

THE EFFICACY OF VOICE THERAPY FOR BANGLADESHI PATIENTS WITH VOCAL FOLD NODULES

FATEMA JANNAT NUPUR, SONIA ISLAM NISHA AND SADIA TAJMIN*

Department of Communication Disorders, University of Dhaka.

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Abstract

Voice therapy in improving the voice quality of vocal fold nodule patients has evidentiary support. This study aimed to investigate the efficacy of voice therapy for Bangladeshi patients (N=30) with vocal fold nodules, as well as the factors (therapy practice and maintenance of vocal hygiene) that influence the effectiveness or outcome of voice therapy in treating vocal fold nodules. This study was an observational cohort study of 30 Bangladeshi adult patients with vocal fold nodules (mean age=41; SD= 8.78). Before and after voice therapy, Phonation exercises and narrative-telling tasks were used to elicit voice features, and the size of vocal fold nodules was observed through Fiber Optic Laryngoscopy (FOL). The data was statistically analyzed using the percentage/proportion test and Fisher's exact test to demonstrate the success of voice therapy and the factors impacting the therapy's efficacy. The findings indicated that voice therapy was successful for most participants (87%). Practicing therapy regularly and maintaining vocal hygiene had an impact on therapy success.

Introduction

Vocal fold nodule (VFN) is commonly attributed to vocal abuse, misuse, and overuse⁽¹⁾. These are benign white lumps that develop at the midpoint of the vocal folds and are bilaterally symmetrical⁽²⁾. VFNs are mainly common in people whose jobs require them to use their voices excessively because they are brought on by accumulated perpendicular stress on the vocal fold's free edges. Trauma to the vocal fold tissues is regarded as one of the main etiologic factors for VFNs⁽³⁾. The percentage of people with voice abnormalities in the normal population is around 10%, which is 50% among voice specialists⁽⁴⁾. Even though voice disorders affect both children and adults, the causes vary depending on the age group. Voice disorders are more prevalent in professions where voice is primarily employed, such as singing, acting, politics, teaching, and ministry⁽⁵⁾.

VFNs are thought to respond well to voice therapy. It can facilitate vocal fold repair, lessen vocal strain, and enhance vocal function^(6,7,8). However, total pathology clearance

* Author for correspondence: tajminsadia@du.ac.bd

may not be achievable in all cases, particularly if the vocal fold cover's basement membrane has been irreversibly damaged. For patients who do not show progress following voice therapy, surgical intervention should be regarded as a preferable treatment option for VFN and speech-language pathology intervention⁽⁶⁾. Even though surgery may be required in some circumstances, voice therapy is frequently suggested as the main course of treatment or in combination with surgical intervention. Several variables, such as the size and severity of the nodules, the unique patient characteristics, and adherence to therapy, might affect how effective voice therapy is for VFNs^(9,10,11).

While treating VFNs, solely using surgery may not be beneficial or successful⁽⁶⁾. Voice therapy tries to improve vocal patterns and address the root causes of VFNs to encourage recovery⁽¹²⁾. The concept of voice therapy is an emerging area in Bangladesh, and awareness of the effectiveness of therapy in treating voice disorders among the population is inadequate. As a course, patients are less sincere in maintaining the regimen of voice therapy, which affects the recovery rate of voice disorder cases^(10,12).

Voice therapy is considered a useful therapeutic strategy for various voice pathologies, including vocal fold nodules and polyps. Although vocal fold nodules and polyps share similarities, the two are very distinct in many ways⁽¹³⁾. Most of the previous research focused on the effectiveness of voice therapy in treating vocal fold polyps. The research on vocal fold nodules is less extensive than that on vocal fold polyps. Comparing research is difficult because previous studies differ in terms of participant age, sample size, assessment method, duration of voice therapy, and number of follow-up sessions. Many studies on vocal fold nodule treatment are limited to a specific age range, gender, and occupation^(14,15). Despite many people in Bangladesh suffering from VFNs and other voice disorders, research in this area is scarce.

The primary goal of this study was to investigate the efficacy of voice therapy for Bangladeshis with VFNs, as well as to discover factors (therapy practice and maintenance of vocal hygiene) impacting the success or outcome of voice therapy. This study aimed to assist Bangladeshi speech and language pathologists in making effective interventional decisions. A greater understanding of voice therapy's efficacy in treating VFNs is believed to give a structural framework for treating persons with VFNs in clinical and home settings.

Materials and Methods

Participants and the design of the study: Thirty adult male and female patients took part in the study. All of the contestants were from various parts of Bangladesh, and the age of the participants ranged between 25 to 60 years (Mean=41; SD= 8.78), of which 17 were female and 13 were male. The inclusion criteria for the participants were benign bilateral VFN, hoarse, breathy, dysphonic voice with the complaint of feeling a lump in the throat.

Data was collected by purposive sampling from a voice therapy institution through observation. Separate before-and-after self-made binary questionnaires were used to collect patients' insights. Before therapy, the questionnaire was about their speech symptoms

and associated conditions to VFNs, and after therapy, the questionnaire was focused on the practice of therapy, maintaining vocal hygiene, and existing voice symptoms. All participants were adults and provided consent while filling out the questionnaires.

Measurement Before Therapy: The participants' FOL reports provided evidence of VFNs and their sizes. To detect the voice symptoms, the participants were asked to do easy phonation, which included pronouncing prolonged vowel sounds (every single vowel sound from 1-10). Their responses noted the presence of voice symptoms in written form. The participants were asked to pronounce humming sounds (em, am, um, im) to detect voice symptoms. Their responses noted the presence of voice symptoms collected in written form. Spontaneous speech samples were elicited by asking simple questions about their voice problem, habits of smoking and drinking alcohol, professions, educational qualifications, and daily routine.

Therapy techniques

Vocal hygiene: Participants were asked to follow vocal hygiene guidelines⁽¹⁶⁾, which included avoiding frequent coughing, throat clearing, shouting, and yelling. They were told to limit their speaking and singing and give their vocal cords time to heal. They were also advised to drink enough water and fluid throughout the day to keep their vocal fold hydrated. Patients were instructed to avoid smoking and drinking alcohol.

Voice rest: Participants were forbidden to talk without necessity (take voice rest) for 15 days.

Abdominal breathing: Participants were instructed to sit or lie down straight -place one hand on the chest and the other on the abdomen – take a deep breath slowly, allowing the abdomen to raise, and let the hand on the chest remain still – breathe out slowly through the mouth and abdominal breathing was advised to perform for five minutes and five times a day.

Easy phonation: Practicing prolonged vowel pronunciation five times daily was advised.

Humming exercises: Participants were advised to sit in a straight position and perform humming exercises

Sobbing exercises: Initially, the participants were asked to perform Eng (এং), Ing (ইং), Ung (উং), Ang (আং). Ong(অং), Sing (সিং), Bring (ব্রিং) sound (easy phonation, humming, and sobbing) melodically five times a day.

Word-sentence-conversation practice: It was recommended that participants practice uttering words starting with vowel sounds and “m” after inhaling through the nose and exhaling through the mouth. Then, participants were told to produce normal sentences starting with vowel sounds and “m.” Finally, they were asked to practice producing these sounds while talking and continuing the conversation with a normal voice.

All participants have received voice therapy for two months (2 sessions per week,

each lasting up to 30 minutes), and the data about the difference between their vocal issues before and after the therapy was collected through speech assessment (similar to before therapy assessment) and observation of FOL reports.

Data Analysis: The statistical analyses of the data found from the FOL reports of the participants, the presence and sizes of the nodules, and the data found from the speech assessment of the participants (before and after therapy) were analyzed using IBM SPSS (the Statistical Package for the Social Science) software version 20. To confirm the hypothesis that voice therapy was effective in treating participants with VFNs to improve their voice issues, a proportion test was performed with a statistical significance level of 0.05. Fisher's exact test was employed to show the association between therapy practice, vocal hygiene maintenance, and the efficacy of voice therapy.

Results and Discussion

Before voice therapy, eight patients out of 30 used to smoke, 28 had small-sized nodules, and others had medium-sized ones. 12 out of 30 participants were housewives. After voice therapy, 26 people (87%) reported better voice quality and absence of the feeling lump in the throat and four patients (13%) showed no improvement.

Table 1. Proportion test of the efficacy of voice therapy

Voice therapy	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
	5.81	29	0.00	0.37	0.24	0.50

In the conducted test, the computed test statistic was determined to be 5.81, with a resulting p-value of less than 0.001. Consequently, decisive evidence emerged to support the claim that the population proportion relating to the efficacy of therapy surpasses the value of 0.5. Therefore, the efficacy of therapy is more than 50%. The 95% confidence of the proportion of efficacy is computed as 0.74 - 1.

Results from Table 2 show the influence of practicing therapy regularly on improving voice quality.

Table 2. Association between influencing factors and improvement of voice quality

Factors		Improvement of Voice Quality After Therapy		χ^2	p-value
		No	Yes		
Vocal Hygiene Maintenance and Practicing Therapy Regularly	No	3 (100%)	0 (0.0%)	21.67	0.000
	Yes	1 (3.7%)	26 (96.3%)		

*Note: The p-value is computed using Fisher's Exact test

The test is highly significant ($p < 0.01$), which indicates that the null hypothesis can be rejected. It can be concluded that there is an association between practicing therapy regularly, maintaining vocal hygiene, and improving voice quality. Though all participants were provided with similar voice therapy, voice improvement was 0% for those who did not practice or maintain vocal hygiene, and voice improvement was 96.3% for those who practiced and maintained vocal hygiene.

Voice therapy a treatment method of vocal fold nodules, is considered as the first line (primary) treatment for patients with VFNs, since it frequently improves voice difficulties and prevents recurrence in many patients⁽¹⁾. Treatment alternatives include vocal hygiene instruction, behavior change, vocal exercises, psychological support, decreased phonotraumatic behaviors, and surgery⁽¹⁷⁾. Previous research has found that voice treatment can help people with VFNs, restore their natural voice, and improve their voice quality⁽¹⁸⁾. In our study, 26 out of 30 participants felt no lump or pain in the throat, also they have significantly reduced the symptoms of strained, breathy, and dysphonic voice. The lessened breathiness may be due to a reduction in the size of the nodules, allowing for a more thorough glottal closure.

This study discovered that after voice therapy, there was a significant improvement in evaluations of perceptual measures of voice quality, including roughness, breathiness, hoarseness, voice weakness, and voice quality overall. These modifications coincided with improvements in vocal fold function. Following voice therapy 26 patients did not show any voice symptoms while talking. During the follow-up session, they could talk in a normal voice without the presence of hoarseness, breathiness, roughness, or vocal fatigue. The improvement in all vocal qualities can be viewed as a measure of the efficacy of voice therapy.

Also, it is crucial for participants with VFNs to correctly practice the vocal relaxation exercises prescribed in voice therapy at home to experience voice progression⁽¹⁹⁾. Therapy is more likely to be effective in patients whose nodules are small and who adhere to good vocal hygiene. Sufficient hydration as well as lubrication aid in the maintenance of moisture in the larynx and the reduction of aberrant secretion, allowing the mucosa to vibrate gently when commencing phonation and protecting the vocal fold from injury. In this study, 2 out of the 4 patients in whom voice therapy was ineffective had medium-sized nodules. The statistical analysis demonstrated that voice improvement was 0% for individuals with medium-sized nodules, but 92.9% for those with small-sized nodules. Adherence to vocal hygiene plays a significant role in improving voice in patients with vocal fold nodules. The outcome of voice therapy can be greatly influenced by the factor of maintaining vocal hygiene⁽²⁰⁾.

The findings of the current study suggested that patients who practiced good vocal hygiene no longer experienced lumps in their throats after voice therapy, demonstrating that the size of the nodules reduced. 3 of the 4 patients who did not maintain vocal hygiene did not improve their voice. Voice improvement was 0% for those who did not maintain vocal hygiene but voice improvement was 96.3% for those who maintained vocal hygiene.

Also, 26 of the 27 participants who practiced the therapy saw improvements in their voices after getting voice therapy, but 3 of the 4 participants who did not adequately practice the therapy at home did not have improvements. Based on our study's observational and statistical data, we can conclude that the aforementioned factors have a substantial influence on the efficacy of voice therapy for patients with vocal fold nodules.

Though this study only confirms the overall efficacy of voice therapy in treating the voice of patients with VFNs, it does not address how an individual therapeutic exercise affects the progression of voice difficulties. The study was primarily observational and based on FOL reports and patients' vocal problems. The voice condition before and after therapy was compared to determine the efficacy of the therapy. However, the FOL test was not conducted following therapy. As a result, the outcome was solely determined by the observations and information provided by the participants. In our study, a successful treatment was defined as a size decrease in 87% of the patients, which is arbitrary. Furthermore, this study found that various factors affect the efficacy of voice therapy, which helps to make individualized treatment plans for the patients⁽²¹⁾. A tailored strategy can better address these problems because patients may have different underlying causes or contributing factors to their nodules.

Positive findings from the study may encourage cooperation between otolaryngologists (ENT specialists) and speech-language pathologists. Together, these specialists may offer a thorough method of treating vocal fold nodules that takes into account both the anatomical and functional elements of the voice. According to this study's findings, voice treatment can be a good alternative to surgery for treating vocal fold nodules for patients who want to avoid the dangers, expenses, and potential consequences related to surgical intervention, this is especially crucial. When opposed to surgical surgery, voice therapy is typically a more affordable treatment option, particularly when the nodules are not severe or problematic. The study's conclusions could result in lower healthcare expenses for patients and healthcare systems.

Furthermore, this study's findings will aid and create awareness among Bangladeshi patients with VFNs in using their voices correctly and practicing vocal hygiene. Moreover, findings will help professionals create individualized voice therapy programs that cater to the unique requirements of each patient.

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