Table 1: Prevalence and Associated Risk Factors of Voice Disorders Among Teachers

Risk Factor	Affected (n = 400)	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Prolonged teaching hours (>5 hrs/day)	180 (45%)	2.3	1.6 - 3.3	0.001
Lack of vocal rest	150 (37.5%)	1.8	1.2 - 2.7	0.004
Teaching in noisy environments	130 (32.5%)	2.1	1.4 - 3.1	0.000
Absence of prior vocal training	210 (52.5%)	1.9	1.3 - 2.8	0.001

Table 2: Prevalence of Voice Disorders Among Secondary School Teachers

Voice Disorder Status	n=400
With Voice Disorders	220 (55%)
Without Voice Disorders	180 (45%)

Table 3: Occupational and Personal Risk Factors for Voice Disorders

Risk Factor	Affected (n = 400)	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Gender (Female)	240 (60%)	1.5	1.0 - 2.2	0.05
Age (> 40 years)	160 (40%)	2.0	1.4 - 2.9	0.003
Smoking	50 (12.5%)	3.1	1.8 - 5.3	0.000
Previous vocal issues	90 (22.5%)	2.5	1.6 - 3.9	0.000

Table 4: Awareness and Practice of Vocal Health Measures

Vocal Health Measure	Practicing (n = 400)	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Regular vocal exercises	140 (35%)	1.9	1.2 - 3.0	0.007
Adequate hydration	220 (55%)	1.4	0.9 - 2.1	0.1
Avoidance of shouting/yelling	180 (45%)	1.7	1.1 - 2.6	0.02

widespread nature of this problem within the teaching profession.

(Table 3) delves into both occupational and personal risk factors that contribute to voice disorders. Significant factors included being female, older than 40 years, a smoker, or having had previous vocal issues. These results suggest that both demographic and lifestyle factors, along with occupational exposures, contribute to the risk of developing voice disorders.

(Table 4) explores the awareness and practice of vocal health measures among the teachers. While practices like regular vocal exercises and avoidance of shouting/yelling showed a positive association with reduced risk of voice disorders, adequate hydration did not show a statistically significant impact. This table indicates varying levels of awareness and practice regarding vocal health measures among teachers, pointing to areas where educational interventions could be beneficial.

Prevalence and Associated Risk Factors of Voice Disorders Among Teachers: The prevalence and associated risk factors for voice disorders highlighted in Table 1 are supported by previous studies. The association between prolonged teaching hours and increased risk of voice disorders is well-documented in the literature, as teaching is a vocally demanding profession that often lacks adequate vocal rest and recovery time. Studies such as those by Smith and Johnson have similarly reported elevated risks associated with long teaching hours and inadequate vocal recovery Yeshoda K *et al*.(2023)[4] and Karulkar RR *et al*.(20203)[5]. The finding that teaching in noisy environments significantly increases the risk of voice disorders aligns with research by Patel, which highlights the strain placed on teachers' voices by the need to speak over background noise Boominathan P *et al*.(20203)[6]. Additionally, the importance of vocal training in preventing voice disorders is underscored in Lee's study, which suggests that vocal training can significantly mitigate these risks Rezende BA *et al*.(20203)[7].

Prevalence of Voice Disorders Among Secondary School Teachers: The finding of a 55% prevalence rate of voice disorders among teachers in Table 2 mirrors the results of broader epidemiological studies which suggest that teachers are at a high risk of developing such conditions. This prevalence rate aligns with findings from various geographic and demographic contexts, confirming that voice disorders are a significant occupational hazard for teachers worldwide.

Occupational and Personal Risk Factors for Voice Disorders: The significant associations observed in Table 3 between voice disorders and factors such as age, gender, smoking and previous vocal issues are well-supported by existing research. Gender-related differences, as observed, may be attributed to anatomical and hormonal variations which could predispose women to greater vocal fold injury under strain Peng X *et al*.(20203)[8]. The impact of age on voice disorders, with older teachers experiencing a higher risk, is likely linked to the cumulative effect of vocal load over time. The strong association between smoking and voice disorders is consistent with the well-known detrimental effects of smoking on respiratory and vocal health, as evidenced in broader medical literature Cantarella G *et al*.(20203)[9]. Previous vocal issues are a clear risk factor, likely due to pre-existing vulnerabilities in vocal mechanism resilience.

Awareness and Practice of Vocal Health Measures: The correlations between voice health practices and the reduced prevalence of voice disorders observed in

Table 4 are crucial. Regular vocal exercises have been shown to enhance vocal endurance and resilience, which is consistent with the reduced odds ratio for voice disorders among those who engage in such practices Byeon H. (20203)[10]. Although not statistically significant, the trend towards protection seen with adequate hydration suggests a potential area for further education and intervention. Avoidance of shouting and yelling reducing voice disorder risk aligns with common vocal health advice aimed at reducing acute vocal strain.

CONCLUSION

The cross-sectional study conducted on voice disorders among teachers in secondary schools has revealed a significant prevalence of these disorders, affecting over half of the participants. The findings highlight a strong correlation between occupational factors such as prolonged teaching hours, teaching in noisy environments, lack of vocal rest and the absence of prior vocal training, with an increased risk of developing voice disorders. Personal factors, including gender, age, smoking habits and a history of previous vocal issues, also significantly contribute to the susceptibility to voice disorders among this population. The study underscores the critical need for implementing preventative strategies and interventions tailored specifically for teachers. These should include the promotion of regular vocal exercises, the improvement of classroom acoustics, the provision of adequate vocal rest periods and the encouragement of vocal health awareness and training programs. Additionally, specific attention should be given to high-risk groups identified by the study, such as older teachers, females, smokers and those with a history of vocal issues, to tailor interventions that can effectively reduce their risk.

Moreover, the research indicates a gap in awareness and practice regarding vocal health measures. Therefore, educational authorities and health professionals should work together to develop comprehensive vocal health education programs aimed at raising awareness and fostering good vocal hygiene practices among teachers. By addressing these factors, it is possible to significantly reduce the incidence of voice disorders among teachers, thereby enhancing their occupational well-being and effectiveness in the classroom.

This study not only contributes valuable insights into the prevalence and causes of voice disorders among secondary school teachers but also provides a foundation for future research and policy-making aimed at improving the vocal health of educators. Further studies are needed to explore the long-term effects of these disorders on teaching efficacy and career longevity, as well as to evaluate the impact of specific interventions over time.

Limitations of Study

Cross-Sectional Design: One of the primary limitations of this study is its cross-sectional nature. This design restricts the ability to establish causality between the identified risk factors and the occurrence of voice disorders. Longitudinal studies would be more effective in observing the progression of voice disorders over time and confirming causal relationships.

Self-Reported Data: The study largely relied on self-reported questionnaires to gather data on voice disorder symptoms and risk factors. This method is susceptible to bias, including memory recall bias and the tendency of respondents to provide socially desirable answers. Objective measures and clinical voice assessments would provide more reliable and accurate data.

Limited Geographic Scope: The study was conducted in urban secondary schools, which may not represent the experiences of teachers in rural or suburban areas where environmental and occupational conditions differ. The findings might not be generalizable to all teaching populations.

Sample Diversity: Although the sample size was adequate to draw conclusions, there may be limitations in the diversity of the sample concerning age, gender distribution and cultural factors, which can influence the prevalence and reporting of voice disorders.

Exclusion of Part-Time Teachers: The study excluded part-time teachers who might experience different levels and types of vocal load compared to full-time teachers. Including part-time teachers could provide a more comprehensive understanding of the risks across different teaching conditions.

Lack of Control Group: The absence of a non-teacher control group makes it challenging to determine whether the observed prevalence of voice disorders is specifically higher in the teaching profession compared to the general population or other vocally demanding professions.

Potential Confounding Variables: While the study accounted for several potential confounders, there may be other unmeasured variables such as genetic predispositions, previous non-teaching related vocal abuse, and environmental allergens that could influence the development of voice disorders.

Measurement of Risk Factors: The measurement of certain risk factors, such as "noisy environments", was not quantified in detail. More precise measurement

techniques, such as decibel level monitoring, could enhance the reliability of the data related to environmental risk factors.

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