Policy Research Journal
ISSN (E): 3006-7030 ISSN (P) : 3006-7022 Volume 3, Issue 10, 2025

"EFFECTS OF MISUSE OF VOICE IN SLP PROFESSIONALS"

Faryal Qayyum[*1], Hafeez Punjani[2], Rimsha Khalid[3], Mahnoor Faisal[4]

[*1]faryal.qayyum98@gmail.com, [2]hafeez.punjani@zu.edu.pk, [3]rimshakhalid1403@gmail.com, [4]mahnoor.faisal.sheikh@gmail.com

DOI: https://doi.org/10.5281/zenodo.17454223

Keywords
Vocal hyperfunction, vocal hygiene, vocal abuse, professional voice users, vocal fatigue.

Article History
Received: 07 September 2025
Accepted: 14 October 2025
Published: 27 October 2025

Corresponding Author: *
Faryal Qayyum

Abstract

Background: *As a professional voice user, it is essential that a speech-language pathologist's (SLP) vocal effectiveness remains consistent throughout the day. Many factors may contribute to affect vocal effectiveness, including prolonged voice use, vocally abusive behaviors, consistent shifts in pitch and loudness, poor vocal hygiene, and environmental factors.*

Objectives: *To determine the effect of service delivery on the perceptual features of voice on SLPs.*

Method: *A quasi-experimental, survey research was used in which a survey questionnaire was designed and distributed among the SLPs. Participants included third and final year students at the Speech-Language Pathology program along with graduate Speech-Language Pathologists from the College of Speech-Language and Hearing Sciences - Ziauddin University (CSLHS - ZU) Karachi-Pakistan. Data was gathered through Google Forms and was summarized using a bar graph. The questions were related to their occupational voice usage along with their social activities and the remedies they do for their voice.*

Results: *Survey analysis showed a significant change in perceptual voice quality being observed by the SLPs. These changes are due to inconsistent shifts in pitch and loudness along with poor vocal hygiene.*

Conclusion: *Significant changes in perceptual features were observed by the SLPs. Guidelines were also provided to SLPs to maintain optimal vocal effectiveness.*

1. INTRODUCTION

It is estimated that approximately one-fourth to one-third of the global workforce, in Pakistan, depends significantly on their voice to perform occupational responsibilities. These individuals, often termed **professional voice users**—such as teachers, singers, theatre performers, lawyers, fitness trainers, religious leaders (Imam Sahabs), telephone or call-center agents, and speech-language pathologists (SLPs)—are required to meet demanding vocal workloads. Their professional roles often involve extended periods of speaking or the use of vocal patterns that differ from their typical conversational voice. Because their livelihood relies on the effective and sustained use of their voice, it can be regarded as their **primary occupational tool** (Titze, Lemke, & Montequin, 1997; Warhurst, Madill, McCabe, Heard, & Yiu, 2010).

In recent years, the importance of maintaining vocal health and implementing preventive voice care strategies among professional voice users has received increased scholarly and clinical attention. This population is recognized as being particularly vulnerable to developing voice-related difficulties or disorders due to their heightened vocal demands (Van Lierde et al., 2008).

Among these professionals, **Speech-Language Pathologists** constitute a unique group with distinct voice-use requirements. Their daily activities involve continuous speaking during therapy sessions, counseling, and professional communication. Optimal vocal quality is essential for SLPs—not only to serve as a clear model for clients but also to sustain engagement and ensure effective treatment outcomes (Warhurst et al., 2010).

The present study aims to investigate whether approximately two hours of continuous voice use during therapeutic service delivery (for example, individual therapy sessions) has measurable effects on the vocal characteristics of SLPs. It is hypothesized that both **acoustic parameters** and **perceptual voice qualities** may exhibit signs of reduced efficiency or fatigue following prolonged clinical voice use.

Method

Research Design

A quasi-experimental survey design was utilized for this study to examine patterns related to occupational voice use among speech-language pathologists (SLPs).

Participants

A **purposive sampling strategy** was adopted to recruit **29 participants**. Eligibility criteria included male and female individuals aged **21 to 60 years**. Participants with a **history of smoking**, **diagnosed voice disorders**, or gastroesophageal reflux disease (GERD) were excluded to avoid potential confounding factors. The participant pool comprised third- and final-year SLP students enrolled at the College of Speech-Language and Hearing Sciences, Ziauddin University, Karachi, as well as qualified SLP graduates currently employed in private practices or at rehabilitation institutions across the city.

Data Collection Protocol

Data were collected through a structured survey questionnaire developed in Google Forms, consisting of **five sections**:

1. Personal Information
2. Medical History
3. Social History
4. Vocal Activity
5. Food Intake

The questionnaire explored respondents' **occupational voice use** during therapy sessions and examined the potential **effects of vocal hyperfunction** on parameters such as **habitual pitch**, **loudness**, and **voice quality**. Additionally, participants were asked to report any **strategies or interventions** they employed to manage or prevent voice-related difficulties.

Procedure

Each participant was requested to complete a structured survey questionnaire. Subsequently, they were independently conducted between three and seven therapy sessions in a noise-controlled clinical environment. The nature of these sessions varied across participants and involved clients representing both geriatric and pediatric populations. The average duration of each session ranged from 30 to 45 minutes.

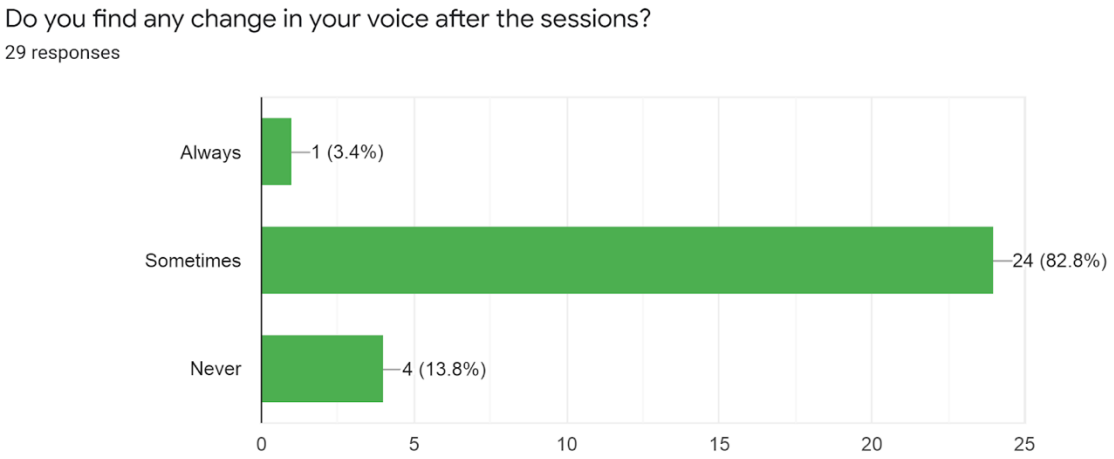
Data Processing

All survey responses were collected and evaluated by three independent judges, who were members of the research team. The compiled data were automatically summarized through Google Forms, which generated visual representations of the results in the form of bar graphs.

Results:

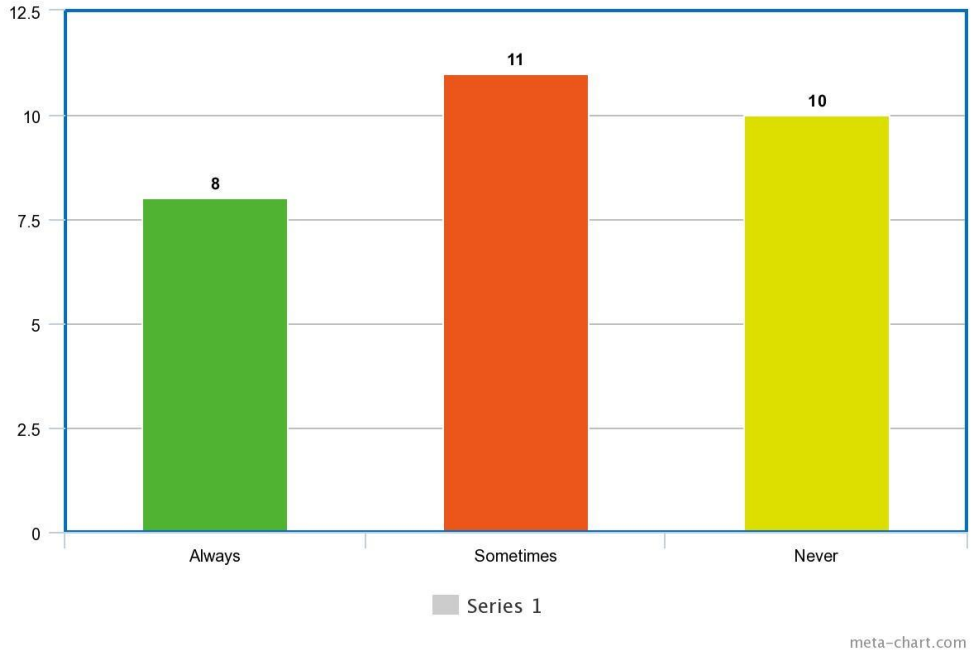
Perpetual results:

Table 1 below shows the perceptual analysis of the participants regarding their voice after the session.



Out of 29 participants, 24 participants (82.8%) reported that they sometimes observe changes in their voice after the sessions, however, 4 participants (13.8%) reported that they don't feel any changes in their voice after the session and 1 participant (3.4%) reported that she always feel changes in their voice after the session.

Table 2 below shows the perception of change in their voice at the end of the day.



Out of 29 participants, 8 participants (27.6%) reported that at the end of the day, their voice is either completely lost (functional aphonia) or becomes breathy and hoarse (functional dysphonia) or requires laryngeal efforts to phonate. The other 11 participants (37.9%) reported that they sometimes feel the variation in their voice at the end of the day, it depends on the population (geriatric or pediatric) they

provide therapeutic service during the day. Remaining 10 participants (34.4%) reported that they don't observe any change in their voice at the end of the day, as they do take care of their vocal hygiene after prolonged voice use and take voice rests.

Vocal Hygiene:

Vocal hygiene are habits, by implementing on it, support in maintaining a healthy and strong voice throughout your life. These vocal hygiene strategies were also recommended to the participants and were asked about it in the questionnaire. None of the participants were involved in drug abuse (smoking, alcohol consumption, etc.). The mean water intake by the participants was 7 glasses per day, out of which 19 participants (65.5%) drink the water of room temperature however 9 participants (31%) consume cold water and 1 participant (3.4%) drink warm water. Isometric exercises play an important role in the relaxation of muscles and reducing muscle tension, other than vocal rests. 23 participants (79.3%) did not do isometric exercises whereas 4 participants (13.8%) reported that they occasionally do isometric exercises and 2 participants (6.9%) do perform isometric exercises at the end of the day. 5 participants (17.2%) reported that they don't take voice rest after hyperfunction of voice usage, however, 9 participants (31%) reported that they do take voice rest for their muscle relaxation and preventing from further damage; and 15 participants (51.7%) reported that they occasionally perform isometric exercises.

Discussion:

Professional Voice Users

Individuals who rely heavily on their voice for occupational purposes are particularly vulnerable to developing vocal strain and pathological conditions due to overuse or improper voice habits (Broaddus-Lawrence et al., 2000). Among these, Speech-Language Pathologists (SLPs) constitute a distinct group of professional voice users, as their work requires continuous verbal interaction during assessments, therapy sessions, and academic or clinical discussions. Such extensive vocal demands can contribute to the onset of voice-related challenges. The ability to modulate vocal intensity, sustain vocal clarity, and preserve adequate strength, endurance, and control are all integral aspects of professional vocal performance (Timmermans, De Bodt, Wuyts, & Van de Heyning, 2004; Warhurst et al., 2010). During therapy, SLPs often engage in vocally demanding behaviors to maintain client engagement and attention. Evidence from a cross-sectional study involving 197 Dutch female SLP students across undergraduate and graduate programs indicated that 93% reported vocal discomfort after speaking, with 71% experiencing sore throat and several noting changes in voice quality (Van Lierde et al., 2010). Given that Speech-Language Pathologists are both clinicians treating voice disorders and advocates for vocal well-being, maintaining optimal vocal health and efficiency should remain a professional priority.

Vocal Fatigue and Hyperfunction

Vocal hyperfunction or excessive vocal loading is frequently observed among professional voice users, often resulting in **vocal fatigue**, which is considered one of the earliest clinical indicators of vocal strain (Hillman et al., 1989; Boominathan et al., 2008). Fatigue, in general, has been defined as the inability to sustain performance at a predetermined level of output (Edwards, 1981). Accordingly, the "onset of fatigue" is marked by a decline in performance below that expected threshold. Within the context of voice disorders, vocal fatigue is commonly recognized as a presenting symptom (Solomon, 2008). It is typically identified through a combination of perceptual and physiological signs, such as increased vocal effort and discomfort, reduced pitch range and flexibility, decreased vocal intensity or projection, diminished control over vocal quality, worsening of symptoms over the course of the day, and noticeable relief following rest.

According to the classification of professional voice users proposed by Koufman and Isaacson (1991), Speech-Language Pathologists (SLPs) fall under Level 2 professional voice users, just below Level 1 users such as singers, teachers, and sales professionals. Even moderate vocal difficulties can interfere with their occupational performance. SLPs regularly provide diagnostic and therapeutic services across a wide range of communication disorders and client populations, which demands consistent and sustained vocal use. Consequently, they are at a higher risk of experiencing symptoms such as hoarseness, discomfort, and increased phonatory effort during voice production

(Roy, Stemple, et al., 2007). Many report changes in pitch stability and voice quality following extended therapeutic sessions and may find it challenging to project their voice effectively afterward.

In response to vocal strain, SLPs often attempt to mitigate fatigue by minimizing verbal output during breaks or after work, allowing partial recovery. However, some adopt maladaptive compensatory behaviors, such as excessive muscular tension or postural adjustments, which may inadvertently intensify vocal fatigue rather than relieve it.

The impact of vocal fatigue extends beyond physical symptoms, as it can also compromise professional efficiency and the overall quality of clinical service delivery. In a survey involving 101 SLPs, Bennett Elsa Joseph et al. (2019) reported that while 41% of participants felt vocal fatigue had no influence on their professional functioning, 51% indicated mild interference, and 8% described a severe negative impact. These findings underscore that vocal fatigue, even when mild, has the potential to disrupt professional performance and affect the standard of care provided to clients.

Influence of Sleep Quality, Depression, and Stress on Vocal Health and Function

The World Health Organization (WHO) defines health as a multidimensional construct encompassing physical, psychological, and social well-being. Similarly, **vocal** health represents a multifactorial concept influenced by numerous interacting elements. These include vocal behaviors such as prolonged or excessive voice use; physical contributors like inadequate posture, respiratory allergies, and insufficient sleep; environmental conditions such as dust exposure and humidity levels; and psychological or emotional factors including anxiety, stress, and depression. Personality traits, such as neuroticism, extraversion, and psychoticism, have also been linked to voice use patterns and vocal vulnerability (Supraja Anand et al., 2019).

Sleep deprivation has been associated with measurable declines in both the quality and quantity of voice output. Individuals experiencing sleep loss often exhibit reduced fundamental frequency (f_0), higher voice handicap scores, and poorer perceptual ratings from both themselves and listeners. Auditory impressions typically describe these voices as sounding fatigued and less resonant (Bagnall et al., 2011; Rocha et al., 2018).

Emotional states also play a crucial role in vocal performance. Heightened emotional arousal can lead to increased muscular tension within the laryngeal mechanism, restricting the flexibility of the vocal folds and amplifying the effort required for phonation (De Jong, 2010; Dietrich et al., 2008). Using data from the **2012** National Health Interview Survey**,** Marmor et al. (2016) identified a strong correlation between depressive symptoms and reported voice disorders, with depressive traits nearly doubling the likelihood of experiencing vocal difficulties.

Stress exerts a comparable physiological influence on the voice. It triggers **muscle constriction** in areas such as the chest, throat, neck, jaw, and larynx, consequently impairing voice quality and control (Jim Folk, 2010). Supraja Anand et al. (2019) further observed that individuals with higher **stress indices** exhibited **elevated mean f_0** and **reduced f_0 variability**, likely reflecting the interplay of **extra-laryngeal muscle activity**, **emotional suppression**, and **vocal fatigue**. In academic contexts, stress among **speech-language pathology students** may stem from a combination of **academic rigor and clinical responsibilities**.

Collectively, these findings align with the **mind–body framework**, which highlights how psychological and emotional processes produce **tangible physiological effects** on the body, including the vocal mechanism (LeMay & Wilson, 2008).

Environmental Factors Influencing Vocal Health

Speech-language pathologists (SLPs) working across different regions encounter diverse environmental, climatic, and lifestyle conditions that can significantly influence vocal well-being. Professionals in rural settings often practice in primary health facilities where the atmosphere may be excessively dusty, humid, or arid (Joseph et al., 2019). In contrast, those in urban environments typically operate within hospitals, academic institutions, or private clinics, where the workspace may be characterized by constant noise, air conditioning, or fluctuating humidity levels. Furthermore, variations in caseload size between rural and urban contexts can place differing levels of strain on the clinician's vocal demands (Pitre, 2011). Collectively, these environmental and occupational conditions can act as predisposing, contributing, or

maintaining factors in the development of vocal fatigue among SLPs (Joseph et al., 2019).

Environmental influences also encompass sociocultural and behavioral patterns. For instance, individuals from communities or families accustomed to speaking loudly may unintentionally subject their vocal folds to excessive stress, resulting in what is commonly termed *vocal abuse* (Rosenfeld, 2002). Persistent exposure to such behaviors can eventually lead to symptoms of vocal fatigue. Conversely, speaking too softly or habitually whispering can also be detrimental, as whispering imposes additional strain on the laryngeal structures (Sharp et al., 2011). Thus, it is crucial for SLPs to remain conscious of vocal hygiene principles and avoid both overuse and misuse of their voices within these contexts (Behrman, 2006).

Another environmental consideration pertains to dietary and habitual practices. In some regions, particularly rural areas, individuals may consume excessive amounts of caffeinated beverages, such as tea—sometimes as many as 10 to 20 cups daily. Caffeine acts as a dehydrating agent, which can dry and irritate the vocal folds, thereby increasing the risk of vocal strain (Bhavsar, 2009).

Therefore, SLPs must recognize and account for environmental, lifestyle, and occupational influences when assessing and managing voice-related conditions. Awareness of these factors allows clinicians to tailor preventive and therapeutic strategies that are contextually appropriate and effective for the populations they serve (Herrington, 1996).

Consensus Auditory–Perceptual Evaluation of Voice (CAPE-V)

The **Consensus Auditory–Perceptual Evaluation of Voice (CAPE-V)** was introduced by the *American Speech-Language-Hearing Association (ASHA)* as a standardized instrument for assessing voice quality through perceptual analysis. Its primary objective is to quantify the degree of deviation in perceptual features associated with a voice disorder. A secondary aim is to aid clinicians in hypothesizing potential anatomical or physiological correlates of the voice disturbance and to determine whether further diagnostic testing is warranted (Zraick et al., 2011).

The CAPE-V identifies six key perceptual dimensions of vocal quality: **(a)** overall severity, **(b)** roughness, **(c)** breathiness, **(d)** strain, **(e)** pitch, and **(f)** loudness. Each characteristic is rated using **a** 100-millimeter Visual Analog Scale (VAS), with unlabeled endpoints. Clinicians may refer to general regions on the scale indicating *mild (MI)*, *moderate (MO)*, and *severe (SE)* deviations to guide their judgments. For each attribute, the evaluator marks a point on the scale corresponding to perceived severity.

To the right of each scale, two response options—**C (Consistent)** and **I (Intermittent)**—allow the clinician to note the pattern of occurrence (Kempster et al., 2009). A "consistent" rating signifies that the perceptual characteristic was present throughout all speech tasks, whereas "intermittent" denotes that it appeared sporadically either within or across tasks.

Assessment through the CAPE-V typically involves rating voice quality after the completion of three speech tasks:

1. **Sustained vowel phonation:** Prolongation of the vowels /a/ and /i/ for approximately 3–5 seconds each.
2. **Standardized sentence production:**
   - *The blue spot is on the key again.*
   - *We eat eggs every Easter.*
   - *How hard did he hit him?*
   - *My mama makes lemon muffins.*
   - *We were away a year ago.*
   - *Peter will keep at the peak.*
3. **Spontaneous speech:** A brief conversational sample in response to prompts such as *"Tell me about your voice problem"* or *"Describe how your voice is functioning."*

Grade of Hoarseness; Roughness, Breathiness, Asthenia, and Strain (GRBAS):

The **GRBAS scale**—an auditory-perceptual framework established by the **Japan Society of Logopedics and Phoniatrics**—is widely utilized to assess the perceptual quality of **hoarseness**. It evaluates five distinct parameters: **Grade (G)**, **Roughness (R)**, **Breathiness (B)**, **Asthenia (A)**, and **Strain (S)**. Each component is rated on a **four-point ordinal scale** ranging from **0 to 3**, where 0 signifies a normal voice quality, *1*

represents a mild deviation, *2* indicates a moderate deviation, and *3* denotes a severe degree of dysphonia. A **rough** voice quality is characterized by a harsh, grating, or irregular vocal tone and is frequently observed in pathologies such as **vocal fold polyps**, Reinke's edema (polypoid corditis), and **laryngeal carcinoma** (Omori, 2011). **Breathiness**, on the other hand, manifests as an audible air escape during phonation and is commonly associated with **recurrent laryngeal nerve paralysis**, **vocal fold nodules**, **acute laryngitis**, **vocal fold atrophy**, and **laryngeal malignancies** (Younger, 2014). **Asthenia**, denoting vocal weakness or reduced intensity, can be evident in cases such as **psychogenic aphonia** and **myasthenia gravis** (Akbulut et al., 2020). Lastly, a **strained** vocal quality, characterized by excessive laryngeal tension, may present in **spasmodic dysphonia** and **laryngeal cancer** (Omori, 2011).

GRBAS versus CAPE-V

Auditory–perceptual assessment remains one of the most widely recognized and frequently utilized approaches in the clinical and research evaluation of voice disorders (Saenz-Lechon et al., 2006). It continues to be regarded as the *gold standard* for documenting voice quality deviations (Oates, 2009). Nevertheless, such assessments are inherently subjective and depend greatly on the evaluator's perceptual experience and level of professional training (Eadie et al., 2006).

The **GRBAS scale**, introduced by Isshiki and colleagues in 1969, is among the earliest and most extensively used perceptual tools. It evaluates five key dimensions of voice quality: *Grade*, *Roughness*, *Breathiness*, *Asthenia*, and *Strain*. This scale has been widely adopted across clinical and research contexts to document the perceptual characteristics of dysphonia. In contrast, the **Consensus Auditory–Perceptual Evaluation of Voice (CAPE-V)**, developed later (Kempster et al., 2009; ASHA, 2010), assesses similar perceptual features—with the exception of asthenia—using a visual analog scale. CAPE-V also includes standardized speech tasks and explicit criteria for analysis, and further extends the assessment to parameters such as *pitch*, *loudness*, *resonance classification*, and additional observable features.

While the GRBAS system employs a categorical scale with fixed intervals to quantify severity, the CAPE-V uses a continuous visual analog scale that provides an asymmetric distribution for mild, moderate, and severe dysphonia. Both frameworks are extensively used by clinicians and researchers in the field of voice, and together they offer comprehensive coverage for describing a wide spectrum of voice disorders, regardless of their etiology (Nemr et al., 2012).

The GRBAS scale is well-established for its validity, reliability, and simplicity, offering ease of application without causing discomfort to either the clinician or the patient (Carding et al., 2009). However, it may be less sensitive in detecting subtle variations in vocal quality compared to CAPE-V (Wuyts et al., 1999). CAPE-V, on the other hand, represents a significant advancement in perceptual voice assessment, providing greater sensitivity to minimal perceptual differences through the use of its visual analog format (Kempster et al., 2009; ASHA, 2010; Solomon et al., 2011; Zraick et al., 2011).

Studies directly comparing both tools have demonstrated a strong positive correlation between the overall dysphonia severity scores of GRBAS and the corresponding severity grades in CAPE-V when applied concurrently (Karnell et al., 2007). However, further investigation is warranted to determine whether this agreement persists when the two protocols are administered at different times, as the use of one scale may influence perceptual judgments on the other. Nemr et al. (2012) further confirmed that both scales demonstrate comparable reliability and inter-rater agreement when applied to identical voice samples across separate sessions.

Voice Handicap Index (VHI)

Voice disorders represent multifaceted clinical conditions that can influence various aspects of a patient's personal and professional life (Arffa et al., 2012). Assessing the severity of these disorders poses a considerable challenge. Existing evaluation techniques range from **subjective measures**, such as perceptual judgments of vocal quality (e.g., rating the voice as mild, moderate, or severe), to **objective assessments**, including videostroboscopic observations and physiological analyses compared with normative data. Although such approaches yield important diagnostic information, they do not fully explain why individuals with comparable vocal

pathologies report different degrees of handicap or disability (Jacobson et al., 1997).

For instance, a teacher experiencing a unilateral vocal fold paralysis may perceive a greater handicap than a retired individual with similar pathology but fewer social or occupational voice demands. The **World Health Organization (1980)** defines handicap as "a social, economic, or environmental disadvantage resulting from an impairment or disability." Consequently, to understand the impact of a voice disorder comprehensively, subjective measures must complement objective findings. **Patient-reported outcome measures** specific to voice can provide valuable insight into the psychosocial burden associated with voice disorders and can be incorporated into ongoing assessments of voice handicap (Arffa et al., 2012).

In this context, **Jacobson et al. (1997)** introduced the **Voice Handicap Index (VHI)**, a self-assessment questionnaire designed to quantify the perceived impact of a voice disorder. The **Agency for Health Care Research and Quality (2002)** later confirmed the VHI as a reliable, valid, and sensitive instrument with robust normative data.

The VHI comprises **30 self-administered items**, each rated on a 5-point Likert scale from **0 (never)** to **4 (always)**. Total scores range from **0 to 120**, where higher scores indicate greater perceived disability. The tool typically requires less than five minutes to complete and is designed for independent use without assistance from clinicians or family members (Rosen & Murry, 2000).

In a comparative study, **Rosen and Murry (2000)** demonstrated that the VHI effectively differentiated between singers and non-singers with voice disorders. Singers generally exhibited lower VHI scores at initial assessment, suggesting reduced perceived handicap. Moreover, the total VHI score varied according to the underlying diagnosis; for example, singers with **vocal fold cysts or polyps** reported greater perceived disability than those with **vocal nodules**.

Effect of Vocal Hygiene on Vocal Professionals

Behlau and Oliveira (2009) describe **vocal hygiene** as a broad framework encompassing all factors related to maintaining optimal vocal health. A well-designed vocal hygiene program generally involves education about the vocal mechanism, identification and reduction of vocal misuse or high-risk situations, and voice conservation through techniques such as controlled voice use and vocal rest. It also emphasizes monitoring of vocal pitch and loudness, adequate systemic hydration and local lubrication, suitable dietary habits, and management of reflux and allergies. Furthermore, it involves minimizing the impact of environmental conditions, medications, and lifestyle habits that may affect vocal function. Consequently, vocal hygiene forms an essential component of any comprehensive voice rehabilitation program.

According to Thomas, Stemple, and colleagues (2007), vocal hygiene represents a **patient-centered behavioral intervention** focused on modifying harmful vocal habits and adopting practices that promote vocal wellness. The primary goal of such intervention is to increase the individual's awareness of how daily activities, environmental exposures, and vocal behaviors contribute to overall vocal function and endurance.

One of the most critical aspects of vocal hygiene is **hydration**, which plays a key role in maintaining healthy vocal fold vibration and reducing phonatory effort. The importance of hydration in vocal function has been discussed since the 1970s, when Punt (1974) first proposed a relationship between hydration and vocal strength. Later research by Verdolini-Marston et al. (1990) and Verdolini, Fennell, et al. (1994) suggested that adequate systemic and surface hydration reduces phonation threshold pressure and minimizes vocal fatigue after extended voice use. To maintain hydration, it is advisable to limit caffeine consumption gradually and ensure sufficient fluid intake throughout the day (Davies & Jahn, 2004). Popkin et al. (2010) recommend drinking approximately 8–12 glasses of water daily, depending on individual body weight and activity level. Consuming water-rich foods such as cucumber and watermelon can also support hydration. Additionally, taking small sips of water during speech may help prevent vocal fold dryness and strain.

Maintaining vocal health further requires minimizing behaviors that impose excessive stress on the vocal folds, such as shouting, yelling, or beatboxing (Murry & Rosen, 2000). These recommendations are particularly relevant for professional voice users, including speech-language pathologists, singers, and

teachers, whose occupational demands involve frequent and sustained voice use (Wingate & Sapienza, et al., 2007). Individual differences—such as the number of clinical sessions conducted, personality traits, and household communication habits—also influence vocal load and fatigue. Avoiding speaking across long distances and using amplification devices when experiencing vocal discomfort can reduce strain and prevent further vocal injury (Carroll & Abaza, et al., 2006).

Gastroesophageal reflux disease (GERD), defined as the backward flow of acidic stomach contents into the esophagus, can significantly affect vocal health. Voice professionals experiencing frequent reflux symptoms after meals should seek medical consultation (Sifrim & Zerbib, 2012). Lifestyle and dietary modifications, such as maintaining an upright posture during and after meals, walking briefly after eating, or elevating the head while sleeping, can help minimize reflux (Monroe, 1999). Reducing caffeine, carbonated beverages, and fatty or spicy foods may further assist in managing reflux symptoms (Balch, 2006).

Substance use also has profound implications for vocal hygiene. Professionals who smoke cigarettes, use sheesha, or consume alcohol should gradually reduce and ultimately eliminate these habits, as they contribute to dehydration and mucosal dryness, resulting in a hoarse or breathy voice quality (Boone & Berg, et al., 2014). For individuals taking medications that cause throat dryness, compensatory strategies—such as chewing sugar-free gum, sipping water frequently, or using humidifiers—can help maintain adequate oral moisture.

Stress, anxiety, and sleep deprivation are additional factors that influence vocal performance (Boominathan, et al., 2008). Adults typically require 7–9 hours of sleep per night; however, insufficient rest can lead to vocal fatigue and decreased breath support (Robles & Carroll, 2011). Sleep facilitates cellular repair and the release of hormones that restore muscle and tissue integrity. Inadequate sleep not only limits respiratory control but also increases reliance on caffeinated beverages, further exacerbating dehydration and mucus buildup on the vocal folds (Cazden, 2012).

Frequent throat clearing is another harmful vocal behavior, as it exerts excessive mechanical stress on the vocal folds (Simpson, 1996). Voice professionals should consciously avoid habitual throat clearing and whispering, as both can cause or worsen benign and malignant vocal lesions, including nodules and polyps (Seifert, 2005).

Among various preventive strategies, **voice rest** is one of the most effective measures to maintain laryngeal health. It reduces phonatory strain and allows for recovery in individuals experiencing vocal fatigue, injury, or pathology (McHenry, Johnson, & Foshea, 2009). Limiting voice use can serve both rehabilitative and preventive purposes (van der Merwe, 2004).

Finally, **steam inhalation** provides significant benefits for vocal fold hydration and comfort. Inhaling warm, moist air helps maintain mucosal moisture and can soothe strained vocal folds (Sivasankar & Fisher, 2002; Gates, Forrest, & Obert, 2013). Breathing steam through the nose for several minutes, two to three times daily, may enhance vocal comfort and endurance.

Conclusion:

The findings of this study indicate that speech-language pathologists (SLPs) frequently experience adverse vocal changes following service delivery. These alterations may reflect the detrimental effects of excessive voice use, vocal strain, and inappropriate vocal behaviors that are often inherent to the demands of their profession. This underscores the need to emphasize structured vocal hygiene programs, along with scheduled voice rest and adequate hydration after therapy sessions. Incorporating vocal hygiene into routine professional practice can facilitate the prevention, early detection, and management of voice disorders before they significantly interfere with clinical performance.

Alterations in a clinician's vocal quality can negatively affect both professional efficacy and personal well-being. Additionally, diminished vocal function may impose financial strain due to potential absenteeism, therapeutic intervention, or even surgical treatment. Therefore, maintaining optimal vocal hygiene not only supports the clinician's own vocal health but also enables them to model and promote effective voice care strategies for their clients.

References:

Van Lierde KM, D'haeseleer E, Wuyts FL, et al. The objective vocal quality, vocal risk factors,

vocal complaints, and corporal pain induce female students training to be speech-language pathologists during the 4 years of study. J Voice. 2010; 24:592–598.

Warhurst, S., Madill, C., McCabe, P., Heard, R. & Yiu, E. (2010). The vocal clarity of female speech-language pathology students: An exploratory study. Journal of Voice, 26(1), 63–68.

Warhurst, S., Madill, C., McCabe, P., Heard, R. & Yiu, E. (2010). The vocal clarity of female speech-language pathology students: An exploratory study. Journal of Voice, 26(1), 63–68.

Van Lierde, K.M., D'haeseleer, E., Wuyts, F.L., De Ley, S., Geldof, R., De Vuyst, J & Sofie, C. (2008). The objective vocal quality, vocal risk factors, vocal complaints, and corporal pain in Dutch female students training to be speech-language pathologists during the 4 years of study. Journal of Voice, 24(5), 592–598.

Warhurst, S., Madill, C., McCabe, P., Heard, R. & Yiu, E. (2010). The vocal clarity of female speech-language pathology students: An exploratory study. Journal of Voice, 26(1), 63–68.

Thibeault, S. L., Merrill, R. M., Roy, N., Gray, S. D., & Smith, E. M. (2004). Occupational risk factors associated with voice disorders among teachers. *Annals of epidemiology*, *14*(10), 786-792.)

Couch, S., Zieba, D., Van der Linde, J., & Van der Merwe, A. (2015). Vocal effectiveness of speech-language pathology students: Before and after voice use during service delivery. South African Journal of Communication Disorders, 62(1), 1-7.)

Santos, A. C. M. D., Borrego, M. C. D. M., & Behlau, M. (2015, August). Effect of direct and indirect voice training in Speech-Language Pathology and Audiology students. In CoDAS (Vol. 27, No. 4, pp. 384-391). Sociedade Brasileira de Fonoaudiologia.)

Ligon, C., Rountrey, C., Rank, N. V., Hull, M., & Khidr, A. (2019). Perceived Desirability of Vocal Fry Among Female Speech Communication Disorders Graduate Students. Journal of Voice, 33(5), 805-e21.)

Anand, S., Bottalico, P., & Gray, C. (2019). Vocal Fatigue in Prospective Vocal Professionals. Journal of Voice.)

Timmermans, B., De Bodt, M.S., Wuyts, F.L. & Van de Heyning, P.H. (2004). Analysis and evaluation of a voice-training program in future professional voice users. Journal of Voice, 19(2), 202–210

Warhurst, S., Madill, C., McCabe, P., Heard, R. & Yiu, E. (2010). The vocal clarity of female speech-language pathology students: An exploratory study. Journal of Voice, 26(1), 63–68.

Broaddus-Lawrence, P.L., Treole, K., McCabe, R.B., Allen, R.L. & Toppin, L. (2000). The effects of preventative vocal hygiene education on the vocal hygiene habits and perceptual vocal characteristics of training singers. Journal of Voice, 14(1), 58–71.

Hillman RE, Holmberg EB, Perkell JS, et al. Objective assessment of vocal hyperfunction: an experimental framework and initial results. J Speech Hear Res. 1989; 32:373–392.

Boominathan P, Rajendra A, Nagarajan R, et al. Vocal abuse and vocal hygiene practices among different level professional voice users in India: a survey. Asia Pac J Speech Lang Hear. 2008; 11:47–55.

Edwards, R. H. T. (1981). Human muscle function and fatigue. In R. Porter & J. Whelan (Eds.), Human muscle fatigue: Physiological mechanisms (pp. 1 – 18). London: Pitman.

Solomon NP. Vocal fatigue and its relation to vocal hyperfunction. Int J Speech-Lang Pathol. 2008;10:254–266.

Kaufman JA, Isaacson G. The spectrum of vocal dysfunction. Otolaryngol Clin North Am. 1991;24:985–988.

Joseph, B. E., Joseph, A. M., & Jacob, T. M. (2019). Vocal fatigue—do young speech-language pathologists practice what they preach? *Journal of Voice*.

Organization., W.H., WHO Definition of Health. The preamble to the Constitution of the World Health Organization as adopted by the International Health Conference.1946: New York.

Bagnall AD, Dorrian J, Fletcher A. Some vocal consequences of sleep deprivation and the possibility of "fatigue proofing" the voice with Voice craft voice training. J Voice. 2011; 25:447–461.

Rocha BR, Behlau M. The influence of sleep disorders on voice quality. J Voice. 2018; 32:771. e1–771.e13.

De Jong F. An introduction to the teacher's voice in a biopsychosocial perspective. Folia Phoniatr Logopaed. 2010; 62:5–8. 83.

Dietrich M, Abbott KV, Gartner-Schmidt J, et al. The frequency of perceived stress, anxiety, and depression in patients with common pathologies affecting voice. J Voice. 2008; 22:472–488.

Marmor S, Horvath KJ, Lim KO, et al. Voice problems and depression among adults in the United States. Laryngoscope. 2016; 126:1859– 1864

Anxietycentre.com. (n.d.). Voice Changes in Anxiety Symptoms. Retrieved from https://www.anxietycentre.com/anxiety-symptoms/voice-changes.shtml

Journal of the Japan Medical Association. (n.d.). Diagnosis of Voice Disorders (4th ed., Vol. 54). Fukushima, Japan.

Saenz-Lechon N, Godino-Llorente JI, Osma-Ruiz V, Blanco-Velasco M, Cruz-Roldan F. Automatic assessment of voice quality according to the GRBAS scale. Conf Proc IEEE Eng Med Biol Soc. 2006; 1:2478–2481.

Oates J. Auditory-perceptual evaluation of disordered voice quality: pros, cons, and future directions. Folia Phoniatr Logop. 2009; 61:49–56.

Eadie TL, Baylor CR. The effect of perceptual training on inexperienced listeners' judgments of dysphonic voice. J Voice. 2006; 20:527–544.

Isshiki N, Olamura M, Tanabe M, Morimoto M. Differential diagnosis of hoarseness. Folia Phoniatr (Basel). 1969; 21:9–23.

ASHA. Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V) Special Interest Division 3, Voice, and Voice Disorders. Available at: http://www.asha.org. Accessed June 18, 2010.

Kempster GB, Gerratt BR, Abbott KV, Barkmeier-Kraemer J, Hillman RE. Consensus Auditory-Perceptual Evaluation of Voice: development of a standardized clinical protocol. Am J Speech Lang Pathol. 2009; 18:124–132.

Nemr, K., Simoes-Zenari, M., Cordeiro, G. F., Tsuji, D., Ogawa, A. I., Ubrig, M. T., & Menezes, M. H. M. (2012). GRBAS and Cape-V scales: high reliability and consensus when applied at different times. *Journal of Voice*, *26*(6), 812-e17.

Carding PN, Wilson JA, MacKenzie K, Deary IJ. Measuring voice outcomes: state of the science review. J Laryngol Otol. 2009; 123:823–829.

Wuyts FL, De Bodt MS, Van de Heyning PH. Is the reliability of a visual analog scale higher than an ordinal scale? An experiment with the GRBAS scale for the perceptual evaluation of dysphonia. J Voice. 1999; 13:508–517.

Solomon NP, Helou LB, Stojadinovic A. Clinical versus laboratory ratings of voice using the CAPE-V. J Voice. 2011;25: e7–e14.

Zraick RI, Kempster GB, Connor NP, et al. Establishing the validity of the Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V). Am J Speech Lang Pathol. 2011; 20:14–22.

Karnell MP, Melton SD, Childes JM, Coleman TC, Dailey SA, Hoffman HT. Reliability of clinician-based (GRBAS and CAPE-V) and patient-based (V-RQOL and IPVI) documentation of voice disorders. J Voice. 2007; 21:576–590.

Arffa, R. E., Krishna, P., Gartner-Schmidt, J., & Rosen, C. A. (2012). Normative values for the voice handicap index-10. *Journal of Voice*, *26*(4), 462-465.

Jacobson, B. H., Johnson, A., Grywalski, C., Silbergleit, A., Jacobson, G., Benninger, M. S., & Newman, C. W. (1997). The voice handicap index (VHI) development and

validation. *American Journal of Speech-Language Pathology*, *6*(3), 66-70.

World Health Organization. International Classification of Impairments, Disabilities, and Handicaps: A Manual of Classification Relating to the Consequences of Disease. Geneva, Switzerland: World Health Organization; 1980. pp. 25–25.

Rosen, C. A., Murry, T., Zinn, A., Zullo, T., & Sonbolian, M. (2000). Voice handicap index change following treatment of voice disorders. *Journal of Voice*, *14*(4), 619-623.

Rosen CA, Murry T. Voice Handicap Index in singers. Journal of Voice. 2000; 14:370-377.

Behlau, M., & Oliveira, G. (2009). Vocal hygiene for the voice professional. *Current opinion in otolaryngology & head and neck surgery*, *17*(3), 149-154.

Thomas L, Stemple J. Voice therapy: does science support the art? Communicative Disord Rev 2007; 1:49–77.

Punt NA. Proceedings: lubrication of the vocal mechanism. Folia Phoniatr (Basel) 1974; 26:287–288.

Verdolini-Marston K, Titze IR, Drucker FG. Changes in phonation threshold pressure with induced conditions of hydration. J Voice 1990; 4:142–151.

Verdolini K, Titze IR, Fennell A. Dependence of phonatory effort on hydration level. J Speech Hear Res 1994; 37:1001–1007.

Van der Merwe A. The voice use reduction program. Am J Speech Lang Pathol 2004; 13:208–218.

Pitre, A. R. (2011). Factors influencing the recruitment and retention of speech language pathologists in rural and urban school districts in Texas. Sam Houston State University.

Rosenfeld, M. (2002). Report on the ASHA speech-language pathology health care survey. Rockville, MD: American Speech-Language-Hearing Association.

Sharp, H. M., & Tasko, S. M. (2011). Disorders of Speech and Voice. In Neurodevelopmental Disabilities (pp. 193-212). Springer, Dordrecht.

Behrman, A. (2006). Facilitating behavioral change in voice therapy: The relevance of motivational interviewing. American Journal of Speech-Language Pathology.

Bhavsar, V. (2009). An essay on the evidence base of vocal hygiene. Journal of Singing, 65(3), 285-296.

LeMay, K., & Wilson, K. G. (2008). Treatment of existential distress in life threatening illness: a review of manualized interventions. Clinical psychology review, 28(3), 472-493

Herrington, J. D. (1996). Effects of music in service environments: a field study. Journal of Services Marketing.

Roy, N., Stemple, J., Merrill, R. M., & Thomas, L. (2007). Epidemiology of voice disorders in the elderly: preliminary findings. The Laryngoscope, 117(4), 628-633.

Davies, D. G., & Jahn, A. F. (2004). Care of the professional voice: a guide to voice management for singers, actors and professional voice users. Routledge.

Popkin, B. M., D'Anci, K. E., & Rosenberg, I. H. (2010). Water, hydration, and health. Nutrition reviews, 68(8), 439-458.

Murry, T., & Rosen, C. A. (2000). Vocal education for the professional voice user and singer. Otolaryngologic Clinics of North America, 33(5), 967-981.

Wingate, J. M., Brown, W. S., Shrivastav, R., Davenport, P., & Sapienza, C. M. (2007). Treatment outcomes for professional voice users. Journal of voice, 21(4), 433-449.

Carroll, T., Nix, J., Hunter, E., Emerich, K., Titze, I., & Abaza, M. (2006). Objective measurement of vocal fatigue in classical singers: A vocal dosimetry pilot study. Otolaryngology--Head and Neck Surgery, 135(4), 595-602.

Sifrim, D., & Zerbib, F. (2012). Diagnosis and management of patients with reflux symptoms refractory to proton pump inhibitors. Gut, 61(9), 1340-1354.

Monroe, J. (1999). Coping with Ulcers, Heartburn, and Stress-related Stomach Disorders. The Rosen Publishing Group, Inc.

Balch, P. A. (2006). Prescription for nutritional healing. Penguin.

Boone, D. R., McFarlane, S. C., & Berg, S. L. V. (2014). The voice and voice therapy. Pearson Education,

Boominathan, P., Chandrasekhar, D., Nagarajan, R., Madraswala, Z., & Rajan, A. (2008). Vocal hygiene awareness program for professional voice users (teachers): an evaluative study from Chennai. Asia Pacific Journal of Speech, Language and Hearing, 11(1), 39-45.

Robles, T. F., & Carroll, J. E. (2011). Restorative biological processes and health. Social and personality psychology compass, 5(8), 518-537.

Cazden, J. (2012). Everyday voice care: the lifestyle guide for singers and talkers. Hal Leonard Corporation.

Simpson, C. B. (1996). General Voice Care/Vocal Hygiene. UT Health Science Center.

Seifert, E. (2005). Stress and distress in non-organic voice disorder. Swiss medical weekly, 135(2728).

McHenry, M., Johnson, J., & Foshea, B. (2009). The effect of specific versus combined warm-up strategies on the voice. Journal of Voice, 23(5), 572-576.

Sivasankar, M., & Fisher, K. V. (2002). Oral breathing increases Pth and vocal effort by superficial drying of vocal fold mucosa. Journal of Voice, 16(2), 172-181.

Gates, R., Forrest, L. A., & Obert, K. (2013). The owner's manual to the voice: a guide for singers and other professional voice users. Oxford University Press.

Omori, K. (2011). Diagnosis of voice disorders. JMAJ, 54(4), 248-253.

Younger, D. S. (2014). 13 CHAPTER Laryngeal Motor Disorders. Motor Disorders, 221.

Zehnthof-Dinesen, A., Akbulut, S., Calderón, E. C., Demir, M., Deuster, D., Fuchs, M., ... & Niebudek-Bogusz, E. (2020). Special Kinds and Clinical Manifestation of Voice Disorders. In Phoniatrics I (pp. 239-347). Springer, Berlin, Heidelberg.

Kempster, G. B., Gerratt, B. R., Abbott, K. V., Barkmeier-Kraemer, J., & Hillman, R. E. (2009). Consensus auditory-perceptual evaluation of voice: development of a standardized clinical protocol. American Journal of Speech-Language Pathology.

Zraick, R. I., Kempster, G. B., Connor, N. P., Thibeault, S., Klaben, B. K., Bursac, Z., ... & Glaze, L. E. (2011). Establishing validity of the consensus auditory-perceptual evaluation of voice (CAPE-V). American Journal of Speech-Language Pathology.