

Research Article

Factors Related to Treatment Attendance for Patients Seeking Gender-Affirming Voice Therapy

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ABSTRACT

Objective: The purpose of this study was to investigate factors related to treatment attendance for patients seeking gender-affirming voice therapy (GAVT).

Method: We completed retrospective chart reviews of 50 patients (43 transgender women, three transgender men, four nonbinary patients; aged 18–67 years, $M = 34.92$ years, $SD = 12.32$ years) referred for GAVT at a Midwest outpatient center from 2016 to 2021. Data extraction included patient demographics, therapy visit specifics (e.g., number of sessions attended, treatment completion status, and in-person vs. virtual visits) and treatment timing (in relation to the onset of the COVID-19 pandemic), and psychosocial and socioeconomic information.

Results: There was no impact of treatment-timing relative to the onset of the pandemic on any attendance measure; however, patients were 1.9 times more likely to complete therapy with each virtual telehealth session attended. Individual factors of outside social support and hormone replacement therapy were positively related to the number of therapy sessions attended, whereas insurance provider and employment status were related to therapy completion.

Conclusions: Telehealth attendance during the COVID-19 pandemic was positively associated with GAVT completion. Future research should investigate psychosocial and socioeconomic factors to understand how to identify patients at risk for poor treatment adherence and facilitate access to clinical care.

Gender-diverse individuals, encompassing transgender and gender nonconforming people, represent a growing patient population seeking multidisciplinary care. Many, but not all, patients may experience gender dysphoria, defined as “discomfort or distress that is caused by a discrepancy between a person’s gender identity and that person’s sex assigned at birth” (Coleman et al., 2012). Gender-diverse individuals may choose to transition socially (e.g., outwardly presenting as the identified gender) and/or medically (e.g., gender-affirming surgeries) to alleviate gender dysphoria and affirm their gender identity. Feelings of

dysphoria can extend into the way an individual communicates (Russell & Abrams, 2019), leading to what is known as vocal dysphoria. Therefore, some patients may seek the services of a speech-language pathologist (SLP) to provide gender-affirming voice therapy (GAVT) and improve communication-related well-being.

Patients seeking GAVT do not necessarily exhibit dysphonic vocal quality (Nygren et al., 2016; Young et al., 2021), defined as an auditory-perceptual deviance in quality measures such as breathiness, roughness, or strain (Kempster et al., 2009); however, that does not mean that they do not qualify for voice services. The American Speech-Language-Hearing Association (ASHA) recognizes GAVT as a service within the scope of practice of SLPs (American Speech-Language-Hearing Association [ASHA], 2016). ASHA states that “a voice disorder is present when an individual expresses concern about having an abnormal voice that does not meet daily needs—even if others do not

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perceive it as different or deviant” (ASHA, n.d.-b). Studies have shown that a voice that is incongruent with gender identity may negatively impact the patient’s psychosocial well-being (Novais Valente Junior & Mesquita de Medeiros, 2020). An SLP may help a patient develop voice and communication that is congruent with their gender identity, thus alleviating vocal dysphoria and reducing psychosocial distress.

The goals of GAVT can be extrinsically and/or intrinsically motivated. That is, some patients may aim to use a voice that is perceived by *others* as congruent with the patient’s gender identity, but other patients may be more interested in finding a voice that authentically represents their own personal identity (Hancock, 2015). Depending on the patient’s goals, GAVT often targets a combination of one or more of the following domains of voice and communication: pitch, resonance, intonation patterns, voice quality, articulation, speech intensity, semantics, pragmatics, and nonverbal communication (Adler et al., 2018; Davies et al., 2015; Hancock & Siegfriedt, 2020; Oates & Dacakis, 2015). The patient and SLP then work together to develop individualized voice therapy goals. Therefore, clinical competency for providing GAVT not only requires prerequisite voice knowledge but incorporates an awareness of patient-specific factors related to each patient’s transition journey.

Treatment Attendance Trends for Voice Therapy

The rates of treatment attendance and completion for patients seeking voice therapy for dysphonia are well documented. Studies have found that between 28% and 38% of patients referred for voice therapy do not attend an initial voice evaluation (Kavookjian et al., 2018; Pasternak et al., 2020; Portone et al., 2008) and between 56% and 72% of referred patients do not complete voice therapy (Ebersole et al., 2018; Hapner et al., 2009; Kavookjian et al., 2018).

GAVT attendance and completion rates are not well established in the literature. Summary attendance information is usually specific to the number of therapy visits needed to successfully attain gender-related voice and communication goals. Studies report a general range of eight to 15 sessions for successful GAVT (Gelfer & Tice, 2013; Hancock & Helenius, 2012; Merrick et al., 2022), although some patients may require longer therapy courses (Hancock & Garabedian, 2013).

However, a recent study by Merrick et al. (2022) evaluated successful treatment completion rates for patients receiving GAVT for voice feminization. They compared two groups: patients attending all voice therapy via individual sessions and patients participating in a hybrid therapy format that included both individual and group sessions. Patients who attended a hybrid treatment program had a

higher goal achievement rate (74%), compared with those who attended individual sessions (21%). The therapy dropout rate was only 16% in the hybrid group, but 72% in the individual group. Further investigation into the relationship between the odds of achieving goals and individual patient factors found that none of the factors (e.g., age, hormone status, and social support) were related to successful goal completion.

The findings of Merrick et al. (2022) are in conflict with a body of work that has reported several significant relationships between patient- and institution-specific factors and voice therapy attendance to treat dysphonia. Studies show that an interdisciplinary evaluation (Litts & Abaza, 2017; Starmer et al., 2014; Vamosi et al., 2020) and occupational voice use (Kavookjian et al., 2018) increase therapy completion rates. Conversely, a lack of insurance coverage (Portone et al., 2008), increased travel distance and/or transportation difficulties (Portone et al., 2008), and a prolonged interval between initial voice evaluation and first voice therapy appointment (Gustin et al., 2020) act to reduce therapy compliance and completion. Furthermore, patients who self-reported as a racial minority had higher no-show rates (Vamosi et al., 2020) and a higher likelihood of missing an initial voice therapy appointment (Gustin et al., 2020) compared with those who did not identify as a minority.

Therefore, it is likely that treatment attendance is influenced by multiple factors regarding access to health care, including barriers at both the organizational level and the individual level, and requires an in-depth analysis of all factors together to understand how they influence one another and lead to, or limit, therapy completion. Furthermore, the factors related to GAVT completion may be different than those that limit voice therapy for dysphonia and should be tailored to the known challenges related to transgender care.

Access and Barriers to Care

According to a framework developed by Levesque et al. (2013), access to medical care is based on organization-specific characteristics and the ability for a patient to interact with the health care system. The health care access framework describes five areas specific to a health care organization (approachability, acceptability, availability and accommodation, affordability, and appropriateness) and five individual abilities (ability to perceive, ability to seek, ability to reach, ability to pay, and ability to engage), which interact with each other and explain barriers someone may encounter when seeking care (see Levesque et al., 2013, for further information). By identifying these two levels of access regarding organizational and individual characteristics, providers can better respond to a specific population’s access to care, while also understanding that

these domains are not truly independent of each other when barriers arise.

Telepractice During the COVID-19 Pandemic

When considering access to care at an organizational level, the availability and accommodation of the health care service provider can impact patient care. This can include variables such as location, accommodation, hours of operation, and appointment mechanisms (Levesque et al., 2013). An organization's model of service delivery can be a point of access or a barrier to care for an individual obtaining appropriate health services.

The health care model for voice treatment has been upended over the past few years with the onset of the COVID-19 pandemic. The pandemic has presented several challenges to in-person treatment attendance for medical visits and vocal care. Subsequently, telepractice has grown as an alternative to various types of in-person speech-related appointments (Bokolo, 2021; Campbell & Goldstein, 2021). Telepractice, henceforth, referred to as *telehealth sessions*, is defined for the purposes of this work as synchronous audiovisual sessions provided through a virtual platform. The prepandemic incidence of SLPs providing telehealth sessions across all types of therapies was 4%, whereas surveys postpandemic onset showed that 62% of SLPs provided telehealth services in May of 2020 (ASHA, 2020).

Telehealth sessions may overcome some of the challenges and barriers predetermined to impact vocal care. For example, voice therapy can be safely delivered without the use of social distancing and face masks. This is important as face masks have shown to attenuate speech frequencies (Goldin et al., 2020; Magee et al., 2020; McKenna et al., 2021; Nguyen et al., 2021) and impact intelligibility (Mendel et al., 2008; Radonovich et al., 2009). Moreover, telehealth sessions may increase access to care for those with travel or transportation difficulties (Bokolo, 2021; Portone et al., 2008) and increase the ability to attend subspecialized services (Kelchner, 2013)—such as GAVT. Telehealth also has the potential to overcome specific barriers facing gender-diverse patients, such as anxiety about discrimination in public spaces and safety concerns (Hamnvik et al., 2020). However, the telehealth treatment modality presents its own challenges (Bashshur et al., 2020; Kelchner et al., 2021). The ability to successfully complete telehealth sessions relies on several factors, such as (a) access to a computer or other device (Campbell & Goldstein, 2021), (b) access to the Internet with sufficient bandwidth and consistent connectivity (Campbell & Goldstein, 2021; Eddison et al., 2022), (c) technological literacy and the ability to interact with a virtual platform (Eddison et al., 2022), and (d) privacy (Adams et al., 2021; Dowshen & Lett, 2022), including both platform privacy and the privacy/confidentiality specific to the patient's personal environment

during sessions. Privacy and confidentiality may be of specific concern to those seeking GAVT who may not want to disclose their gender identity to those in their surrounding environment (e.g., household members; Grasso et al., 2022).

Despite these challenges, telehealth has shown promise as a treatment modality for transgender medical services. A previous study sought to understand how providing telehealth services after the onset of the pandemic influenced treatment rates for transgender patients across 10 family planning centers located in the Midwestern United States (Lock et al., 2022). The authors found no difference in the rate of total transgender services provided at the centers when comparing rates before and after the onset of the pandemic. The results further showed that once telehealth services were provided, 60% of patients attended at least one virtual visit, and 47% of all visits were provided through this modality. A similar study at a health center located in Boston, MA, showed that their shift to providing telehealth services after the onset of the pandemic did not impact their overall attendance at their center and, in fact, increased the number of new transgender clients that they were able to see (Grasso et al., 2022). Both studies support the notion of telehealth services being a feasible way to provide gender-related care to gender-diverse clients.

To our knowledge, no studies have investigated how the pandemic and implementation of telehealth sessions may be related to treatment access for gender-diverse patients seeking GAVT. Information on the utility of telehealth is critical to make recommendations for best treatment practices and adequate treatment modalities moving forward, especially for marginalized populations who already experience barriers to accessing medical care.

Attendance and Barriers to Medical Care for Gender-Diverse Patients

We propose that attendance measures (number of attended visits, missed visits, etc.) and treatment completion may be used as correlates to health care access and markers for successful interactions with the health care system. Knowledge relating individual factors to attendance when considering access to care may help SLPs identify patients at risk for loss of follow-up and aid in developing initiatives to support patients and improve health care access at an organizational level (Levesque et al., 2013). Hancock and Downs (2021) incorporated this access to care framework into a qualitative assessment of interviews from a focus group of people who identified as both gender diverse and from a racial minority. Themes related to four out of five individual abilities (all but “ability to engage”) emerged from the discussion on GAVT access and services, bolstering the use of the framework when examining access to care for transgender patients.

Despite the lack of understanding of challenges presented to gender-diverse patients seeking voice related services, there are several barriers to health care and disparate health outcomes identified for this patient group. Some of these barriers continue at the organizational level when considering acceptability of the service provider in the domains of professional values, norms, and culture (Levesque et al., 2013). For example, stigma and discrimination are present in health care settings (Howell & Maguire, 2021; White Hughto et al., 2015) and may deter this population from seeking medical and mental health care. In a large national survey from 2010, 70% of gender-diverse respondents reported discriminatory experiences in a health care setting, with rates of discrimination being reported at Levels 2–3 times more frequently than patients who identified as lesbian, gay, or bisexual (Lambda Legal, 2010). Furthermore, transgender patients report avoiding medical appointments at large hospital centers due to anticipated bias and unsupportive environments (Howell & Maguire, 2021).

Studies have shown that stigma and discrimination toward this group extend beyond that of the medical setting and impact several individual access factors. Approximately 40% of gender-diverse individuals do not have family support, which is linked to greater incidence of mental health diagnoses and psychosocial distress (James et al., 2016). Several studies indicate that symptoms of depression and anxiety, suicidal ideation, and suicide attempts are significantly more prevalent among gender-diverse individuals (Borgogna et al., 2019; Connolly et al., 2016; James et al., 2016; McNeil et al., 2017; Testa et al., 2017). A recent study found increases in depression and anxiety symptoms among sexual and gender minority people since the onset of the pandemic (Flentje et al., 2020).

Additionally, it has been reported that gender-diverse individuals who have greater mental health diagnoses are more likely to be unemployed (Wang et al., 2021). The largest survey of transgender people in the United States showed large socioeconomic disparities between this population and the general U.S. population, with a 15% unemployment rate compared with a 5% rate in the general population at the time of the survey (James et al., 2016). Moreover, 30% of responders reported homelessness at some point in their lives, with 12% reporting being homeless in the previous year due to being transgender. It is thought that there is a negative cycle of mental health problems, unemployment, and financial problems that exacerbate one another (Mizock & Mueser, 2014). Together, these can impact a patient's "ability to reach" health centers, their "ability to pay" for services, and the "ability to engage" in ongoing care plans (Levesque et al., 2013).

Even with steady employment and employer-provided health insurance, gender-affirming medical services are not always affordable; there is evidence that gender-diverse

individuals may experience insurance denials for other gender-affirming services at rates as high as 50% for some insurance providers (Bakko & Kattari, 2020). The same can be said for GAVT: A study by DeVore et al. (2021) examined policies from the top three commercial insurers in each U.S. state and found that only about 2.7% of commercial insurers contained policies that specifically covered GAVT. Consequently, 33% of transgender people reported that they do not seek medical care due to its high costs (James et al., 2016).

With this knowledge of access and barriers to care, we decided to investigate individual factors with an emphasis on the demographic, psychosocial, and socioeconomic areas that have been previously identified as barriers to transgender care. While using an access to care framework (Levesque et al., 2013), individual-level factors were targeted in an exploratory analysis to identify promising areas for future investigation.

Purpose

The overarching goal of this work was to add to the growing body of literature on treatment considerations for vocal care of gender-diverse patients. The first aim of this study was to compare the treatment trends in patients seeking GAVT surrounding the global pandemic, with special consideration to the advent of the organizational factor of telehealth services once the pandemic began. We hypothesized that increased availability of telehealth sessions would be positively related to attendance measures for these patients. A secondary aim was to explore the relationship between individual barriers to health care access and attendance measures, with the goal to identify key factors for further investigation and provide important information for clinicians working with gender-diverse patients.

Method

This study was completed at the Robin Cotton & Rocco Dal Vera Professional Voice, Swallowing, and Airway Center at the University of Cincinnati, a midsize Midwestern outpatient center. Institutional review board approval was obtained prior to the initiation of the study. We followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (von Elm et al., 2008) that include a 22-item checklist to ensure transparency and replicability.

Participants

We completed a retrospective chart review of 64 patients referred for GAVT between September 2016 (the

date we began gender-affirming vocal care at our center) and July 2021. Fourteen of these patients were excluded because they were midtherapy at the time of data extraction (defined as receiving therapy within 3 months of the review period, without an official therapy discharge in place). Therefore, we extracted information from the charts of the remaining 50 patients (43 transgender women, three transgender men, and four nonbinary patients), aged 18–67 years ($M = 34.92$ years, $SD = 12.32$ years), who were no longer actively involved in the therapy process.

Therapy Center and Environment

All patients were referred to the same SLP who specialized in GAVT. The SLP was a cisgender woman, which means that she did not have lived experience in terms of gender diversity. To become competent in providing voice-related transgender care, the SLP completed multiple national trainings and attended conferences led by key researchers and practitioners in the field. She had 2 years of experience with GAVT prior to starting gender-affirming services at our center (September 2016).

In-person treatment was provided through an outpatient clinic that included additional medical staff (e.g., laryngologists and medical assistants) as a potential part of patient care. Therapy sessions were provided in a quiet, private therapy room with a large visible sign speaking to the inclusive mission of the treatment team. Clinician pronouns were displayed on her lab coat at all times during treatment, and all patients were asked about their level of comfortability and safety in the treatment room. All-gender restrooms were available in the clinic and labeled as such.

Virtual treatment sessions were conducted in the same therapy room with the door closed to ensure patient privacy and confidentiality. Therapy was provided via a desktop computer with a mounted webcam and speakers used for audio. *Epic*—a confidential, electronic record software—was used to carryout telehealth sessions. Patients accessed the secured video platform through their personal *Epic MyChart* account. On occasion, the Internet connection would be disrupted if the patient had poor connection; however, this was infrequent and did not prevent any intended therapy sessions from being successfully completed.

Treatment Course

GAVT care at this outpatient center began with an in-person initial evaluation during which the SLP gathered the patient's background history, outlined the treatment trajectory, established a rapport with the patient, collected acoustic measures of voice, and educated the patient on the fundamentals of vocal hygiene and reflux management, as needed.

Patients were evaluated for dysphonia using the Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V; Kempster et al., 2009), a formalized visual-analog scale (0–100 mm) in which a trained clinician may rate overall dysphonia as well as other vocal percepts of strain, breathiness, roughness, pitch, and loudness. The SLP also informally inquired about patient reports of vocal fatigue, self-perceived hoarseness, and deviations in their voice in specific environments. Dysphonia was diagnosed if it was perceived by the clinician or self-reported by the patient. A laryngeal examination was typically not performed, unless the patient presented with auditory-perceptual indications of dysphonia, a history of voice problems, or history of smoking. If a patient did have vocal pathology or dysphonia, the patient worked to improve voice quality and resolve vocal pathology concurrently with gender-affirming voice goals. See Appendix A for information on voice-related health history and health behaviors relevant to voice care.

The treating therapist recommended weekly therapy sessions, lasting 1 hr in duration, for at least 6–8 weeks for all GAVT patients (Carew et al., 2007). The therapy goals most often included a combination of evidence-based voice therapy techniques such as semi-occluded vocal tract exercises, resonant voice therapy, and pitch training exercises. Per patients' individual needs, the SLP provided counseling for patients experiencing vocal dysphoria and/or helped patients identify safe environments in which to practice their target voice.

Our center promotes a collaborative approach to goal development and achievement (Kavookjian et al., 2018) that incorporates the patient's standard of personal success into their therapy plans. No patient was discharged from therapy until the patient expressed that they were ready and/or the SLP and patient decided together that the patient had met their own personal goals for gender-affirming communication. The patient's self-perception of each parameter of communication (target in each goal) was taken into account when scoring their therapeutic accuracy. All patients were consulted at every phase of therapy about what level of accuracy and competency they felt they met.

Data Extraction

Two researchers (T.D. and S.S.) independently extracted data from each patient's electronic medical record into a formalized Excel spreadsheet. Then, researchers met to compare extracted data and come to a consensus. When needed, a third researcher (V.M.) discussed the extraction and finalized the data. Extracted data included demographic information of age, race, ethnicity, and gender identity. Pertinent medical information related to gender transition was extracted, including the status of hormone replacement therapy and any gender-affirming

medical procedures. Psychosocial information was recorded, such as details about social transition, history of social support in relation to gender identity, and mental health diagnoses and/or relevant mental health symptoms. Although distress surrounding gender incongruence (i.e., gender dysphoria) is currently considered a mental health diagnosis (American Psychiatric Association, 2013), there has been movement toward depathologizing gender-related experiences

(Fernández Rodríguez, 2018). For that reason, we chose to focus on general mental health symptoms and diagnoses (e.g., anxiety and depression) and did not include gender dysphoria in our data extraction. Finally, we extracted socioeconomic factors, which included the patient's employment status at time of initial GAVT evaluation and the source of insurance coverage for GAVT. See Table 1 for an in-depth look at patient information.

Table 1. Participant characteristics.

Variable	Total N = 50 n (%)	Pre-COVID n = 16 n (%)	Mixed-COVID n = 8 n (%)	Lockdown-COVID n = 26 n (%)
Gender				
Female	43 (86)	13 (81)	8 (100)	22 (85)
Male	3 (6)	2 (13)	0 (0)	1 (4)
Nonbinary ^a	4 (8)	1 (6)	0 (0)	3 (12)
Race				
Asian	1 (2)	0 (0)	0 (0)	1 (4)
Black	6 (12)	3 (19)	1 (13)	2 (8)
Multiracial	3 (6)	1 (6)	1 (13)	1 (4)
Other	1 (2)	1 (6)	0 (0)	0 (0)
White	38 (76)	11 (69)	6 (75)	21 (81)
Not reported	1 (2)	0 (0)	0 (0)	1 (4)
Ethnicity				
Hispanic or Latino	0 (0)	0 (0)	0 (0)	0 (0)
Not Hispanic or Latino	49 (98)	16 (100)	8 (100)	25 (96)
Not reported	1 (2)	0 (0)	0 (0)	1 (4)
Payer Source				
Self	1 (2)	0 (0)	0 (0)	1 (4)
Medicare	1 (2)	0 (0)	0 (0)	1 (4)
Medicaid	18 (36)	9 (56)	3 (38)	6 (23)
Private	23 (46)	5 (31)	4 (50)	14 (54)
Other ^b	7 (14)	2 (13)	1 (13)	4 (15)
Employment Status				
Yes	30 (60)	8 (50)	5 (63)	17 (65)
No	16 (32)	6 (38)	3 (38)	7 (27)
Not reported	4 (8)	2 (13)	0 (0)	2 (8)
Social Support ^c				
Yes	20 (40)	4 (25)	1 (13)	15 (58)
No	2 (4)	0 (0)	1 (13)	1 (4)
Mixed	23 (46)	9 (56)	5 (62)	9 (34)
Not reported	5 (10)	3 (19)	1 (13)	1 (4)
Mental Health Factors ^d				
Yes	41 (82)	13 (81)	6 (75)	22 (88)
No	5 (10)	2 (13)	1 (13)	2 (8)
Not reported	4 (8)	1 (6)	1 (13)	2 (8)
Gender-affirming procedures				
Yes	24 (48)	7 (44)	6 (75)	11 (42)
No	24 (48)	9 (56)	1 (13)	14 (54)
Not reported	2 (4)	0 (0)	1 (13)	1 (4)
Hormone Replacement Therapy ^e				
Yes	42 (84)	15 (94)	8 (100)	19 (73)
No	7 (14)	1 (6)	0 (0)	6 (23)
Not reported	1 (2)	0 (0)	0 (0)	1 (4)

^aThese four patients identified as: male and nonbinary, nonbinary and demi-guy, nonbinary and gender-queer, and nonbinary girl. ^b“Other” included coverage by both Medicare and Medicaid, both private and Medicaid, and both private and Medicare. ^c“Yes” was defined as positive support of gender identity from most familial and social relationships. “Mixed” was defined as both support and lack of support of gender identity from relationships. “No” was defined as a none or very little support of gender identity from relationships. ^dMental health factors included psychological diagnoses and relevant symptoms, such as suicidal ideation, but gender dysphoria was not included. ^eHormone replacement therapy status was taken at time of the initial evaluation.

Next, the researchers extracted information on the number of attended visits, reschedules, cancellations, and no-show appointments (see Table 2 for a list of attendance definitions). The mode of therapy delivery (in person or virtual) was noted for each appointment. Researchers described the patient's therapy course by noting if the patient was formally discharged from therapy, defined as meeting therapeutic goals and having a formalized "discharge" note in their record. The reasons for missed appointments or breaks from therapy, patient-perceived barriers to gender-affirming care, or other factors that may plausibly impact therapy participation were also extracted from each chart and used to inform our interpretation of the findings.

Statistical Analysis

Aim 1. Our first aim was to evaluate the impact of the COVID-19 pandemic on treatment measures and understand how the onset of virtual telehealth sessions was related to attendance. Patients were divided into three groups based on their first scheduled visit in relation to the Ohio pandemic lockdown date of March 23, 2020. The "pre-COVID" group completed all therapy visits prior to the lockdown date, whereas the "mixed-COVID" group had visits both before the lockdown and after. Finally, the "lockdown-COVID" group enrolled in GAVT after the initiation of the pandemic lockdown.

We completed separate nonparametric Kruskal–Wallis tests (as our data did not meet normality assumptions) for the measurements of number of visits attended, number of cancellations, number of no-shows, and number of rescheduled visits, in order to compare attendance measures across the three groups. Next, a binary logistic regression model was calculated to determine whether

membership of the three groups predicted treatment completion, which was defined categorically as "yes, completed therapy" with a formalized discharge note in place and "no, did not complete therapy" as evidenced by no discharge documentation.

Finally, a separate binary logistic regression model examined whether the number of telehealth visits attended related to treatment completion for the groups that were offered telehealth (i.e., the mixed- and lockdown-COVID groups). Of note, we could not compare telehealth attendance across the three attendance groups because the center did not begin offering telehealth until after the pandemic began. Significance was set to $p < .05$ for each Kruskal–Wallis and logistic regression model.

Aim 2. We completed exploratory analyses of individual factors to understand their relationships with the total number of therapy visits attended as well as treatment completion. Model predictors included gender identity, age, race, presence of hormone therapy, presence of gender-related surgeries, social transition status, social support status, presence of a mental health diagnosis/symptomology, employment status at the time of the initial evaluation, and insurance provider. Ethnicity was not considered because all participants self-identified as non-Hispanic, except for one that did not disclose their ethnic identity.

For the purposes of the exploratory analyses, some factors had to be collapsed to meet the assumptions of the statistical models. For example, a complete analysis of all races was not possible due to the low number of patients in some racial categories. Subsequently, race was collapsed into two categories: (a) patients who identified as white only and (b) patients who identified as anything else (note, this may include the identity of being biracial such as being white and another race). See Appendix B for a complete list of variables and explanation of collapsed categories for the analyses.

We completed a backward step-wise regression model with the nine factors as predictor variables and the outcome measure of total attended therapy visits. At each iteration, the predictor with the largest p value was removed until the model met our preset criterion of all variables with $p < .30$. In the same respect, we completed a second backward binary logistic regression model with all predictors and the outcome variable of treatment completion (defined as "yes" and "no"). Again, variables were removed at each iteration until the model met the preset criterion of $p < .30$. For both models, variable significance was liberalized to $p < .10$ due to the exploratory nature of this work. The appropriate coefficient of determination (R^2) was calculated for each model to understand the amount of variance accounted for by the independent variables. When indicated, Tukey's post hoc comparisons of multilevel factors were completed to

Table 2. List of attendance terms.

Term	Definition
Attended visit	Visit was attended, whether in person or virtually, and there was an official note of record in the patient's medical record.
Therapy completion	Patient officially finished GAVT, based on both completion of therapy goals and patient satisfaction, as evidenced by an official "discharge" note in their medical record.
Cancellation	Patient did not attend therapy visit and gave more than 24 hr notice.
No-show	Patient did not attend therapy visit and gave less than 24 hr notice.
Reschedule	Patient cancelled or no-showed but attended another therapy visit within one week of original appointment.

GAVT = gender-affirming voice therapy.

determine where significant differences were between subgroups. For these comparisons, significance was maintained at $p < .10$. All statistical analyses for both the first and second aims were calculated in Minitab statistical software (Ver. 20).

Results

Treatment Group and Therapy Attendance

A nonparametric Kruskal–Wallis test was completed to understand whether treatment attendance measures varied based on treatment timing for the three groups: pre-COVID, mixed-COVID, and lockdown-COVID. We found no significant difference across groups for attended visits ($p = .374$), rescheduled visits ($p = .628$), cancellations ($p = .128$), or no-shows ($p = .139$). See Figure 1 for a boxplot of attended visits by group. Results of the binary logistic regression model showed that treatment group did not predict therapy completion ($p = .530$). Therapy completion rates across the three groups were 25%, 38%, and 42% for the pre-, mixed-, and lockdown-COVID groups, respectively.

Telehealth Visits and Therapy Completion

A binary logistic regression model was calculated to determine the relationship between telehealth sessions and treatment completion for the mixed- and lockdown-COVID groups, finding that the number of telehealth sessions attended significantly predicted treatment completion ($p = .03$; $R^2 = .23$). For each telehealth session attended, patients were 1.9 times more likely to complete therapy.

Figure 1. Number of attended therapy visits by group. The pre-COVID group attended all visits prior to the Ohio lockdown, whereas the lockdown-COVID group attended all visits after the lockdown was initiated. The mixed-COVID group attended visits both before and after the lockdown.

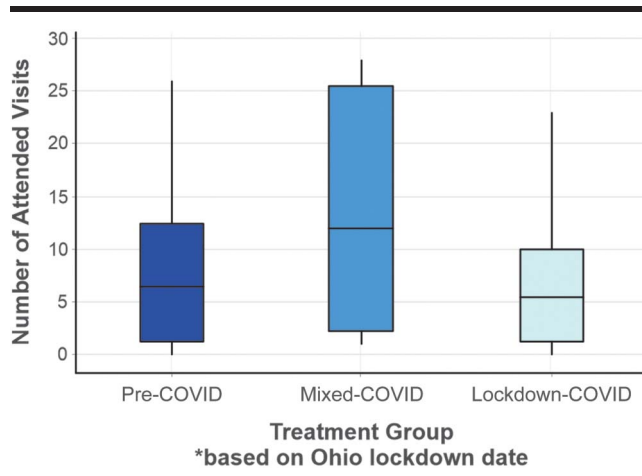


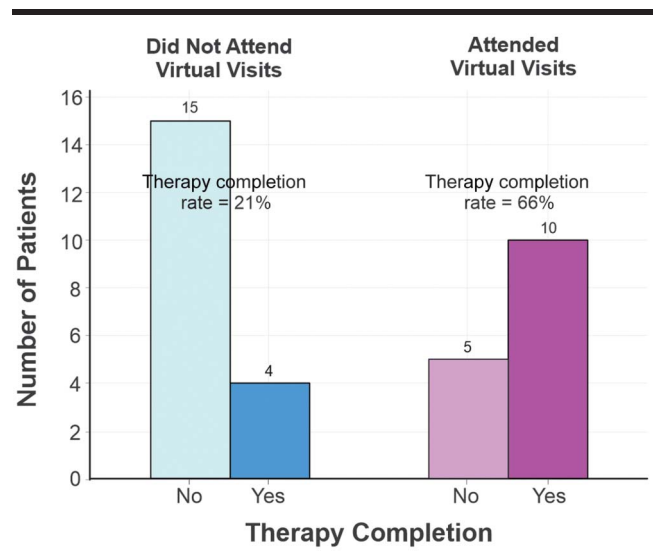
Figure 2 provides a visual comparison for patients who attended all therapy sessions in person versus those who attended at least one virtual telehealth session. Those who attended all therapy sessions in person had a therapy completion rate of 21%, whereas those who attended at least one telehealth session had a therapy completion rate of 66%. A total of 15 of the 34 patients (44%) in these treatment groups attended at least one telehealth session.

Exploratory Analysis

We completed an analysis of individual factors to determine their relationship with the number of therapy visits attended. Prior to the statistical analysis, we determined that the number of therapy visits attended was not normally distributed (Anderson-Darling, $p < .005$), so a data transformation was applied to meet normality standards (Anderson-Darling, $p = .302$). Next, a backward stepwise regression was completed with nine predictors, revealing a final model that contained four predictors: race ($p = .268$), gender identity ($p = .215$), hormone replacement therapy ($p = .016$), and social support ($p = .021$) with $R^2_{adj} = .18$; however, only hormone replacement therapy and social support were significantly predictive of therapy visits at the $p < .10$ level. Participants who were receiving hormonal replacement therapy had a greater number of visits ($M = 10.1$ visits) compared with those who were not ($M = 4.5$ visits).

Tukey's post hoc analysis was pursued for the predictor variable of social support because it included three levels (yes, no, and mixed). The post hoc analysis showed that patients without any social support had a greater

Figure 2. Bar plot of therapy completion status for patients who did and did not attend virtual telehealth visits from the mixed- and lockdown-COVID groups.



number of therapy visits ($M = 24.5$ visits) compared with those with social support ($M = 7.4$ visits) with significance of $p = .022$. The difference between those without social support and those that reported “mixed” social support approached significance ($p = .101$). There was no difference in attended visits between people with social support and mixed social support ($p = .258$).

The same individual factors were investigated to understand their relationship with treatment completion. The same criterion of backward variable inclusion ($p < .30$), and significance ($p < .10$) were applied to a backward binary logistic regression model. The final model included three predictors: mental health diagnosis ($p = .187$), insurance provider ($p = .016$), and employment ($p = .041$), with a model fit of deviance $R_{adj}^2 = .16$. Patients with private health insurance were 19 times more likely to complete therapy compared with those with any other type of insurance. Those who were employed at the time of the evaluation were 12 times *less* likely to complete therapy compared with those who were unemployed ($OR = 0.08$).

Discussion

The purpose of this study was to understand factors related to treatment attendance in those seeking GAVT. Our retrospective review of 50 patients was able to capture a snapshot into treatment trends before and during the COVID-19 pandemic and explore the relationship between virtual sessions and targeted attendance measures. In addition, we completed an exploratory analysis to understand how individual access factors were related to treatment attendance and completion, which were used as correlates to health care access and the ability to interact with the health care system.

Overall, patients attended an average of 8.4 visits ($SD = 7.9$; range: 0–28 visits), consistent with the initial evaluation recommendation of a minimum of six to eight therapy sessions at our voice center. Some patients sought GAVT beyond eight sessions, with 10 patients (20%) attending 15 or more visits in total. Davies et al. (2015) suggested that shorter therapy courses may encourage focus and motivate patients, whereas longer may increase habituation and generalization of vocal behaviors. Other studies have reported large variations in the number of visits required to meet therapeutic goals, with many stating that at least 15 sessions are needed for GAVT success (Gelfer & Tice, 2013; Hancock & Garabedian, 2013; Mészáros et al., 2005; Söderpalm et al., 2004). Still, a greater number of therapy sessions could reflect more difficulty attaining treatment goals and/or an overreliance on the voice therapist and an inability to gain independence. More information is needed on the benefits and drawbacks of the duration of therapy for GAVT.

The GAVT completion rate was 36% across all patients. Although seemingly low, this rate is similar to those reported previously in literature on voice therapy for dysphonic patients in which only 28%–44% of patients complete their voice therapy course (Ebersole et al., 2018; Hapner et al., 2009; Kavookjian et al., 2018) and higher than a previous report of the proportion of patients completing GAVT (i.e., 21%; Merrick et al., 2022). Of the 50 total patients, seven (or 14%) did not attend their first therapy visit, which was lower than other reports on patients seeking therapy for dysphonia (i.e., 28%–38%; Kavookjian et al., 2018; Pasternak et al., 2020; Portone et al., 2008). This may mean that patients referred for GAVT are more motivated to pursue GAVT and follow-through with initiating therapy compared with those who are referred for dysphonia alone.

Treatment Attendance and Telehealth Sessions

Unexpectedly, the timing of therapy visits with respect to the COVID-19 pandemic did not impact any attendance measure. In other words, it did not matter whether patients began GAVT before or after the 2020 Ohio lockdown. The median attendance for the pre-COVID and lockdown-COVID groups were 5.5 and 6.5 visits, respectively, whereas the mixed-COVID group was higher with a median of 12 visits; however, the large spread of data and overlapping variance resulted in no significant differences between the treatment groups. Similarly, treatment group was unrelated to treatment completion in the statistical model; however, completion rates trended higher following the onset of the pandemic with a 17% increase when comparing the pre-COVID completion rate (25%) and the lockdown-COVID completion rate (42%).

Prior to completing the study, we hypothesized that telemedical services, an organizational-level factor of access to care, would be positively related to treatment attendance for our patients. Our hypothesis was supported when patients who attended virtual sessions were more likely to complete GAVT at a rate of 1.9 times those who did not attend any telehealth sessions. The therapy completion rate in patients who attended at least one telehealth session was a staggering 66%, whereas those who did not attend any telehealth sessions completed therapy at a rate of 21%.

Although these numbers are promising, it is impossible to tease out the situational impact of the pandemic from the true effects of offering virtual therapy sessions. That is, the social changes caused by the COVID-19 pandemic may have increased the ability for patients to attend treatment and complete their therapy course, regardless of the implementation of telehealth. For example, quarantining and working from home at the onset of the pandemic could

have increased flexibility to attend therapy sessions. Moreover, stimulus checks, provided as early as April of 2020, may have increased the ability to pay for medical services for some patients. The availability of patients and affordability of sessions were not investigated in our study design, but should be included in future studies, as these have been identified in the access to care framework (Levesque et al., 2013).

Nevertheless, telehealth sessions provided an alternative modality for treatment with 44% of patients attending at least one telehealth session. That is, 15 patients completed telehealth sessions out of the 34 who sought treatment after the onset of the pandemic (the mixed- and lockdown-COVID groups). These numbers give credence to the feasibility of incorporating telemedicine services for patients seeking GAVT and provide supporting evidence for continuing to offer telehealth services after the pandemic has subsided.

Still, telehealth practices for voice therapy must be examined through a critical lens. ASHA has stated that telemedicine services “must be equivalent to the quality of services provided in person” (ASHA, n.d.-a). Recently, the ability to provide adequate voice therapy has been questioned, not due to the capabilities of SLPs but rather the limitations of technology. Specifically, the quality of the acoustic signal and its subsequent voice measures (e.g., cepstral peak prominence, low-to-high-spectral ratio) are significantly impacted by virtual streaming and the type of virtual platform used (e.g., Zoom and Microsoft Teams; Weerathunge et al., 2021).

One way to circumvent some of the problems with audio quality is to incorporate remote acoustic monitoring through at-home low-cost acoustic programs (e.g., Praat; Boersma, 2001). These may provide a more objective way to track treatment progress when sound signals may become distorted during session streaming. A recent pilot study incorporated smartphone applications to monitor vocal pitch throughout GAVT home practice, finding an improvement in three of four patients with this hybrid approach (Hawley & Hancock, 2021). Further investigations into telehealth treatment outcomes and remote monitoring applications for GAVT are warranted, although they are trending positively at this time.

Exploratory Analysis: Individual Factors

Treatment Attendance

We completed separate statistical models to understand how individual factors may relate to treatment attendance measures. Although four factors were identified in the final treatment attendance model (race, gender identity, hormone replacement therapy, and social support), only hormone replacement therapy and social support showed significant positive relationships with the number of treatment sessions attended.

First, we found that patients receiving hormone replacement therapy attended more sessions than those who were not (10.1 visits vs. 4.5 visits, respectively). It is possible that patients receiving hormone therapy may have learned about voice therapy and its efficacy from their hormone provider, as many of the patients at our center are referred from primary care. Therefore, the access to health care framework (Levesque et al., 2013) would point toward an increased “ability to perceive” the benefits of GAVT and subsequent pursuit of those services. Another possible reason for the increased visits would fall into the “ability to seek” wherein patients may have had greater internal motivation to pursue GAVT to further their physical and/or social transition. Conversely, a great number of visits could reflect challenges in acquiring and transferring target voice behaviors. Incorporating patient feedback into a prospective study could assist in identifying the individual factors that led to higher attendance and determine whether attendance reflects facilitators or barriers to progress.

In this same statistical model, gender-identity was a final factor; however, it was not significant. Historically, it has been thought that transmasculine people do not pursue voice therapy due to the effects of testosterone therapy on the voice; several studies have documented that testosterone therapy lowers speaking fundamental frequency (Cler et al., 2020; Cosyns et al., 2014; Deuster et al., 2016; Hodges-Simeon et al., 2021; Nygren et al., 2016). However, more recent investigations have suggested that some transmasculine individuals are not satisfied with voice changes due to testosterone therapy alone and may present with a variety of self-reported voice problems, including being misgendered on the telephone, vocal fatigue, hoarseness, strain, and other dissatisfaction with pitch or overall vocal quality (Azul et al., 2018; Nygren et al., 2016; Ziegler et al., 2018). A larger group of speakers across the gender spectrum is needed to understand how gender identity and GAVT goals (e.g., masculinization, feminization, and androgyny) could influence treatment attendance.

A major finding of our work was that the patients without any social support had a significantly greater number of therapy visits compared with those with support. The difference between those without support and those reporting “mixed” support (i.e., support in some areas of their lives) approached significance, but was not significant at the $p < .10$ level. The “no support” and “mixed support” groups accounted for 50% of our sample, indicating that approximately half of patients may be lacking important relationships supporting their gender transition. Our results suggest that these patients may be increasing their reliance on their affirming medical providers when family and friends are not available to help support their gender transition. Per the health care access

framework, this would fall under a patient's "ability to engage" with their clinicians and treatment process, potentially resulting in more consistent treatment attendance with an affirming provider.

Gender-diverse people with social support are less likely to report concurrent negative experiences of homelessness, suicide attempts, and severe psychological distress (James et al., 2016). This is consistent with the psychological literature that identifies social support as a major factor impacting personal *resilience*, defined as internal resources or beliefs that interact with environmental stressors to determine coping skills (Jew et al., 1999; Mizock & Mueser, 2014). Given this relationship, it becomes important that SLPs identify patients who may be lacking social support outside of the clinic. The SLP may be the one to make additional connections for their patients including gender-affirming health care providers, community groups and organizations, and other gender-diverse patients with similar lived experiences. This may also provide patients with communication partners with whom they can practice target voices.

Treatment Completion

Mental health was a factor in the final model predicting therapy completion, although it was not a significant factor within that model ($p = .187$). Mental health diagnosis and/or symptomology (e.g., suicidal ideation) was present in 82% of the participant sample. Importantly, we did not include gender dysphoria as a mental health diagnosis in these estimates (although gender dysphoria is a psychological diagnosis; American Psychiatric Association, 2013), meaning that 82% of our sample experienced psychological distress beyond that of their gender-related incongruence. This rate is markedly higher than the general U.S. population, where the estimated incidence of mental health disorders was 20% of adults in 2019 (SAMSA, 2020), as well as higher than other reports on gender-diverse patients (estimates of mental health disorders and suicide ideation closer to 40%; Connolly et al., 2016; James et al., 2016). However, a recent study found that transwomen who experienced mental health symptoms (60% of the sample) had higher levels of vocal dysphoria compared with those who did not have any mental health problems (Novais Valente Junior & Mesquita de Medeiros, 2020). Thus, patients with vocal dysphoria may represent a specific subgroup of gender-diverse patients who experience psychological symptoms at greater incidences than those without vocal incongruence. If so, mental health support for these patients may become a critical part of their care plan and the SLP may serve as an important resource for connecting these patients to psychological services and resources.

Employment rates in our sample showed that 60% of patients were employed and 32% were unemployed at

the time of their GAVT evaluation (note, 8% were not reported). The statistical analysis revealed that employment status was a significant predictor of treatment completion, but, counterintuitively, showed that people who were employed were 12 times *less* likely to complete therapy compared with those who were unemployed. Said another way, patients who were unemployed were more likely to complete their therapy course. These results are surprising because unemployment is usually seen as a barrier to medical care and is associated with poor follow-through with medical treatment (Huang et al., 2014). It could be that patients who were unemployed had greater motivation to attend therapy appointments or, potentially, more flexibility to attend appointments.

In the United States, approximately one in four employed individuals do not have the benefit of paid time off to attend medical appointments (Bureau of Labor Statistics, 2020). This means that these individuals need to either (a) go unpaid so that they can attend appointments or (b) attend medical visits during "off" hours. A 2015 survey revealed that 30% of transgender people live at or below the national poverty line (James et al., 2016), increasing the likelihood of financial instability and an inability to miss work days. Our voice center does not offer evening or weekend appointments, which subsequently limited the timing of attendance for patients who work during standard business hours, and presents an organizational-level barrier to health care access. The availability of appointments and their potential conflicts with work schedules (defined as the "ability to reach" on the individual level of health care access) was not investigated in our study but may be an important consideration when offering therapy services in the future.

It comes as no surprise that insurance coverage would be significantly associated with treatment completion and reflect an individual's "ability to pay" for health care services. In our study, patients with private health insurance—defined as private health insurance alone or in addition to another form of insurance—were 19 times more likely to complete GAVT compared with those with other insurances. This finding is similar to other work by Bakko and Kattari (2020) who systematically investigated insurance denials for gender-related services, finding that private health insurance generally provides more coverage than others. The authors reported denial rates from 50% to 61% across private, Medicare, Medicaid, military, and mixed providers, which varied based on insurance provider, medical request, and location. For example, denials were higher for those seeking hormone therapy through a Medicaid provider (1.22 times more likely to be denied compared with other insurance providers), and denials were more common in the Southern and Midwestern United States. Still, a recent report that focused on private insurance coverage of GAVT found that 75.8% of major

insurances provided no coverage at all (DeVore et al., 2021), indicating that even private insurers are not providing adequate support. Our initial data extraction noted patient-reported reasons for missed or cancelled therapy appointments, finding that patients in our sample did report an inability to pay for services and/or insurance denial as reasons for missed visits. Similarly, a study by Portone et al. (2008) surveyed patients who did not return to follow-up voice therapy for dysphonia and found that insurance denials were the number one reported reason for not attending. Thus, insurance coverage is not only an issue for voice therapy for dysphonia but also for gender-related services, including GAVT.

Taken together, the results for employment status and insurance provider seem to contradict one another. We asked: How could it be that unemployment and private health insurance both *increased* the likelihood to complete therapy given that employment and insurance are so closely tied to one another? With this question, we further examined our data and found that four patients (8% of our sample) with private health insurance were unemployed and were able to successfully complete GAVT. This included two college students under the age of 26 years, who were insured on their parents' insurance (via the Affordable Care Act), one patient above the age of 26 years who was a full-time online student, and one patient who recently graduated college and gained employment during the course of GAVT. These results suggest that student status may be an underlying factor positively influencing therapy attendance. Further investigation into student status and educational level are needed, as students only represented a small subset of our group at 14% of our sample.

Clinical Significance

First, this study provides evidence supporting telehealth as a feasible and successful treatment modality for GAVT. Telehealth had a positive impact on therapy completion with higher rates of completion in those who attended telehealth sessions compared with those who did not (66% and 21%, respectively). Approximately 45% of patients took advantage of telehealth sessions, indicating its appeal to a large breadth of patients. As we move forward into a post-pandemic era, our model for health care will need to be reassessed. The possibility of a hybrid approach, with sessions both in person and virtual, may be a viable and feasible option for many patients, especially those who are geographically isolated. Telehealth sessions may also serve an important role for patients with mental health considerations who may not feel able to attend in-person sessions.

The only psychosocial factor predictive of therapy attendance was outside social support, as those who reported no outside social support attended more treatment sessions than those who reported supportive relationships

in their lives. Importantly, social support has been shown to have protective effects against more severe mental health symptomology and risk-taking behaviors (Grant et al., 2011), therefore increasing overall psychosocial well-being. SLPs may play an important role in the social-emotional well-being for some patients. SLPs can serve as vital members of a care team in a role as clinician, confidant, and supporter during their patient's transition process. Davies et al. discussed the role of the SLP in GAVT, stating that "a relationship grounded in mutual respect, trust, and genuine care for the client's well-being facilitates open communication and encourages active engagement in therapy" (Davies et al., 2015, p. 126). Skills of empathy, genuineness, and warmth are clinical counseling skills that should be cultivated in order to successfully provide therapy to gender-diverse patients (Adler, 2017).

Therefore, there is a critical need to provide adequate training within SLP graduate programs; this training should not only provide clinically appropriate services to all voice clients but also provide culturally responsive care (Hancock, 2015; Jakomin et al., 2020). Unfortunately, studies have consistently reported a lack of training in responsive practices and humility across many professions (Bonvicini, 2017), including SLPs working with gender-diverse patients (Jakomin et al., 2020). In a 2014 survey of SLPs and SLP graduate students, 47% of respondents indicated that transgender voice and communication was not covered in their master's curriculum (Hancock & Haskin, 2015); in a 2017 survey of SLPs and SLP students, only 20% of respondents received training for working with transgender individuals (Matthews et al., 2020). Threading topics of gender, stigma, and health care disparities into SLP programs and clinical placements can help create a workforce that is culturally and clinically competent.

Finally, an SLP may serve to be a consistent touchpoint for gender-diverse patients, with weekly sessions and follow-ups, to help them access and navigate a complex medical system. An SLP can provide a critical link to other health care professionals. Several studies have shown that treatment attendance for voice therapy for dysphonia improved when patients were treated by a multidisciplinary team (Litts & Abaza, 2017; Starmer et al., 2014; Vamosi et al., 2020), perhaps because of the ability to access more medical providers and garner further medical and emotional support through their care team. However, listening to the client's personal needs and preferences for a care team is critical: Not all patients may want or require a large care team (Azul, 2015). Furthermore, they may feel intimidated when perusing services from unknown sources or large hospital centers (Howell & Maguire, 2021). Therefore, the SLP should be familiar with the complexities of gender-related care as well as local, trusted referral sources (e.g., reproductive specialists,

psychologists, and endocrinologists) that are adequately trained in gender care. The SLP may help to expand the treatment team to those beyond laryngology to help treat the patient holistically while still respecting the patient's own goals and wishes for their treatment.

Limitations and Future Directions

Our exploratory analysis was limited by the number of patients in this study. It required that we collapse across demographic groups, such as race, and lacked the ability to investigate ethnicity. Moreover, we had unequal enrollment across the gender spectrum, with only 14% of our treatment population identifying as nonbinary or transgender men. Historically, the voice literature has focused more on GAVT for transgender women but, recently, there has been a much-needed shift to including patients of all genders. A larger, more diverse study is needed to determine whether our preliminary findings are repeatable in more subjects.

The Cincinnati Voice Center usually pulls from the tri-state area including Ohio, Indiana, and Kentucky; however, Cincinnati itself is a large metropolis that does not represent rural America. There may be additional social and political climate considerations related to rural populations and communities that are medically underserved. Therefore, the generalization of our results across all areas of the United States is not possible at this time. Further investigations into patients in underserved, rural areas are needed, especially in light of the potential utility of telehealth as a feasible and appropriate option for GAVT. Moreover, our hospital-based center follows a multidisciplinary treatment model that has shown to be beneficial to patients with dysphonia but could deter patients seeking GAVT. Many transgender clients avoid attending services at large centers due to concerns of bias and misgendering (Howell & Maguire, 2021). Therefore, our attendance rates may only generalize to other large centers and would not reflect attendance rates for smaller practices, such as private practice, that are able to reduce the number of contact points and ensure affirming care throughout the entire therapy process.

The predictors of both exploratory models only accounted for a small variance in the number of attended visits ($R^2_{adj} = .18$) and therapy completion ($R^2_{adj} = .16$), indicating that more work is needed to understand what factors are related to GAVT attendance measures. Several other access factors may include income, education level, transportation, and level of discrimination/stigma experienced—none of which were investigated here. Moreover, an important factor for adherence to any behavioral treatment program is the level of patient motivation. A recent study by Kavookjian et al. (2018) examined how the Vocal Handicap Index (VHI; Jacobson et al., 1997), or the degree to which voice problems

impact daily living, varied between people who did and did not complete therapy. The researchers determined that those with a greater impact of vocal problems on their daily lives attended more therapy visits, which may be due to a greater motivation to address vocal symptoms. Although the VHI would not be an appropriate metric for gender-diverse patients, as many do not experience dysphonia, voice-specific questionnaires for gender-diverse patients like the Transgender Self-Evaluation Questionnaire (Davies, 2006) or the Trans Woman Voice Questionnaire (Dacakis et al., 2013) may be better alternatives. Both questionnaires not only incorporate questions regarding vocal symptoms similar to the VHI but also include self-perceptions of vocal dysphoria and congruence that impact daily life. A larger scale study is necessary to investigate how individual factors influence therapy attendance and, more importantly, how health care professionals may be able to facilitate access to treatment at both the individual and organizational levels for those at risk for low attendance.

Finally, the findings of this study must be interpreted in the context of the study design. A retrospective analysis is only able to report associations but cannot point to cause (Hess, 2004). A prospective study is needed to fully understand GAVT treatment trends and the impact of telehealth services on attendance measures.

Conclusions

We determined that the COVID-19 pandemic did not impact therapy attendance measures (visits attended, missed visits, and treatment completion) in a group of patients seeking GAVT. We hypothesized that the ability to access therapy after the onset of the pandemic was strengthened by our center's inclusion of telehealth services. The positive association found between telehealth visits and therapy completion provides further support for telehealth as a feasible and successful means for providing GAVT. Further investigation into the potential benefits and drawbacks of telehealth for GAVT should be investigated in a prospective study design to make clinical recommendations regarding its implementation once the pandemic subsides. Finally, our exploratory analysis identified several individual-level access factors related to treatment measures, but a larger examination of patients across the gender spectrum and in other parts of the United States is warranted.

With these results in mind, it continues to be important for SLPs to develop skills in culturally competent and responsive practices for gender-diverse patients. SLPs may serve an important role in providing gender-affirming support, which may include referrals to community groups and gender-specialized medical providers, as appropriate. More work is needed to understand how SLPs can help to

identify patients at risk for low attendance and assist in improving access to medical services through both individual-level initiatives and organizational change.

Data Availability Statement

Data for this study are available upon request from the authors.

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References

- Adams, R. B., Nelson, V. R., & Holtz, B. E. (2021). Barriers for telemedicine use among nonusers at the beginning of the pandemic. *Telemedicine Reports*, 2(1), 211–216. <https://doi.org/10.1089/tmr.2021.0022>
- Adler, R. K. (2017). The SLP as counselor for the transgender client. *Perspectives of the ASHA Special Interest Groups*, 2(10), 92–101. <https://doi.org/10.1044/persp2.SIG10.92>
- Adler, R. K., Hirsch, S., & Pickering, J. (2018). *Voice and communication therapy for the transgender/gender diverse client: A comprehensive clinical guide*. Plural.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). <https://doi.org/10.1176/appi.books.9780890425596>
- American Speech-Language-Hearing Association. (2016). *Scope of practice in speech-language pathology*. <https://www.asha.org/policy/sp2016-00343/>
- American Speech-Language-Hearing Association. (2020). *ASHA COVID-19 survey results—May 2020* (pp. 1–18). <https://www.asha.org/siteassets/uploadedfiles/COVID-19-Tracker-Survey-May-2020.pdf>
- American Speech-Language-Hearing Association. (n.d.-a). *Telepractice* (practice portal). Retrieved December 26, 2021, from <http://www.asha.org/Practice-Portal/Professional-Issues/Telepractice/>
- American Speech-Language-Hearing Association. (n.d.-b). *Voice disorders*. Retrieved July 19, 2021, from <https://www.asha.org/practice-portal/clinical-topics/voice-disorders/>
- Azul, D. (2015). On the varied and complex factors affecting gender diverse people's vocal situations: Implications for clinical practice. *SIG 3 Perspectives on Voice and Voice Disorders*, 25(2), 75–86. <https://doi.org/10.1044/vvd25.2.75>
- Azul, D., Arnold, A., & Neuschaefer-Rube, C. (2018). Do trans-masculine speakers present with gender-related voice problems? Insights from a participant-centered mixed-methods study. *Journal of Speech, Language, and Hearing Research*, 61(1), 25–39. https://doi.org/10.1044/2017_JSLHR-S-16-0410
- Bakko, M., & Kattari, S. K. (2020). Transgender-related insurance denials as barriers to transgender healthcare: Differences in experience by insurance type. *Journal of General Internal Medicine*, 35(6), 1693–1700. <https://doi.org/10.1007/s11606-020-05724-2>
- Bashshur, R., Doarn, C. R., Frenk, J. M., Kvedar, J. C., & Woolliscroft, J. O. (2020). Telemedicine and the COVID-19 pandemic, lessons for the future. *Telemedicine and E-Health*, 26(5), 571–573. <https://doi.org/10.1089/tmj.2020.29040.rb>
- Boersma, P. (2001). Praat, a system for doing phonetics by computer. *Glott International*, 5, 341–345.
- Bokolo, A., Jr. (2021). Exploring the adoption of telemedicine and virtual software for care of outpatients during and after COVID-19 pandemic. *Irish Journal of Medical Science (1971 -)*, 190(1), 1–10. <https://doi.org/10.1007/s11845-020-02299-z>
- Bonvicini, K. A. (2017). LGBT healthcare disparities: What progress have we made? *Patient Education and Counseling*, 100(12), 2357–2361. <https://doi.org/10.1016/j.pec.2017.06.003>
- Borgogna, N. C., McDermott, R. C., Aita, S. L., & Kridel, M. M. (2019). Anxiety and depression across gender and sexual minorities: Implications for transgender, gender nonconforming, pansexual, demisexual, asexual, queer, and questioning individuals. *Psychology of Sexual Orientation and Gender Diversity*, 6(1), 54–63. <https://doi.org/10.1037/sgd0000306>
- Bureau of Labor Statistics. (2020). *employee benefits survey. Paid sick leave: What is available to workers?* <https://www.bls.gov/ncs/ebs/factsheet/paid-sick-leave.htm>
- Campbell, D. R., & Goldstein, H. (2021). Evolution of telehealth technology, evaluations, and therapy: Effects of the COVID-19 pandemic on pediatric speech-language pathology services. *American Journal of Speech-Language Pathology*, 31(1), 271–286. https://doi.org/10.1044/2021_AJSLP-21-00069
- Carew, L., Dacakis, G., & Oates, J. (2007). The effectiveness of Oral resonance therapy on the perception of femininity of voice in male-to-female transsexuals. *Journal of Voice*, 21(5), 591–603. <https://doi.org/10.1016/j.jvoice.2006.05.005>
- Cler, G. J., McKenna, V. S., Dahl, K. L., & Stepp, C. E. (2020). Longitudinal case study of transgender voice changes under testosterone hormone therapy. *Journal of Voice*, 34(5), 748–762. <https://doi.org/10.1016/j.jvoice.2019.03.006>
- Coleman, E., Brockting, W., Botzer, M., Cohen-Kettenis, P., DeCuypere, G., Feldman, J., Fraser, L., Green, J., Knudson, G., Meyer, W. J., Monstrey, S., Adler, R. K., Brown, G. R., Devor, A. H., Ehrbar, R., Ettner, R., Eyler, E., Garofalo, R., Karasic, D. H., & Zucker, K. (2012). Standards of care for the health of transsexual, transgender, and gender nonconforming people? *International Journal of Transgenderism*, 13(4), 165–232. <https://doi.org/10.1080/15532739.2011.700873>
- Connolly, M. D., Zervos, M. J., Barone, C. J., Johnson, C. C., & Joseph, C. L. M. (2016). The mental health of transgender youth: Advances in understanding. *Journal of Adolescent Health*, 59(5), 489–495. <https://doi.org/10.1016/j.jadohealth.2016.06.012>
- Cosyns, M., Borsel, J. V., Wierckx, K., Dedecker, D., de Peer, F. V., Daelman, T., Laenen, S., & T'Sjoen, G. (2014). Voice in female-to-male transsexual persons after long-term androgen therapy. *The Laryngoscope*, 124(6), 1409–1414. <https://doi.org/10.1002/lary.24480>
- Dacakis, G., Davies, S., Oates, J. M., Douglas, J. M., & Johnston, J. R. (2013). Development and preliminary evaluation of the transsexual voice questionnaire for male-to-female transsexuals. *Journal of Voice*, 27(3), 312–320. <https://doi.org/10.1016/j.jvoice.2012.11.005>
- Davies, S. (2006). Transgender self-evaluation of voice questionnaire. In R. Adler, S. Hirsch, & M. Mordaunt (Eds.), *Voice and*

- communication therapy for the transgender/transsexual client: A comprehensive clinical guide (pp. 485–487). Plural.
- Davies, S., Papp, V. G., & Antoni, C.** (2015). Voice and communication change for gender nonconforming individuals: Giving voice to the person inside. *International Journal of Transgenderism, 16*(3), 117–159. <https://doi.org/10.1080/15532739.2015.1075931>
- Deuster, D., Matulat, P., Knief, A., Zitzmann, M., Rosslau, K., Szukaj, M., am Zehnhoff-Dinnesen, A., & Schmidt, C.-M.** (2016). Voice deepening under testosterone treatment in female-to-male gender dysphoric individuals. *European Archives of Oto-Rhino-Laryngology, 273*(4), 959–965. <https://doi.org/10.1007/s00405-015-3846-8>
- DeVore, E. K., Gadkaree, S. K., Richburg, K., Banaszak, E. M., Wang, T. V., Naunheim, M. R., & Shaye, D. A.** (2021). Coverage for gender-affirming voice surgery and therapy for transgender individuals. *The Laryngoscope, 131*(3), E896–E902. <https://doi.org/10.1002/lary.28986>
- Dowshen, N., & Lett, E.** (2022). Telehealth for gender-affirming care: Challenges and opportunities. *Transgender Health, 7*(2), 111–112. <https://doi.org/10.1089/trgh.2021.0206>
- Ebersole, B., Soni, R. S., Moran, K., Lango, M., Devarajan, K., & Jamal, N.** (2018). The role of occupational voice demand and patient-rated impairment in predicting voice therapy adherence. *Journal of Voice, 32*(3), 325–331. <https://doi.org/10.1016/j.jvoice.2017.06.002>
- Eddison, N., Leone, E., Healy, A., Royse, C., & Chockalingam, N.** (2022). The potential impact of allied health professional telehealth consultations on health inequities and the burden of treatment. *International Journal for Equity in Health, 21*(1), 91. <https://doi.org/10.1186/s12939-022-01689-2>
- Fernández Rodríguez, M.** (2018). Gender incongruence is no longer a mental disorder. *Journal of Mental Health and Clinical Psychology, 2*(5), 6–8. <https://doi.org/10.29245/2578-2959/2018/5.1157>
- Flentje, A., Obedin-Maliver, J., Lubensky, M. E., Dastur, Z., Neilands, T., & Lunn, M. R.** (2020). Depression and anxiety changes among sexual and gender minority people coinciding with onset of COVID-19 pandemic. *Journal of General Internal Medicine, 35*(9), 2788–2790. <https://doi.org/10.1007/s11606-020-05970-4>
- Gelfer, M. P., & Tice, R. M.** (2013). Perceptual and acoustic outcomes of voice therapy for male-to-female transgender individuals immediately after therapy and 15 months later. *Journal of Voice, 27*(3), 335–347. <https://doi.org/10.1016/j.jvoice.2012.07.009>
- Goldin, A., Weinstein, B. E., & Shiman, N.** (2020). How do medical masks degrade speech perception? *Hearing review, 27*(5), 8–9.
- Grant, J. M., Mottet, L. A., Tanis, J., Harrison, J., Herman, J. L., & Kiesling, M.** (2011). *Injustice at every turn: A report of the national transgender discrimination survey*. National Center for Transgender Equality and National Gay and Lesbian Task Force. <https://www.thetaskforce.org/injustice-every-turn-report-national-transgender-discrimination-survey/>
- Grasso, C., Campbell, J., Yunkun, E., Todisco, D., Thompson, J., Gonzalez, A., Brewster, A., & Keuroghlian, A. S.** (2022). Gender-affirming care without walls: Utilization of telehealth services by transgender and gender diverse people at a federally qualified health center. *Transgender Health, 7*(2), 135–143. <https://doi.org/10.1089/trgh.2020.0155>
- Gustin, R. L., Pielage, K. C., Howell, R., Khosla, S., & Giliberto, J. P.** (2020). Increased interval from initial evaluation to initial voice therapy session is associated with missed voice therapy appointments. *Journal of Voice, 34*(6), 870–873. <https://doi.org/10.1016/j.jvoice.2019.05.007>
- Hamnvik, O. R., Agarwal, S., AhnAllen, C. G., Goldman, A. L., & Reisner, S. L.** (2020). Telemedicine and inequities in health care access: The example of transgender health. *Transgender Health, 7*(2), 113–116. <https://doi.org/10.1089/trgh.2020.01221>
- Hancock, A. B.** (2015). The role of cultural competence in serving transgender populations. *SIG 3 Perspectives on Voice and Voice Disorders, 25*(1), 37–42. <https://doi.org/10.1044/vvd25.1.37>
- Hancock, A., & Downs, S. C.** (2021). Listening to gender-diverse people of color: Barriers to accessing voice and communication care. *American Journal of Speech-Language Pathology, 30*(5), 2251–2262. https://doi.org/10.1044/2021_AJSLP-20-00262
- Hancock, A., & Garabedian, L.** (2013). Transgender voice and communication treatment: A retrospective chart review of 25 cases. *International Journal of Language & Communication Disorders, 48*(1), 54–65. <https://doi.org/10.1111/j.1460-6984.2012.00185.x>
- Hancock, A., & Haskin, G.** (2015). Speech-language pathologists' knowledge and attitudes regarding lesbian, gay, bisexual, transgender, and queer (LGBTQ) populations. *American Journal of Speech-Language Pathology, 24*(2), 206–221. https://doi.org/10.1044/2015_AJSLP-14-0095
- Hancock, A., & Helenius, L.** (2012). Adolescent male-to-female transgender voice and communication therapy. *Journal of Communication Disorders, 45*(5), 313–324. <https://doi.org/10.1016/j.jcomdis.2012.06.008>
- Hancock, A., & Siegfried, L.** (2020). *Transforming voice and communication with transgender and gender-diverse people: An evidence-based process*. Plural.
- Hapner, E., Portone-Maira, C., & Johns, M. M.** (2009). A study of voice therapy dropout. *Journal of Voice, 23*(3), 337–340. <https://doi.org/10.1016/j.jvoice.2007.10.009>
- Hawley, J. L., & Hancock, A.** (2021). Incorporating mobile app technology in voice modification protocol for transgender women. *Journal of Voice, S089219972100299X*. <https://doi.org/10.1016/j.jvoice.2021.09.001>
- Hess, D. R.** (2004). Retrospective studies and chart reviews. *Respiratory Care, 49*(10), 1171–1174.
- Hodges-Simeon, C. R., Grail, G. P. O., Albert, G., Groll, M. D., Stepp, C. E., Carré, J. M., & Arnocky, S. A.** (2021). Testosterone therapy masculinizes speech and gender presentation in transgender men. *Scientific Reports, 11*(1), 3494. <https://doi.org/10.1038/s41598-021-82134-2>
- Howell, J. D., & Maguire, R.** (2021). Factors associated with experiences of gender-affirming health care: A systematic review. *Transgender Health, 7*(2), 0033. <https://doi.org/10.1089/trgh.2021.0033>
- Huang, J., Birkenmaier, J., & Kim, Y.** (2014). Job loss and unmet health care needs in the economic recession: Different associations by family income. *American Journal of Public Health, 104*(11), e178–e183. <https://doi.org/10.2105/AJPH.2014.301998>
- 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. <https://doi.org/10.1044/1058-0360.0603.66>
- Jakomin, J. R., Ziegler, A., Rio, C., & Suddarth, R.** (2020). Opportunities to learn transgender voice and communication therapy in graduate speech-language pathology education: Preliminary E-survey findings. *Perspectives of the ASHA Special Interest Groups, 5*(4), 876–883. https://doi.org/10.1044/2020_PERSP-20-00047

- James, S. E., Herman, J. L., Rankin, S., Keisling, M., Mottet, L., & Anafi, M. (2016). *Executive summary of the report of the 2015 U.S. transgender survey*. National Center for Transgender Equality.
- Jew, C. L., Green, K. E., & Kroger, J. (1999). Development and validation of a measure of resiliency. *Measurement and Evaluation in Counseling and Development*, 32(2), 75–89. <https://doi.org/10.1080/07481756.1999.12068973>
- Kavookjian, H., Holcomb, A., Garnett, J. D., & Kraft, S. (2018). The role of quality-of-life instruments in predicting voice therapy dropout. *The Laryngoscope*, 128(12), 2832–2837. <https://doi.org/10.1002/lary.27269>
- Kelchner, L. (2013). Telehealth and the treatment of voice disorders: A discussion regarding evidence. *SIG 3 Perspectives on Voice and Voice Disorders*, 23(3), 88–94. <https://doi.org/10.1044/vvd23.3.88>
- Kelchner, L., Fredeking, J. C., & Zacharias, S. C. (2021). Using telepractice to deliver pediatric voice care in a changing world: Breaking down challenges and learning from successes. *Seminars in Speech and Language*, 42(01), 054–063. <https://doi.org/10.1055/s-0040-1722320>
- Kempster, G. B., Gerratt, B. R., Verdolini, A. K., 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*, 18(2), 124–132. [https://doi.org/10.1044/1058-0360\(2008\)08-0017](https://doi.org/10.1044/1058-0360(2008)08-0017)
- Lambda Legal. (2010). *When health care isn't caring: Lambda Legal's Survey on Discrimination Against LGBT People and People Living with HIV*. <https://www.lambdalegal.org/publications/when-health-care-isnt-caring>
- Levesque, J.-F., Harris, M. F., & Russell, G. (2013). Patient-centred access to health care: Conceptualising access at the interface of health systems and populations. *International Journal for Equity in Health*, 12(1), 18. <https://doi.org/10.1186/1475-9276-12-18>
- Litts, J. K., & Abaza, M. M. (2017). Does a multidisciplinary approach to voice and swallowing disorders improve therapy adherence and outcomes? *The Laryngoscope*, 127(11), 2446–2446. <https://doi.org/10.1002/lary.26756>
- Lock, L., Anderson, B., & Hill, B. J. (2022). Transgender care and the COVID-19 pandemic: Exploring the initiation and continuation of transgender care in-person and through telehealth. *Transgender Health*, 7(2), 165–169. <https://doi.org/10.1089/trgh.2020.0161>
- Magee, M., Lewis, C., Noffs, G., Reece, H., Chan, J. C. S., Zaga, C. J., Paynter, C., Birchall, O., Rojas Azocar, S., Ediriweera, A., Kenyon, K., Caverlé, M. W., Schultz, B. G., & Vogel, A. P. (2020). Effects of face masks on acoustic analysis and speech perception: Implications for peri-pandemic protocols. *The Journal of the Acoustical Society of America*, 148(6), 3562–3568. <https://doi.org/10.1121/10.0002873>
- Matthews, J.-J., Olszewski, A., & Petereit, J. (2020). Knowledge, training, and attitudes of students and speech-language pathologists about providing communication services to individuals who are transgender. *American Journal of Speech-Language Pathology*, 29(2), 597–610. https://doi.org/10.1044/2020_AJSLP-19-00148
- McKenna, V. S., Kendall, C. L., Patel, T. H., Howell, R. J., & Gustin, R. L. (2021). Impact of face masks on speech acoustics and vocal effort in healthcare professionals. *The Laryngoscope*, 132(2), 391–397. <https://doi.org/10.1002/lary.29763>
- McNeil, J., Ellis, S. J., & Eccles, F. J. R. (2017). Suicide in trans populations: A systematic review of prevalence and correlates. *Psychology of Sexual Orientation and Gender Diversity*, 4(3), 341–353. <https://doi.org/10.1037/sgd0000235>
- Mendel, L. L., Gardino, J. A., & Atcherson, S. R. (2008). Speech understanding using surgical masks: A problem in health care? *Journal of the American Academy of Audiology*, 19(9), 686–695. <https://doi.org/10.3766/jaaa.19.9.4>
- Merrick, G., Figol, A., Anderson, J., & Lin, R. J. (2022). Outcomes of gender affirming voice training: A comparison of hybrid and individual training modules. *Journal of Speech, Language, and Hearing Research*, 65(2), 501–507. https://doi.org/10.1044/2021_JSLHR-21-00056
- Mészáros, K., Csokonai Vitéz, L., Szabolcs, I., Góth, M., Kovács, L., Görömbei, Z., & Hacki, T. (2005). Efficacy of conservative voice treatment in male-to-female transsexuals. *Folia Phoniatrica et Logopaedica*, 57(2), 111–118. <https://doi.org/10.1159/000083572>
- Mizock, L., & Mueser, K. T. (2014). Employment, mental health, internalized stigma, and coping with transphobia among transgender individuals. *Psychology of Sexual Orientation and Gender Diversity*, 1(2), 146–158. <https://doi.org/10.1037/sgd0000029>
- Nguyen, D. D., McCabe, P., Thomas, D., Purcell, A., Doble, M., Novakovic, D., Chacon, A., & Madill, C. (2021). Acoustic voice characteristics with and without wearing a facemask. *Scientific Reports*, 11(1), 5651. <https://doi.org/10.1038/s41598-021-85130-8>
- Novais Valente Junior, C., & Mesquita de Medeiros, A. (2020). Voice and gender incongruence: Relationship between vocal self-perception and mental health of trans women. *Journal of Voice*, S0892199720303763. <https://doi.org/10.1016/j.jvoice.2020.10.002>
- Nygren, U., Nordenskjöld, A., Arver, S., & Södersten, M. (2016). Effects on voice fundamental frequency and satisfaction with voice in trans men during testosterone treatment—A longitudinal study. *Journal of Voice*, 30(6), 766.e23–766.e34. <https://doi.org/10.1016/j.jvoice.2015.10.016>
- Oates, J., & Dacakis, G. (2015). Transgender voice and communication: Research evidence underpinning voice intervention for male-to-female transsexual women. *SIG 3 Perspectives on Voice and Voice Disorders*, 25(2), 48–58. <https://doi.org/10.1044/vvd25.2.48>
- Pasternak, K., Diaz, J., & Thibeault, S. L. (2020). Predictors of voice therapy initiation: A cross-sectional cohort study. *Journal of Voice*, 36(2), 194–202. <https://doi.org/10.1016/j.jvoice.2020.05.003>
- Portone, C., Johns, M. M., & Hapner, E. R. (2008). A review of patient adherence to the recommendation for voice therapy. *Journal of Voice*, 22(2), 192–196. <https://doi.org/10.1016/j.jvoice.2006.09.009>
- Radonovich, L. J., Yanke, R., Cheng, J., & Bender, B. (2009). Diminished speech intelligibility associated with certain types of respirators worn by healthcare workers. *Journal of Occupational and Environmental Hygiene*, 7(1), 63–70. <https://doi.org/10.1080/15459620903404803>
- Russell, M. R., & Abrams, M. (2019). Transgender and nonbinary adolescents: The role of voice and communication therapy. *Perspectives of the ASHA Special Interest Groups*, 4(6), 1298–1305. https://doi.org/10.1044/2019_PERSP-19-00034
- SAMSA. (2020). *Key substance use and mental health indicators in the United States: Results from the 2019 National Survey on Drug Use and Health* (HHS Publication No. PEP20-07-01-001, NSDUH Series H-55). <https://www.samhsa.gov/data/>
- Söderpalm, E., Larsson, A., & Almquist, S.-Å. (2004). Evaluation of a consecutive group of transsexual individuals referred for vocal

- intervention in the west of Sweden. *Logopedics Phoniatrics Vocology*, 29(1), 18–30. <https://doi.org/10.1080/14015430310021618>
- Starmer, H. M., Liu, Z., Akst, L. M., & Gourin, C.** (2014). Attendance in voice therapy: Can an interdisciplinary care model have an impact? *Annals of Otolaryngology, Rhinology & Laryngology*, 123(2), 117–123. <https://doi.org/10.1177/0003489414523708>
- Testa, R. J., Michaels, M. S., Bliss, W., Rogers, M. L., Balsam, K. F., & Joiner, T.** (2017). Suicidal ideation in transgender people: Gender minority stress and interpersonal theory factors. *Journal of Abnormal Psychology*, 126(1), 125–136. <https://doi.org/10.1037/abn0000234>
- Vamosi, B. E., Mikhail, L., Gustin, R. L., Pielage, K. C., Reid, K., Tabangin, M. E., Altaye, M., Collar, R. M., Khosla, S. M., & Giliberto, J. P.** (2020). Predicting no show in voice therapy: Avoiding the missed appointment cycle. *Journal of Voice*, 35, 604–608. <https://doi.org/10.1016/j.jvoice.2020.01.003>
- von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., & Vandenbroucke, J. P.** (2008). The Strengthening of Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies. *Journal of Clinical Epidemiology*, 61(4), 344–349. <https://doi.org/10.1016/j.jclinepi.2007.11.008>
- Wang, Y., Chang, S., & Miao, N.** (2021). Health status and quality of life of middle-aged and older Taiwanese sexual and gender minorities. *Journal of Nursing Scholarship*, 53(3), 369–377. <https://doi.org/10.1111/jnu.12640>
- Weerathunge, H. R., Segina, R. K., Tracy, L., & Stepp, C. E.** (2021). Accuracy of acoustic measures of voice via Telepractice videoconferencing platforms. *Journal of Speech, Language, and Hearing Research*, 64(7), 2586–2599. https://doi.org/10.1044/2021_JSLHR-20-00625
- White Hughto, J. M., Reisner, S. L., & Pachankis, J. E.** (2015). Transgender stigma and health: A critical review of stigma determinants, mechanisms, and interventions. *Social Science & Medicine*, 147, 222–231. <https://doi.org/10.1016/j.socscimed.2015.11.010>
- Young, V. N., Yousef, A., Zhao, N. W., & Schneider, S. L.** (2021). Voice and stroboscopic characteristics in transgender patients seeking gender-affirming voice care. *The Laryngoscope*, 131(5), 1071–1077. <https://doi.org/10.1002/lary.28932>
- Ziegler, A., Henke, T., Wiedrick, J., & Helou, L. B.** (2018). Effectiveness of testosterone therapy for masculinizing voice in transgender patients: A meta-analytic review. *International Journal of Transgenderism*, 19(1), 25–45. <https://doi.org/10.1080/15532739.2017.1411857>

Appendix A

Voice-Relevant Conditions and Health Behaviors

	Total N = 50 n (%)	Pre-COVID n = 16 n (%)	Mixed-COVID n = 8 n (%)	Lockdown-COVID n = 26 n (%)
History of laryngeal pathology				
Yes	5 (10)	1 (6)	0 (0)	4 (15)
No	45 (90)	15 (94)	8 (100)	22 (85)
Dysphonia				
WNL	34 (68)	14 (88)	5 (63)	15 (58)
Mild	6 (12)	1 (6)	1 (12)	4 (15)
Moderate	3 (6)	0 (0)	2 (25)	1 (4)
Never attended	7 (14)	1 (6)	0 (0)	6 (23)
Laryngopharyngeal reflux				
Yes	13 (26)	5 (31)	3 (37)	5 (19)
No	37 (74)	11 (69)	5 (63)	21 (81)
Chronic cough				
Yes	3 (6)	1 (6)	1 (12)	1 (4)
No	47 (94)	15 (94)	7 (88)	25 (96)
Asthma				
Yes	7 (14)	1 (6)	2 (25)	4 (15)
No	43 (86)	15 (94)	6 (75)	22 (85)
Smoking and vaping				
Never	24 (48)	5 (31)	4 (50)	15 (58)
Occasional use	6 (12)	3 (19)	1 (12)	2 (8)
0.5 ppd	4 (8)	2 (12)	0 (0)	2 (8)
0.6 to 1 ppd	1 (2)	0 (0)	0 (0)	1 (4)
Smoke other substance	1 (2)	1 (6)	0 (0)	0 (0)
Unspecified use	4 (8)	3 (19)	0 (0)	1 (4)
Former smoker, current vaper	3 (6)	0 (0)	1 (12)	2 (8)
Former smoker	5 (10)	2 (12)	1 (12)	2 (8)
Not reported	2 (4)	0 (0)	1 (12)	1 (4)
Substance use disorder				
Yes	9 (18)	3 (19)	1 (12)	5 (19)
No	41 (82)	13 (81)	7 (88)	21 (81)

Note. WNL = within normal limits; ppd = pack-per-day.

Appendix B

Factors Examined in the Exploratory Analyses

Factor	Levels	Data combinations, removed data, missing data
Race	2: White only, Other	Races combined to make the “Other” category included “Asian,” “Black,” “Multiracial,” and “Other” Missing data (not reported): $n = 1$
Social transition	3: Yes, No, Mixed ^a	Missing data (not reported): $n = 2$
Social support	3: Yes, No, Mixed	Missing data (not reported): $n = 5$
Hormone therapy	2: Yes, No	Missing data (not reported): $n = 1$
Gender identity	3: Female, Male, Nonbinary	n/a
Gender-related surgeries	2: Yes, No	Missing data (not reported): $n = 2$
Employment	2: Yes, No	Missing data (not reported): $n = 4$
Payer source	2: Private, Other	Insurances combined to make “private” category included private alone or private with the addition of another insurance; “other” was any other type of insurance that was not private
Mental health diagnosis	2: Yes, No	Missing data (not reported): $n = 4$

Note. Age was also included in the analyses as a continuous predictor. Ethnicity was not included in this analysis as 98% of patients self-identified as non-Hispanic. n/a = not applicable, that is, there were no data combinations, or data were removed or missing.

^aSocial transition categories were defined as: *Yes* = presenting as identified gender in all settings, *No* = not presenting as identified gender around others, and *Mixed* = presenting as identified gender in some (but not all) settings.