Characteristics of a Treatment-seeking Population in a Private Practice Community Voice Clinic: An Epidemiologic Study

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Summary: Objective. The purpose of this study was to evaluate epidemiologic characteristics of a treatment-seeking population referred to a private practice community voice clinic.
Study Design. This is a retrospective cohort study.
Methods. Patient files representing evaluation referrals over a 28-month period were reviewed. Variables tabulated from records included disorder diagnosis, age, gender, perceptual voice quality ratings, and self-perceived voice handicap at initial evaluation. Descriptive statistics were used to evaluate the diagnosis category and demographic patterns. Parametric statistics were applied to quantitative clinical measurements to test the effect of voice disorder category on perceptual voice quality ratings and self-perceived voice handicap.
Results. A total of 216 consecutive patient files were reviewed. Collectively, the most common disorder diagnosis was "other," consisting of a varied cluster of etiologies, including reflux laryngitis, chronic cough, bilateral paralysis or paresis, leukoplakia, and polypoid degeneration. The most common diagnosis in women was mid-membranous lesions, and that in men was the "other" category followed by atrophy and bowing associated with presbylaryngis. The greatest severity and handicap measures were found in patients with unilateral paralysis.
Conclusions. Collectively, the demographic patterns reported in this study align with those from specialty voice clinics housed in academic medical centers and community voice clinics led by laryngologists and general otolaryngologists. Translating these findings to professional practice, the data support the notion that speech-language pathologists specializing as voice therapists who seek to establish private practice clinics should possess competencies in the knowledge and skills required to serve treatment-seeking populations with a wide variety of voice impairments.
Key Words: Voice disorder−Dysphonia−Epidemiology−Private practice−Otolaryngology.

BACKGROUND

Laryngology has evolved for more than a century to its current state as a formalized subspecialty of otolaryngology—head and neck surgery, evidenced by more than 20 formal fellowship programs established in major academic medical programs across the United States.[1] Many fellowship trained laryngologists will take their advanced knowledge and skill to community otolaryngology practices, where an increasing number of community-based specialty voice care clinics are being established. In both academic medical and community-based voice clinics, laryngologists utilize an interprofessional approach to assessment and management, which includes, among other health-care professionals, the speech-language pathologist (SLP).

Vocology, the science and practice of voice habilitation, is a subspecialty of SLP. Those SLPs in clinical practices that serve substantial numbers of treatment-seeking populations with voice and airway impairments often refer to themselves as "vocologists," "voice therapists," or "voice specialists." These professionals practice in at least four different settings, including (1) academic medical voice care centers, (2) academic speech and hearing clinics, (3) community-based specialty voice clinics led by laryngologists, and (4) community-based private practices housed alone or as part of a general otolaryngology practice. Although no formally recognized fellowship or certification for SLP voice specialization exists at this time, many voice therapists work interprofessionally with laryngologists in the specialty voice centers housed in academic medical centers and community voice care clinics. This team-based interprofessional collaboration is thought to benefit patient care and outcomes. For example, disorder diagnosis can change in a substantial number of cases when specialty voice evaluations are performed.[2−4]

A number of voice therapists also work in private practice settings, some of which are collaborative practices housed in general otolaryngology clinics, whereas others work independently in community-based private practice voice clinics. Although no study has sought to identify the number of SLP voice therapists working in these settings, there are approximately 8000 SLPs who identify voice as one of their areas of clinical specialty.[4] Among these, hundreds identify as working in private practice or in private physician offices.[4] Although referral patterns, patient characteristics, diagnosis trends, and referral pathways have been reported from epidemiologic studies of laryngology and general otolaryngology practices, to our knowledge, there are no existing data to inform us about patient demographics or the incidence and distribution of disorders in private practice voice clinics led by an SLP voice therapist. As such, we currently know very little about the epidemiologic characteristics of treatment-seeking populations referred to voice therapists in community private practice voice clinics.

Epidemiologic studies are important to our understanding of the frequency and causes of dysphonia in different populations. Epidemiologic data are essential because these can increase our understanding and awareness of at-risk populations, inform management decisions, and provide insight of practice patterns among laryngologists and vocologists.[5] A substantial body of evidence centering on dysphonic patients and disorder demographics has provided valuable information on the incidence, distribution, causes, and clinical characteristics of treatment-seeking populations with dysphonia. However, our current understanding of the incidence and distribution of voice disorders in treatment-seeking populations is based largely on reports from laryngology practices in academic medical or community voice care centers, or data-based evaluations of general otolaryngology practices.[5−9] Additionally, the most common diagnosis associated with dysphonia is the general label of "laryngitis" when pooling across all medical specialties, a diagnosis label that could arise from a multitude of primary or secondary causes.[6] Private practice voice clinics likely receive referrals from a wide range of health providers, and there are little data available to inform professionals seeking to establish those clinics whether or not patient demographics are similar to academic medical voice clinics, otolaryngology practices, or different from those settings. As such, there is a gap in epidemiologic knowledge associated with treatment-seeking populations specific to private practice voice treatment clinics.

An important question for professionals seeking to establish or work in a community private practice clinic as a voice therapist is whether or not the same knowledge and skills will be needed as when working in a laryngologist- or otolaryngologist-led voice center. Epidemiologic studies can provide answers to this question. For example, the knowledge and skills related to evaluating and treating an airway impairment such as vocal cord dysfunction are somewhat different from the knowledge and skills for evaluating and treating muscle tension dysphonia (MTD). As such, knowledge of the types of treatment-seeking populations an SLP engaged in a community private practice voice clinic might encounter would inform their assessment of whether or not they possess adequate discipline-specific knowledge and skills to ethically work with those populations. The purpose of the present study was to evaluate the diagnosis patterns, patient demographics, and disorder characteristics of treatment-seeking patients referred to a private practice community voice clinic led by a voice therapist. In addition, we sought to investigate whether or not differences in auditory-perceptual ratings of voice quality and self-perceived vocal handicap existed as a function of diagnosis in this clinical practice. A retrospective design was employed to assess diagnosis patterns over a 2-year period in a single practice. The specific questions addressed in the present study included the following: (1) What is the frequency of different voice disorder diagnoses in a private practice community voice clinic? (2) What patient demographics (age and gender) are associated with different

disorder diagnoses in this practice? (3) What clinical characteristics (perceptual voice quality and self-reported handicap) are associated with different disorder diagnoses? and (4) Do clinical measurements of perceptual voice quality and voice handicap differ as a function of diagnosis?

MATERIALS AND METHODS

The present study was approved by the Institutional Review Board of Texas Christian University (#S1233). Retrospective data from patient referrals over a 28-month period were analyzed. Variables of interest were obtained from individual records, and included (1) disorder diagnosis based on ICD coding, (2) age, (3) gender, (4) perceptual voice quality ratings at initial evaluation, and (5) self-perceived voice handicap at initial evaluation. Perceptual ratings were completed by a single SLP utilizing the Consensus Auditory Perceptual Evaluation of Voice (CAPE-V).[10] CAPE-V scores reported in the present study represented the score item for overall dysphonic severity. The CAPE-V is a commonly utilized clinical tool for the assessment of perceptual voice quality, which generates multidimensional ratings of voice production, including overall perceptual severity. Self-perceived voice handicap assessment was completed by each patient at the time of initial evaluation utilizing the Voice Handicap Index (VHI).[11] The VHI generates ratings of patient perceptions of handicap across functional, physical, and emotional domains. Analyses of CAPE-V and VHI allowed the investigators to answer research questions three and four.

The private practice voice clinic from which data were obtained was developed by an SLP vocologist (second author). Her professional background leading to a specialty in voice-impaired populations included classical voice training with a minor in vocal performance at the collegiate level, a master's degree in speech-language pathology with a clinical emphasis and mentorship in voice and airway (including mentored internships in two voice clinic settings), 5 years of clinical practice focusing specifically on voice-impaired populations, and regular continuing professional development in the area of vocology. Referrals upon which the data of the current study represent were from community otolaryngology practices, community SLPs, and self-referrals. All patients underwent a clinical otolaryngology examination by the referring physician and specialty voice evaluation. Medical voice and airway diagnoses were established by an otolaryngologist in collaboration with the SLP. The SLP specialty voice evaluation consisted of a behavioral and qualitative examination and a laryngeal function study, and when laryngeal imaging was not already performed, the SLP conducted laryngeal videostroboscopy. Two general otolaryngologists were housed in the same facility and were involved in the process of differential diagnosis with the voice therapist.

For the purposes of the present study, voice disorders were clustered into diagnosis categories based on the International Classification of Diseases, Ninth Revision (ICD-9),

and the International Classification of Diseases, 10th Revision (ICD-10), codes as a guide. This process was consistent with previously published studies.[12,13] Patients with a singular primary diagnosis where more than five cases existed were grouped together into a single category. These clusters were represented by diagnosis categories of (1) benign midmembranous lesions, (2) unilateral vocal fold paralysis (UVFP), (3) atrophy or bowing associated with presbylaryngis, (4) nonspecific dysphonia, (5) vocal cord dysfunction, (6) MTD, (7) paresis, and (8) transgender patients. Patients with multifactorial primary etiologies identified by more than one diagnosis, those with no voice quality disturbance (ie, roughness and breathiness), or those diagnoses consisting of five or fewer cases were grouped together in the (9) "other" category. For the present study, MTD was defined as an impairment in vocal function characterized by a hyperfunctional muscular imbalance of the voice subsystems in the absence of clear neurological or structural etiologies affecting the true vocal folds. A primary difference between diagnoses of MTD and nonspecific dysphonia was that, in cases of MTD, there was a clear primary functional cause of the dysphonia identified by the SLP and the otolaryngologist, whereas in nonspecific dysphonia there was not.

Descriptive statistics were used to organize and describe the frequency of diagnoses and clinical characteristic patterns among the sample of patients. To further investigate the two quantitative variables in the present study (VHI and CAPE-V scores), we applied separate analyses of variance (ANOVAs) to these data with group (diagnosis category) as the independent variable and VHI and CAPE-V scores as factors in the ANOVAs. Significant main effects were followed up with pairwise post hoc tests using the Fisher lease square difference test. To maintain an adequate degree of statistical power, an alpha level of 0.05 was used for all comparisons.

RESULTS

A total of 216 patients were referred for voice evaluation across the time period of the study (28 consecutive months). Table 1 provides data on the distribution of patient ages across gender categories. Seventy-one percent (n = 153) of the sample were females who had a mean age of 50.5 years.

TABLE 1.

Age and Gender Distributions of the Treatment-seeking Cohort (Transgender Clients Are Coded Based on Biological Gender)

Age	Female	Male	Total
≥70	28	13	41
60−69	17	14	31
50−59	41	10	51
40−49	30	12	42
30−39	12	6	18
20−29	14	4	18
<20	11	4	15
Total	153	63	216

Fifty-six percent of the females were age 50 or above. The remaining 29% (n = 63) of the total sample were males, with a mean age of 50.3 years. Fifty-nine percent of the male patients were age 50 or above. Patients represented a wide range of diagnoses, as demonstrated in Table 1. The largest diagnosis grouping was represented by the other category, which consisted of 19.4% of the entire sample. Patients in this group manifested singular or multiple diagnoses associated with reflux laryngitis, chronic cough, bilateral paralysis or paresis, leukoplakia, and polypoid degeneration, among others. Approximately 18.5% of the sample manifested benign midmembranous lesions including nodules, polyps, and cysts. Another 18.5% were diagnosed with nonspecific dysphonia (ICD-10-CM diagnosis code R49.0, CD-9-CM diagnosis code 784.42). These included patients where no observable structural, inflammatory, or movement impairment could be diagnosed at the time of initial evaluation.[13] Approximately 12.5% of the patients were diagnosed with atrophy or bowing associated with presbylaryngis, whereas 11.1% were diagnosed with UVFP (lack of mobility toward midline during phonation attempts). Additional diagnosis groupings included primary MTD (7.0%), vocal cord dysfunction (VCD) or paradoxical vocal fold motion (VCD—6.0%), unilateral paresis (restriction in mobility toward midline—3.7%), and transgender clients (3.3%, all male-to-female).

Diagnoses were further separated into clusters of gender, as shown in Table 2. Across gender categories, females were

TABLE 2.

Distribution of Diagnoses as a Function of Gender Across the Treatment-seeking Cohort (Transgender Clients Are Coded Based on Biological Gender)

Gender	Age	Diagnosis (%)								
		NSD	BML	Atr/Bow	UVFP	MTD	VCD	Paresis	Transgender	Other
Female n = 153	50.5 (18.4)	13.0	15.7	6.9	8.8	6.0	4.6	2.3	0.0	12.5
Male n = 63	53.9 (20.6)	5.5	2.8	5.6	2.3	1.0	1.4	1.4	3.3	6.9
Total	51.5 (19.9)	18.5	18.5	12.5	11.1	7.0	6.0	3.7	3.3	19.4

Percentages reflect the number of patients within a diagnosis category in association with the entire treatment-seeking sample (N = 16).
Abbreviations: Atr/Bow, atrophy and bowing; BML, benign midmembranous lesions; NSD, nonspecific dysphonia.
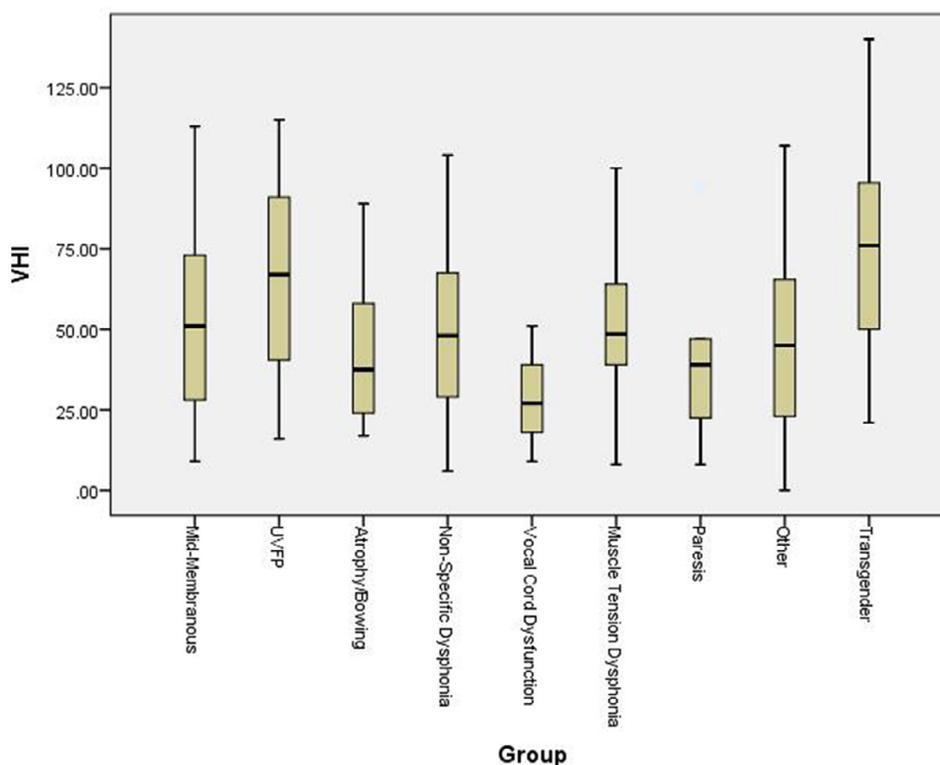
FIGURE 1. Box-and-whisker plot illustrating the patterns of VHI scores at initial evaluation associated with the diagnosis categories.

most often diagnosed with midmembranous lesions, followed by other diagnoses, nonspecific dysphonia, UVFP, atrophy and bowing, MTD, VCD, and paresis, in that order, respectively. Males were most often diagnosed with other etiologies, atrophy and bowing and nonspecific dysphonia (12 cases each), midmembranous lesions, UVFP, VCD, and paresis (3 cases each), and MTD, respectively.

Patterns of VHI scores at initial evaluation associated with the diagnosis categories are illustrated in the box-and-whisker plots in Figure 1. Transgender patients (male-to-female, VHI mean = 75.4, standard deviation [SD] = 41.2) and patients with UVFP manifested the greatest handicap (VHI mean = 66.2, SD = 29.1). These were the only categories where the group VHI mean fell into the severe handicap range (VHI > 60). The majority of the remaining diagnosis categories fell into the moderate handicap range (VHI 31 −60), including midmembranous lesions (mean = 52.4, SD = 27.5), other diagnoses (mean = 48.5, SD = 27.6), nonspecific dysphonia (mean = 47.7, SD = 26.7), atrophy and bowing (mean = 41.5, SD = 19.3), paresis (mean = 40.0, SD = 26.1), and MTD (mean = 36.1, SD = 23.2). Only one category, VCD, fell into the mild handicap range (mean = 29.0, SD = 21.1). As is evident in the box and whiskers of Figure 2, VHI scores were highly variable within each diagnosis category.

CAPE-V scores associated with diagnosis categories are illustrated in Figure 2. As with VHI scores, patients with UVFP manifested the largest perceived dysphonic severity (CAPE-V mean = 59.8, SD = 29.7). Patients with MTD also manifested CAPE-V scores within the moderate-to-severe

range (mean = 54.9, SD = 29.9). In order from more to less severely dysphonic, CAPE-V overall severity scores were next highest for the atrophy and bowing (mean = 46.8, SD = 25.3), midmembranous lesions (mean = 46.7, SD = 26.6), other (42.8, sd = 29.4), nonspecific dysphonia (mean = 37.8, SD = 24.6), paresis (mean = 33.9, SD = 20.6), VCD (mean = 19.7, SD = 15.2), and transgender patients (mean = 13.8, SD = 13.0), respectively. As with VHI scores, CAPE-V measures exhibited a large within-group variability across the diagnosis categories.

Additional statistical analyses were applied to the VHI and CAPE-V data to answer the last research question. Results of the ANOVAs revealed a significant effect of group on the VHI (F[8, 208] = 2.64, $P = 0.009$) and CAPE-V scores (F[8, 208] = 4.23, $P < 0.001$). Follow-up post hoc tests revealed the differences in VHI scores were primarily explained by the UVFP and the transgender groups. The MTD group manifested a significantly greater handicap than midmembranous lesions ($P = 0.05$), atrophy and bowing ($P = 0.001$), nonspecific dysphonia ($P = 0.009$), VCD ($P = 0.02$), paresis ($P = 0.02$), and other ($P = 0.01$) diagnosis categories. The transgender group manifested a significantly greater vocal handicap than midmembranous lesions ($P = 0.03$), atrophy and bowing ($P = 0.01$), nonspecific dysphonia ($P = 0.01$), VCD ($P = 0.1$), paresis ($P = 0.01$), and other ($P = 0.2$) diagnosis categories. Similar results were evident in the CAPE-V comparisons, where the UVFP group manifested significantly greater perceived dysphonia severity than the nonspecific dysphonia ($P = 0.001$), VCD ($P = 0.47$), paresis ($P = 0.21$), and other ($P = 0.30$) diagnosis
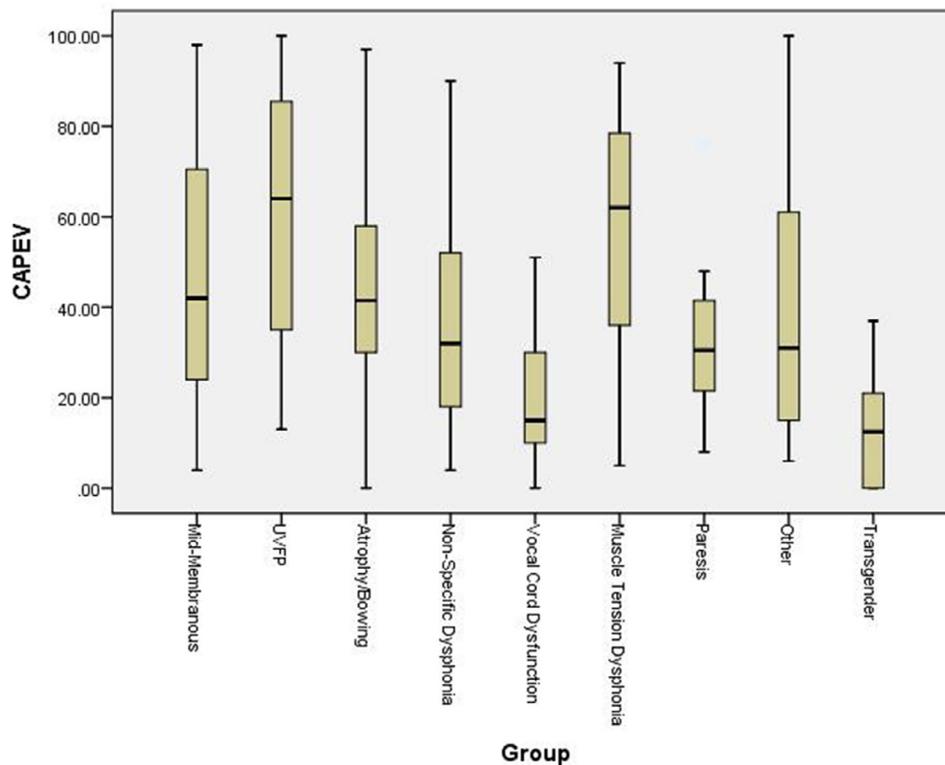
FIGURE 2. Box-and-whisker plot illustrating the patterns of CAPE-V scores at initial evaluation associated with the diagnosis categories.

categories. The MTD group also manifested significantly higher CAPE-V scores than the nonspecific dysphonia ($P = 0.11$), VCD ($P = 0.001$), and transgender group ($P = 0.02$) diagnosis categories. Interestingly, whereas the VHI scores of the transgender group were significantly greater than most other diagnosis categories, the CAPE-V scores of this group were significantly lower than those of all the other groups with exception to the VCD and paresis diagnosis categories. These findings may indicate a disconnect between clinician-perceived voice quality relative to some internal standard and patient-perceived voice handicap associated with the patient's experiences with voice impairment.

DISCUSSION

The purpose of the present study was to evaluate the diagnosis patterns, patient demographics, and disorder characteristics of a treatment-seeking sample referred to a private practice community voice clinic led by an SLP voice therapist. Results revealed that diagnoses were highly variable but included similar clusters as those reported in laryngologist-led specialty voice centers and community otolaryngology clinics.[8,12,13] Among the diagnosis categories associated with single ICD codes, the most frequent clusters of patients were those with midmembranous vocal fold lesions and those diagnosed with nonspecific dysphonia. Diagnoses of UVFP and structural changes associated with presbylaryngis were also common, together accounting for 23.6% of the entire patient sample.

Although diagnostic patterns and patient demographics were similar when comparing data from the present study with previously published epidemiologic data from laryngology and otolaryngology voice clinics, the current findings are not consistent with recent database reviews of national insurance claims data. Specifically, Benninger et al reviewed Marketscan data and found the most common dysphonia-related diagnosis in treatment-seeking populations to be acute laryngitis, accounting for 58% of the claims sample.[14] That study pooled diagnoses across multiple physician specialties, which would have included general medical practitioners among others. It is important to consider that diagnosis patterns reported in the present study, in addition to previous investigations, could also be influenced by multidimensional demographic factors, among which include race, ethnicity, occupation, and socioeconomic profile. These were unaccounted for in the present investigation. However, within the context of the present study and associated reports from specialty voice clinics, it is apparent that voice therapists, laryngologists, and community-based otolaryngologists evaluate patient populations with a greater frequency and diversity of laryngeal disorders than other medical specialties. For the private practice voice therapist, this concept is important as it points to the need for a similar level of knowledge and skill as those SLPs working in academic and community specialty voice centers.

Data from the present study revealed that the voice therapist-led private practice experienced similar ratios of male vs female referrals as those reported from laryngology and

community otolaryngology clinics. Previously published data have revealed that females represented 61%−64% of the treatment-seeking sample, which compares with 71% in the present study.[6,15,16] However, whereas diagnosis categories were also similar to these previous reports, the current study experienced a greater frequency of diagnoses related to benign midmembranous lesions and unilateral paralysis. Recent reports of diagnoses provided by laryngology and otolaryngology practices have indicated the overall percentages of benign midmembranous lesions to fall with the approximate range of 18%-23% of the treatment-seeking samples, compared with 40% in the current study. Previous studies have reported the frequency of paralysis accounting for 3.5%-12% of samples, compared with 25% in the current study.[6,15,16]

Pooling across etiology categories, the sample of the current study experienced handicap and perceived dysphonia across the continuum of severity. Although patients with UVFP accounted for 24% of all diagnoses, they experienced significantly greater perceived handicap (based on VHI) and the greatest perceived dysphonic severity (based on CAPE-V) compared with almost every other diagnosis category. Statistically significant greater voice handicap and dysphonic severity were also evident in patients with benign midmembranous lesions and MTD, as evident in Figures 1 and 2. Although the transgender group manifested the most severe VHI scores, which were significantly greater than those of every other group with exception to UVFP, the auditory-perceptual assessment of voice quality provided by the voice therapist did not align with those scores. This finding is consistent with recent reports comparing perceptual assessments of voice quality in male-to-female transgender clients to controls corresponding to female birth gender. There were no significant differences in ratings of overall perceptual severity between the two groups.[17] Collectively, these patterns might provide insight to SLPs who evaluate voice-impaired populations specific to the generation of clinical hypotheses of handicap and perceived severity as a function of diagnosis type.

CONCLUSIONS

The epidemiologic findings of the present study provide insight into the demographic patterns and disorder characteristics in a treatment-seeking population evaluated at a private practice voice clinic led by a vocologist. Collectively, these demographics and patterns are similar to specialty voice clinics housed in academic medical centers and community voice clinics led by laryngologists and general otolaryngologists. Although the frequency of some diagnoses appears to differ, the types of diagnoses and the distribution of female and male patients are very similar across the varied practice settings. Translating these findings to professional practice, the data support the notion that SLPs specializing in vocology who seek to establish community private practice clinics should possess competencies in the knowledge and skills required to serve treatment-seeking populations with a wide variety of voice impairments.

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