

Risk Factors for Perceived Voice Disorders Across Occupational Groups

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ABSTRACT

Voice quality plays a crucial role in professional performance and social functioning. Improper or excessive voice use increases the risk of phoniatric disorders, which are increasingly recognized as an occupational health concern worldwide. This literature review synthesizes current evidence on the etiology, risk factors, prevention, and management of voice disorders among professional voice users - including teachers, singers, and public speakers - with a particular focus on Georgia. A systematic search was conducted through PubMed, Scopus, Web of Science, and Google Scholar for studies published between 1980 and 2025, encompassing both the Soviet and post-Soviet periods. Findings indicate that voice disorders disproportionately affect adult women, with hormonal and behavioral factors contributing to vulnerability. Common risk factors include smoking, vocal strain, and exposure to irritants. Despite growing global evidence, voice disorders in Georgia remain under-recognized and insufficiently addressed. The review highlights the need for national strategies focused on prevention, early diagnosis, and the promotion of vocal health among professional voice users.

Keywords: Dysphonia; Georgia; occupational health; phoniatrics; risk factors; voice disorders.

INTRODUCTION

The significance of effective communication across diverse professions is increasingly recognized, with the human voice serving as a vital professional instrument in numerous fields. It is estimated that approximately one-third of employees in industrialized societies rely on their voice as their principal occupational tool.¹⁻⁴ Voice quality greatly influences a person's professional performance and social integration. Incorrect, excessive, or improper use of the voice is associated with a higher risk of developing phoniatric disorders. Prolonged speaking and overloading the vocal apparatus (such as improper speaking, shouting, or vocal strain) can lead to injuries like vocal fold nodules, hyperemia, hemorrhage, polyps or nodules on the vocal cords, hypertrophy of the false vocal folds, and others.⁵⁻⁷

A standard definition of a voice disorder is any condition where the voice does not sound as it usually should and interferes with communication.⁸ These disorders are classified as organic: physiological voice abnormalities caused by changes in the mechanisms of the vocal tract, larynx, or respiratory system; structural - organic voice diseases resulting from physical modifications to the vocal mechanism, such as age-related structural changes in the larynx or alterations in the tissues of the vocal folds (e.g., oedema or vocal nodules). Vocal tremor, spasmodic dysphonia, or vocal fold paralysis are examples of neurogenic-organic voice disorders that originate from issues with the innervation of the larynx by the central or peripheral nervous systems and affect the function of the vocal mechanism. Functional voice disorders include diplophonia, ventricular phonation, muscular tension dysphonia, and aphonia, as well as vocal fatigue. These issues stem from

inefficient use of the vocal mechanism when the physical anatomy is normal.⁹

Among occupations that depend heavily on vocal communication, such as teaching, broadcasting, and public speaking, functional voice problems are very common and have a significant impact. Functional issues are frequently due to incorrect voice use, vocal exhaustion, or phono trauma rather than to organic illnesses caused by structural abnormalities. Due to their lack of vocal training, bad acoustics, and extended speaking in noisy settings, teachers are particularly at risk.⁹

Excessive voice use is necessary for many occupations and hobbies. Teachers, clergy, salespeople, telemarketers, actresses, singers, radio and television presenters, and lawyers are the most frequent professional voice user groups. Their ability to generate voice is either entirely or primarily responsible for their livelihoods.^{10,11} Vocal endurance is essential for all professional voice users, despite differences in vocal complexity, quality, and load.^{12,13} Job classification concerning voice load is divided in the following groups: I group - vocal performer singers, actors; II group - "spoken voice" professions: teachers, lecturers, sales representatives, clergy, coaches and trainers, call center workers, barristers; III group - jobs with some tasks in voice: doctors, business executives, lawyers; IV group - jobs with no functions in voice: administrative workers, clerks.¹³⁻¹⁵

Based on the summary above, it is essential to explore the vocal dysfunction. Phonation is a science that studies the production of sound through vocal cord vibration, which resonates through the vocal tract. The voice apparatus and



resonators are critical for both everyday speech and singing. The process of producing sound at the level of the vocal folds is known as phonation. It is necessary to perform a perceptual assessment of phonation (vocal quality, volume, and pitch) during reading and conversation. Hoarseness, breathiness, roughness, raspiness, vocal fry, diplophonia, voice breaks, pitch breaks, and other traits are all aspects of vocal quality. It is significant to assess whether vocal volume or intensity is appropriate for the given situation and adjust it accordingly. It is crucial to determine whether the patient's voice is high, low, or suitable for their age and gender. It is also important to evaluate the frequency of brutal glottal attacks.¹⁶

Voice issues are receiving more attention in occupational health research worldwide. Research has repeatedly shown that educators and other voice professionals have high prevalence rates of dysphonia. Environmental stressors, vocal misuse, a lack of vocal training, and underlying medical conditions are among the contributing factors.^{17,18} Significant gaps in similar research remain in Georgia. This gap is noteworthy because local context (cultural practices, language, and employment) is expected to introduce unique variability to the pathology and consequences of these disorders.

This paper aims to review etiological (as well as risk factors) and mechanisms of voice disorders among singers, professional speakers, and teachers throughout the world and in Georgia.

REVIEW

Methodology

This literature review synthesized existing knowledge on the risk factors, prevention, and management of voice disorders. A systematic approach was used to identify, select, and analyze relevant sources.

Search strategy

A literature search was conducted in four major electronic databases: PubMed, Scopus, Web of Science, and Google Scholar. The literature search covered publications from 1980 to 2025. This broad timeframe was selected intentionally to include studies and documents from both the Soviet and post-Soviet periods in Georgia. Such inclusion enabled a comprehensive analysis of the evolution of healthcare policies, ethical frameworks, and professional practices across diverse historical and political contexts. Keywords and Medical Subject Headings (MeSH) terms related to voice disorders were used in various combinations, including: "voice disorders," "dysphonia," "occupational voice use," "risk factors," and "prevention." Boolean operators (AND, OR) were applied to refine the search strategy. Reference lists of relevant studies and reviews were also screened to identify additional eligible articles.

Eligibility criteria

Studies were included if they met the following criteria: (i) Published in peer-reviewed journals in English or Georgian; (ii) Conducted on adult populations or professional voice users (e.g., teachers, singers); (iii) Focused on prevalence, risk factors, prevention, or management of voice disorders; (iv) Used quantitative, qualitative, or mixed-method approaches, or were systematic reviews/meta-analyses.

Studies were excluded if they: (i) Were case reports, editorials, opinion papers, or conference abstracts; (ii) Focused exclusively on surgical/medical interventions without broader discussion of risk or prevention; (iii) Were duplicates or inaccessible in full text.

Study selection

All identified manuscripts were imported into reference manager software and screened for duplicates. Titles and abstracts were reviewed against the inclusion criteria. Full-text articles of potentially eligible studies were retrieved and assessed for final inclusion. Any discrepancies were resolved through discussion.

Data extraction

A standardized data extraction form was developed. Information collected included: Author(s), year of publication, and country; Study design and population characteristics; Key focus, such as risk factors or prevention; Main findings and recommendations.

Data synthesis

Findings were synthesized thematically and organized under major domains: Occupational and environmental risk factors; Individual and lifestyle-related factors; Preventive strategies and interventions; and Management and treatment approaches.

The results were summarized narratively, highlighting patterns, gaps, and implications for future research and practice.

Results

Consistent with global patterns, voice disorders worldwide represent a heterogeneous group of conditions that compromise vocal endurance, intensity, and acoustic quality, thereby affecting both occupational performance and quality of life. Their etiology is multifactorial, encompassing phonotraumatic behaviors associated with chronic vocal overuse and misuse, structural laryngeal anomalies, neurogenic pathologies such as vocal fold paralysis or movement disorders, and psychogenic contributors linked to stress and anxiety. Occupational voice users - including teachers, singers, actors, call-center operators, and other professionals who rely heavily on sustained phonation - are particularly vulnerable due to the cumulative demands placed on the vocal apparatus.^{8,13,19-21} Epidemiological data suggest that the prevalence of such disorders may be underreported in

some parts of the world, particularly in the Caucasus region, including Georgia, due to limited awareness and the absence of systematic screening programs. Advancing effective prevention and therapeutic strategies, therefore, requires a nuanced understanding of prevalence, risk factors, and underlying mechanisms. Integrating multidisciplinary approaches - spanning otolaryngology, speech-language pathology, occupational health, and psychology - is critical to reducing the burden of voice disorders and improving both clinical outcomes and public health responses.

The most common risk factors for the development of vocal disorders are occupational, behavioral, and psychological factors. Different etiological factors may contribute to voice abnormalities across age groups. In addition to physiological factors, concomitant chronic diseases, tobacco use, patient sex, occupation, and other factors are significant contributors to dysphonia.^{18,22}

Teachers, singers, telemarketers, and others who use their voices professionally should maintain a healthy voice.^{13,15} Due to overuse or misuse of their voices, many persons who use their voices for work have been found to have a higher incidence of vocal disorders than people who do not use their voices for work.²³ One occupational group identified as having a higher likelihood of voice issues is teachers.^{15,24} According to earlier research, between 10% and 70% of this population had a vocal issue.^{25,26} Vocal fatigue,^{1,27,28} hoarseness,²⁹⁻³² and throat discomfort²⁷ are among the many voice problems that many teachers experience.

Over 43% of teachers may at some point in their careers encounter voice problems, and 7% may be forced to quit teaching because of persistent or irreversible vocal problems, according to the American Academy of Otolaryngology.³³ This high prevalence has significant ramifications for the entire educational system, since teacher turnover and absence can affect student learning outcomes, in addition to personal health and career sustainability. Additionally, a lot of impacted educators put off getting help, frequently underestimating the intensity of their symptoms, which can worsen vocal strain and result in long-term issues. Given the demands of their jobs, functional voice problems among educators are a serious public health issue that requires institutional voice care policies, early intervention, and routine screening to protect these vital workers' vocal health.⁸

In extreme situations, individuals may also develop vocal abnormalities, including vocal nodules, according to studies.³⁴ The beginning of voice abnormalities can have detrimental effects on a person's social life in addition to their health. Voice problems cause teachers to perform worse on the job.³⁵ They are more likely to take sick leave²⁶ or leave of absence.³⁶ Additionally, a higher percentage of teachers quit because of vocal problems.³⁷ Teachers' social lives and communication skills may also be negatively impacted by voice issues.¹⁹

To draw in pupils and hold their interest, teachers - the most researched group of voice professionals^{34,38,39} - require more than just a strong voice; they also need a particular kind

of communication skills.⁴⁰ Teachers who lecture or reprimand students in a monologue format for five to seven hours a day are subject to the highest vocal demands, which frequently become louder and more forceful as the day goes on.¹³ However, to effectively create classroom authority and cultivate productive working relationships with students, all teachers require a functional voice.⁴¹

Teachers and speakers are significantly more likely to sustain voice damage than individuals in other occupations, according to De Alvear et al. (2010). Aphonia (total loss of voice),⁴² hoarseness, weak voice, and throat pain are some of the symptoms.⁴² Because professionals utilize their voice as a tool for work, the risk increases with the intensity of use. Teachers are especially susceptible; thus, it is crucial to understand the causes and examine the characteristics of their voices. Environmental factors cause voice problems, and vocal hygiene education can help avoid them.⁴³

As stated above, despite teachers, other occupations are also risk factors for voice disorders. For salespeople, an effective voice is essential to success because it shapes the initial impression they make on clients. Travel and ticket agents talk to customers on the phone and in person for much of the day. Public relations professionals and receptionists serve as the public faces and spokespersons for their companies and organizations. They are in charge of welcoming guests and acting as the public's and media's point of contact. Politicians and journalists are in occupations that demand lively and expressive discourse as well.⁴⁴

Sports coaches' vocal health may be affected by occupational vocal demands. Given coaches' high voice loads during coaching duties and their reported poor occupational vocal health, this is especially crucial. Coaches' vocal performance and health may also be impacted by their lack of knowledge about vocal health management and usage. Further investigation into coaches' occupational voice health is necessary, given the exploratory nature of this study. Members of musical choirs and sports coaches, particularly those without formal training in voice technique, are also impacted by voice problems.⁴⁵

A high, thin, breathy, unsteady, or reedy voice can be caused by age-related changes in the body, such as reduced lung capacity and loss of strength and muscular tone. Vocal fatigue and reduced volume are also common.⁴⁶ Due to pathological or natural changes, vocal abnormalities are common in older persons and can affect quality of life and communication. The prevalence among those over 60 ranges from 4.8% to 29.1%.⁴⁶ Presbyphonia and dysphonia are terms that describe voice changes associated with ageing, including vocal weakness, hoarseness, and pitch breaks or any voice disorder, including those caused or exacerbated by age-related changes, respectively.⁴⁷

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The studies revealed that voice disorders can affect more women in adulthood compared with men. There was no gender difference in dysphonia awareness. After therapy, the women reported that their subjective perceptions and acoustic analyses of their voices had improved.²⁰ Some studies also exposed that oral contraceptives and/or hormone replacement therapy increase the risk of developing voice disorders by five times among females compared with men.²¹

Depending on a person's age or sex, vocal problems can be defined as aberrant production or absence of vocal quality, pitch, loudness, and resonance. They result from several biological processes and risky habits, such as smoking, clearing one's throat, coughing, screaming, yelling, breathing irritants, and talking too much, which strain or damage the vocal folds.^{9,41}

Some studies on the general population explored that the risk factors, such as tobacco or alcohol, did not independently increase the odds of reporting a chronic voice disorder.⁵ Other studies proved that smoking is the leading risk factor for voice health.⁴⁸ Smoking also causes laryngeal disease.⁴⁹

Additionally, it was established that chronic smoking could result in vocal cord disorders like leukoplakia, Reinke's edema, and laryngitis.⁵⁰ Additionally, it was discovered that smokers are more likely than non-smokers to develop some malignancies, including laryngeal, pharyngeal, and oral cancer.^{50,51} Meta-analysis also confirmed that smoking had significant and moderate effects on the voice fundamental frequency, Maximum Phonation Time (MPT), Voice Handicap Index (VHI), and physical functions.⁵²

The research conducted in the USA revealed that voice disorders among young adults were associated with the number of days of drinking.⁵³ Other studies also explore that frequent consumption of alcohol is associated with laryngeal disease.⁴³

Significant psychological impacts, such as elevated rates of stress, anxiety, and depression relative to the general population, are often linked to voice issues. Depression symptoms, anxiety, and elevated stress levels are a few examples of these impacts. In addition to experiencing more challenging life situations, people with voice issues may also display a more noticeable neurotic tendency. Some people experience worsening psychological distress symptoms after developing a voice issue, which raises questions about causality.⁵⁴

Big data analysis in the United States found that the presence of depressive symptoms was linked to a nearly two-fold increase in the likelihood of voice problems and that there

was a significant relationship between depressive symptoms and the effectiveness and reception of voice therapy.⁵⁵ A study done in one of the Asian countries found a positive correlation between self-recognition of voice disorder and mental health status.⁵⁴

Notably, no information on risk factors for voice disorder development in Georgia was found. The publication in English or Georgian was not found.

DISCUSSION

Preventing voice disorders is feasible only when the complex interplay of risk factors is systematically addressed through both individual and organizational measures. These risk factors may include excessive vocal load, inadequate vocal technique, poor working conditions (e.g., background noise or unfavorable acoustics), exposure to environmental irritants, and insufficient rest or hydration. In addition, underlying medical conditions, psychosocial stressors, and the absence of preventive occupational health practices further increase vulnerability to voice pathology. Effective prevention, therefore, requires a multidimensional approach that combines primary prevention strategies (such as education on vocal hygiene, workplace modifications, and regular monitoring of high-risk groups) with early detection and timely intervention. Only through such comprehensive identification, evaluation, and management of risk factors can the incidence and long-term burden of voice disorders be substantially reduced, thereby safeguarding both individual well-being and professional performance in vocally demanding occupations.

Voice disorders are increasingly acknowledged not only as individual health issues but also as occupational and public health concerns. The evidence reviewed indicates that teachers, singers, and other professional voice users in Georgia are exposed to the same range of risk factors documented globally—excessive vocal load, poor acoustics, inadequate vocal hygiene training, and behavioral contributors such as smoking and alcohol consumption. However, unlike in countries with more established occupational health frameworks, Georgia lacks systematic surveillance, preventive training programs, and institutional policies for protecting vocal health in high-risk professions.

The underreporting of dysphonia among teachers and singers highlights cultural and systemic barriers. Teachers, for instance, may normalize hoarseness or vocal fatigue as part of their professional duties, delaying treatment and thereby increasing the likelihood of chronic disorders. Similarly, singers without formal vocal training are vulnerable to phono trauma, but preventive strategies remain limited to informal practices rather than structured education. Evidence from other contexts suggests that interventions such as workplace acoustic modifications, voice amplification, and mandatory voice care education can significantly reduce prevalence. Adapting such approaches to the Georgian context could provide cost-effective preventive strategies.

The psychological dimension of voice disorders is another critical area. Elevated stress, anxiety, and depressive symptoms are consistently associated with voice problems. This relationship may be bidirectional, as stress can exacerbate vocal dysfunction, while chronic dysphonia may diminish quality of life and occupational performance. In Georgia, where awareness of psychosocial health is still developing, this aspect of vocal health remains largely overlooked and warrants further investigation.

Taken together, the literature underscores the need for an interdisciplinary approach that integrates clinical care, occupational health, public health, and educational policy. Establishing national-level guidelines, training programs, and early detection systems would align Georgia with international best practices and mitigate the burden of voice disorders on both individuals and society.

CONCLUSIONS

This literature review demonstrates that voice disorders among teachers and singers are a significant yet under-recognized health concern in Georgia. The risk factors are multifactorial, spanning occupational, behavioral, biological, and psychosocial domains. While international evidence provides clear models for prevention and management, Georgia lacks systematic monitoring, preventive interventions, and policy frameworks to safeguard professional voice users.

Addressing this gap requires coordinated action. Health professionals, educators, and policymakers must collaborate to establish regular screening, promote vocal hygiene awareness, and integrate voice care into occupational health policies. Research tailored to the Georgian context is urgently needed to generate local evidence on prevalence, risk factors, and the effectiveness of interventions. The review revealed insufficient evidence on the risk factors affecting voice disorders in Georgia. Therefore, it is crucial to conduct a comprehensive analysis in this regard for advancing prevention, early detection, and multidisciplinary management. Georgia can not only improve the quality of life and career sustainability of teachers, singers, and other professional voice users but also protect the broader societal and economic contributions of these essential professions.

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