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Evaluating the Effectiveness of Vocal Hygiene Training and Vocal Function Exercises in Primary School Educators

Dr. Nayab Iftikhar[1], Arshad Mahmood Naz[2], Muhammad Bilal Bhatti[3], Hafiz Muhammad Tahir Zia[4]

[1,] Assistant Professor, Centre for Clinical Psychology, University of Punjab, Lahore.
[2,] Speech and Language Pathologist, Mayo Hospital, Lahore.
[3,] Consultant speech and language pathologist, AR Hospital, Lahore.
[4,] Consultant Speech Therapist, REX medical Centre, Lahore.

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Abstract

The current research purposed to explore the effectiveness of vocal hygiene training and vocal function exercises in primary school teachers. The hypothesis was that there are likely to be significant differences in voice disorder intensity and voice related quality of life between treatment group (VHT+VFE) and control group (VHT). The other hypothesis was that there are likely to be significant differences in voice disorder intensity and voice related quality of life before and after treatment. Research design was Quasi Experimental design and non-probability purposive sampling strategy were employed in the study. Sample consisted of N=20 primary school teachers, age ranging between, 25-50 years taken from government schools of Lahore city. The assessment measures used in the study were Voice Handicap Index disorders (Jacobson et al., 1997), Voice related quality of life questionnaire (Hogikyan et al) and Teachers questionnaire. After conducting the requisite analyses, consequences indicated that there were non-significant group differences on the basis of treatment and control groups. The results also indicated there were significant difference in the pre assessment and post assessment of the treatment group. The members in the Treatment Group (VHT+VFE) significantly different on their post treatment scores as compared to pre-treatment scores. The study is likely to open up new avenues of worthwhile opportunities for better understanding of the study variables.

Keywords: (Vocal Hygiene Training), VFE (Vocal Function Exercises)

Introduction

Voice disorder take place when an individual's quality of voice, loudness, and pitch vary or is unsuitable for his or her gender, age, geographical locality or traditional background (Boone et al., 2010; Aronson & Bless, 2009) When a person starts complaining about his/her abnormal voice which do not looks like regular voice to him/her, but others do not find it distinct or different, then a voice disorder exists (American Speech-Language-Hearing Association [ASHA], 1993; Stemple et al., 2010; Colton & Casper, 2011 Verdolini & Ramig, 2001) If a person's voice differentiates in pitch, loudness or quality with others of same gender, age, geographical locality or traditional background, then they have a voice disorder (Stemple, 2000).Two major types of voice disorders exist. One is functional and other is organic (Branski, Murry, & Rosen, 2000) There are three types of functional voice disorders: hyper-functional, hypo-functional, and dysfunctional. Hyper-functional dysphonia is accompanied by extreme phonatory mechanism tension and is frequently linked with an organic lesion. Just like vocal cord paresis, hypo-functional dysphonia is instigated by a weakening of the phonatory mechanism. Dysfunctional

dysphonia refers to warning signs that do not fit into neither of the preceding classifications. It encompasses voice disorder like conversion dysphonia, puberphonia, and psychogenic dysphonia which tells that a patient's phonatory mechanism is not utilized appropriately despite the fact that it is proficient of producing healthy voice (Branski et al., 2000) Often psychological conditions elicit dysphonia, habitual, or maladaptive aphonic, due to which voice quality might be affected. The consequent vocal disorders are termed as psychogenic voice disorders/psychogenic conversion dysphonia or aphonic. Such types of voice disorders are infrequent. Speech and Language Pathologist might send patients doubted of developing a psychogenic voice disorder towards another suitable expert for diagnosis (e.g., psychologists and/or psychiatrists) and may participate in future behavioral treatment (Stemple et al., 2010). Prolonged or abusive use of the vocal sound can result in signs like hoarseness, a murmuring voice, and a painful oesophagus. These can result in vocal fold tissue injury and, as a result, dysphonia (Williams, 2003). Due to the complementary interactions among these biological, psychogenic and functional effects, several voice disorders are triggered by many etiologic component (Verdolini et al., 2006; Stemple et al., 2014). For instance, nodules of vocal fold might form as an outcome of vocal fold misuse (functional etiology). Unfortunately, misuse of the voice consequences in repetitive distress to the vocal cords that could lead to abnormalities of the structures in the tissues of vocal cords. The prevalence of a voice disorder in a paediatric population ranges between 1.4% and 6.0%. (Carding et al., 2006; Black et al., 2015). Premature neonates with more severe dysphonia had extended period of stay in the newborn intensive care unit and longer intubation i.e. above 28 days (Hseu et al., 2018). Approximately average 41% to 73% of children have nodules in vocal cords, revealing that nodules in vocal cords are the most common reason of pediatric dysphonia (Martins et al., 2015). A vocal problem affects one out of every 13 adults in the United States each year, although only a small percentage undergo treatment (Bhattacharyya, 2014). The occurrence of voice disorders in younger adults having 24 to 34 years of age was 6%, with non-significant differences among race/ethnicity, age groups, or educational status (Bainbridge et al., 2017). Adults aged 60 and older were found to have a greater prevalence, with various estimates between 4.8% and 29.1% on the basis of population studies (de Arajo Pernambuco et al., 2014). The most common diagnoses among adults (aged 19 to 60) with a voice disorder were acid laryngitis (12.5%), vocal polyps (12%) and functional dysphonia (20.5%), (Martins et al., 2015). Voice disorders were most typically related with Reinke's edoema , presbyphonia (alterations related to aging of voice), functional dysphonia, reflux/inflammation and vocal fold paralysis/paresis, people above 60 years of age who had been assessed for vocal issues (Martins et al., 2015). Diagnoses of laryngeal cancer was observed to be risen in adults aged 75 to 79 years old and later reduced (Roy et al., 2016). The current study aimed to investigate preventive approaches for voice disorders in primary school teachers in Pakistan. There have been less studies on vocal hygiene training and vocal function exercises in primary school teachers aimed at the avoidance of voice disorders.

Researchers Teggi, Luce, Ramella, Girasoli, Bussi, Calori, and Biafora, (2014) did a study titled Voice disorders in primary school teachers" with the intention of examining the frequency of voice disorders in a section of primary school teachers and exploring for potential cofactors. There were 157 teachers in the sample (155 number of females, mean age of 46 years). Two self-administered questionnaires, one including clinical data the other a certified Italian translation of VHI, were given to participants (voice handicap index). Later on that day, they also had a logopedic evaluation and a laryngostroboscopic examination. The consequences were contrasted with persons of an accompanying control group. Teachers had a greater rate of anomalies at laryngostroboscopic examination as compared to the control group (51.6% versus 16%, respectively).In 7.1% of them, nodules were found during testing. Teaching years, drinking coffee, anxiety levels or smoking were not linked to aberrant vocal folds in our sample. Although the occurrence of nodules was lesseras compared to preceding research and voice packing was not associated with laryngostroboscopic findings, our consequences are steady with earlier studies on the incidence of pathologic illnesses in instructors. Italian legislation no longer

provides guidance on voice instruction and selection in fields with significant vocal loading. This research highlights the significance of these laws. Angadi, Croake, & Stemple, (2019) administered a study with the title "Effects of Vocal Function Exercises: A Systematic Review." In order to better understand the indication for the effectiveness of (VFEs) in boosting voice output, the research will rigorously review the available data. A comprehensive literature finding was carried out by two independent reviewers via appropriate databases to find studies that used Vocal Function Exercises as an intervention. The American Speech-Language-Hearing Association's stages of proof were used to evaluate articles that satisfied the requirements for inclusion. Effect sizes for results were calculated using Hedge's g. The categories of patient self-report measurements, acoustic analysis, auditory-perceptual analysis, aerodynamic analysis and visual perceptual analysis, were utilized to classify voice outcomes. Abbott, Gillespie, and Ziegler (2010) conducted a research study entitled "Behavioral treatment of vocal abnormalities in teachers" in which voice issues in instructors were noted. The determination of this paper was to perform an analysis of the literature on teachers' voice anomalies and behavioral therapy options. The focus has been on phonogenic disorders, which are vocal disorders supposed to be produced by voice usage. The study identified major gaps in the body of knowledge about the management of teacher voice issues. However, it is known that therapeutic tendencies are developing. In contrast, small amount of studies investigated a single-therapy technique with single patients, whereas the majority of the research that was found for analysis used a numerous strategy in a group setting. Despite the conflicting evidence supporting behavioral treatment for voice issues in teachers, a growing corpus of research shows some promising signs for the effectiveness of rehabilitation programs for these professionals. A study named "Voice Disorders in Teachers" was undertaken in 2014 by Martins, Pereira, Hidalgo, and Tavares. According to a review, instructors frequently experience vocal anomalies, which can have major repercussions. Although there is a considerable amount of research on voice problems, there are differences in concepts and methods; the majority of studies only look at teachers' responses to questionnaires, and just a handful of studies use vocal evaluations and videolaryngoscopic tests to make a diagnosis. To investigate the different approaches, the prevalence rates cited by the authors, the central risk factors, the supreme widespread laryngeal lesions, and their impact of dysphonia upon professional responsibilities in demographic studies associated to voice issues in teachers. A narrative analysis of the existing literature was supported by using the databases from the internet resources (from 1997 to 2013). Both articles that explicitly evaluated treatment approaches and those whose abstracts weren't made accessible in those databases were disregarded. Among the terms used were teacher, dysphonia, vocal issues, and professional voice. In 2020, a research on the efficacy of voice therapy for voice-related impairment was undertaken by Barsties v. Latoszek, B., Watts, C. R., and Neumann, K. Different voice therapy treatment methods exist, however it is unclear how each one affects patients differently. Evaluations of the effects of treatment using various methods are essential for clinical decision-making and evidence-based practise. Utilizing the statistical method of a system meta-analysis (NMA) using a random effects model, we aim to assess findings of therapeutic efficacy on the primary outcome Voice Handicap Index with 30-items (VHI-30) from current RCTs of voice therapy. The type of evaluation is a meta-analysis. The criteria for inclusion were reports of randomised controlled/clinical trials (RCTs) conducted on study subjects with organic or inorganic voice disorders and utilising the VHI-30 as an end measure, and published in English or German. Studies did not include those who had vocal health or neurological motor speech issues. Additionally, no pharmaceutical, medical, or instrumental therapies (such voice amplification) were investigated. Studies did not include those who had vocal health or neurological motor speech issues. Additionally, no pharmaceutical, medical, or instrumental therapies (such voice amplification) were investigated. The VHI-30, a number that ranged from 0 to 120, was the main outcome variable. The pre-post treatment modification in VHI-30 scores was on normal 13 points, per multiple VHI-30 test-retest data. 13 RCTs from 464 publications that assessed nine interventions were included in the

final investigation (including duplicates). The most successful intervention, Stretch-and-Flow Phonation (SFP), had a considerable and clinically meaningful improvement (mean pre-post differences 28.37, 95% confidence interval [CI], 43.05 to13.68). Significant improvements were also observed with the Comprehensive Voice Rehabilitation Program (CVRP), Vocal Function Exercises, and Resonant Voice (RV) (VFE). Out of the nine voice treatments identified with the present NMA, SFP, RVT, CVRP, and VFE enhanced VHI-30 scores between pre- to post-treatment. SFP was the most effective and clinically pertinent therapy. It is necessary to carry out additional high-quality intervention studies to promote vocology practise that is founded on evidence. A publication titled "Vocal function exercises and vocal hygiene combined therapy approach as a strategy of increasing vocal quality in irradiated patients with laryngeal malignancies" was published in 2018 by La Mantia, I. G. N. A. Z. I. O., Cupido, and Andaloro. Few investigations have concentrated on the effectiveness of voice treatment in the population with exposed laryngeal malignancies, despite the fact that the detrimental properties of radiation therapy on voice quality are generally acknowledged in the collected works. The reason of this investigation was to examine the effectiveness of Vocal Function Exercises (VFE) and Vocal Hygiene (VH) when used together to improve vocal function in individuals who had had laryngeal radiation therapy. In a prospective, randomised, and well-ordered study, clients with primary laryngeal cancer received radiation therapy with the goal of curing their condition. Both interventions started one month after radiation was finished and continued six weeks for the study group (10 patients), who got VFE+VH therapy, and the control group (9 patients), which received VH alone therapy. GRBAS rating scale auditory-perceptual measurements, laryngeal stroboscopy, high-speed laryngeal imaging, acoustic analysis, aerodynamic analysis, influence on Health-Related Quality of Life (HRQL), and EORTC QLQ Head and Neck module (EORTC QLQ-H&N35). The VFE+VH combo therapy improved VHI (p=0.023), GRBAS (p=0.038), MPT (p0.001), jitter (p=0.015), NMWA (p=0.011), NGG (p=0.026), and EORTC QLQ-H&N35 (p=0.047) more effectively and statistically than the VH alone group. According to the results of the current investigation, combining VFE and VH improved voice function in those who had had radiation treatment for laryngeal cancer. In 2006, K. Ishikawa conducted research for his doctoral dissertation at the University of Cincinnati entitled "Vocal Function Exercises (VFE): Acoustic and Physiologic Examination of Sustained/o/with Buzz." Investigations were made into the efficacy of vocal function exercises. Vocal Function Exercises (VFE) is a vocal treatment technique that involves producing a buzzy /o/ sound with tightly pursed lips. The program's effectiveness in clinical testing has been shown to work with both healthy and pathological voices. Voice quality may have improved as a result of the usage of sound, but the process has not been studied. The auditory and physiologic features of /o/ with and without buzz were examined in the current study. Video and sound recordings of both sounds were given by four voice therapists who have received training in delivering VFE. To learn how participants interpret the physiological and auditory characteristics of /o/ with buzz, a questionnaire was used. The differences between the two works with the two participants may be seen through a visual comparison. Investigation of the sound's acoustics revealed a unique buzzing sound. The individuals' descriptions were congruent with their lip arranging and the occurrence of sympathetic vibration at their lips. The literature is limited concerning vocal hygiene programs and vocal function exercises that specifically target voice quality of teachers. Vocal issues are obviously present in some populations. One group that has been recognized as needing substantial voice use is the teacher population. As a result, they ought to be singled out as a group that could profit from instruction in vocal cleanliness and vocal function exercises. Few studies on the efficiency of vocal hygiene instruction and vocal function exercises for elementary school teachers have been conducted in Pakistan.

Method

Quasi Experimental Research Design was used to evaluate the effectiveness of vocal function exercises and vocal hygiene training programs in improving voice quality and overall vocal health. Additionally,

to assess the severity of voice disorders and their impact on the quality of life among primary school teachers.20 participants were recruited from government schools of Lahore. Sample was collected according to the proposed inclusion criteria and exclusion criteria. The purposive sampling type of non-probability technique was utilized. Primary school teachers having voice disorders (mild to moderate) were included from government schools, Primary school teachers of 25 to 50 years of age were included. Teachers having class strength more than 50 students were included.

Assessment Measures

Demographic information sheet: Self-constructed demographic information sheet by researcher gathered knowledge about the exclusive information of the participants such as name, age, gender, qualification, profession, marital status etc.

The Voice Handicap Index (VHI). The VHI measures the self-perceived psychological and social effects of voice abnormalities and is statistically reliable (Jacobson et al., 1997). The 30 statements in this self-report scale assess a patient's awareness of the comparative influence of their voice issue on everyday activities. A 5-point Likert scale with the following values is used by subjects to rate individually every statement, showing how regularly he or she had the involvement in these statements: 0 = never, 1 = very never, 2 = occasionally, 3 = almost always, and 4 = always. The VHI generates three subscale scores: Functional (F), Emotional (E) and Physical (P), a total score (ranging from 0 to 120). It has received good internal consistency, reliability, and test-retest stability following psychometric validation. The VHI, according to its creators, can be used as a gauge of the efficacy of particular therapeutic approaches as well as a part of functional outcomes measurement (Jacobson et al., 1997).

Voice Related Quality of Life

Hogikyan et al. developed the V-RQOL questionnaire at the University of Michigan in 1999. A self-administered brief patient report tool called V-RQOL is used to assess the personal problem caused by voice disorders. It is a 10-item questionnaire made up of two multi-item functional subscales with 6 and 4 questions, respectively, on the physical and social-emotional scales. The total scale is used to evaluate the overall V-RQOL.

Teachers Questionnaire In addition to the VHI, participants in the two therapy groups filled out a post treatment questionnaire with four questions to gauge how much they felt their voices had improved and how well they had adhered to the treatment plan. On a scale of 1 to 5, where 1 is very minute progress and 5 is a lot, subjects were requested to rate the degree of their compliance and improvement. The four inquiries focused on (a) voice sign progress, (b) verbal intelligibility, (c) talking and singing voice comfort, and (d) level of adherence to recommended treatment regimen.

Procedure

Before collection of data permission was taken from the relevant authors to use the questionnaires. Prior to collection of data, consent was taken from the relevant authority on the data collection from the Centre for Clinical Psychology, University of the Punjab, Lahore. After this primary school teacher from different government schools will be approached. Pre assessment will be completed on sample population. The total sample were comprised of (N=20). Every research participant was informed of the study's goal. The consent forms were provided to the participants at the beginning of research. Voice Handicap Index to check voice disorder severity and Voice related Quality of life questionnaire to check quality of life of participant, were administered on Group one and Group two. Only those participants who met the inclusion requirements and showed an interest to participate in the study were included. Two groups of participants were made. Vocal hygiene training was administered to Group one. Group two received vocal hygiene training program and vocal function exercises program collectively. They received guarantees about the privacy of the responses and the freedom to leave the study at any moment without penalty. All the intervention plan were introduced to the participants of study. After therapy of

4 weeks post assessment was completed by administering Voice related Quality of life questionnaire and teacher's questionnaire. After data collection, analysis were made by statistical procedures, followed by discussion about the obtained results. Therapy protocol was attached in the appendix.

Results

The data analysis was completed in the following four steps. Firstly reliability analysis using Chronbach's alpha and descriptive statistics were computed for scales and subscales. Secondly, Mann-Whitney test was utilized to measure the group differences in pre and post intervention to check the effectiveness of treatment. Thirdly, Wilcoxon Signed Ranks Test was administered to check the difference within groups. The comprehensive outcomes of the results are given below.

Reliability Analysis

The reliability and descriptive analyses for each assessment measure and its subscales are provided below.

Table

Cronbach's Alpha and Descriptive Statistics of voice handicap index and voice related quality of life questionnaire (N= 20)

Variables	A	k	Cut off	M(SD)
Voice Handicap Index				
Subscales				
Physical Scale	.85	10	14.4	14.8(6.97)
Functional scale	.85	10	17.5	17.7(7.12)
Emotional Scale	.83	10	16.8	16.8(5.34)
Voice Related Quality of Life	.87	10	26.6	26.8(5.78)

*Note. Cut off = Median score

Table 4.1 shows the reliabilities, numbers of items, cut off scores, mean and standard deviation of the assessment measure. The reliability analysis was conducted using Chronbach's Alpha for each assessment measure. Chronbach's Alpha for scales measuring Voice Disorder and Voice related quality of life were in acceptable range. Sample specific cut off score was calculated from the median value of Voice Handicap Index and Voice Related Quality of Life as author did not specify any cut off scores. The above table demonstrate that mean of subscales of Voice Handicap Index i.e., physical scale, functional scale and emotional scale is equal to cut off scores. The mean score of Voice Related Quality of Life is equal to the cut off point.

4.2 Inferential Statistics

Mann-Whitney U test was run to check the group differences in pre and post assessment to check the efficacy of treatment group. It was assumed that there are likely to be significant differences in voice disorder intensity and voice related quality of life between treatment group (VHT+VFE) and control group (VHT). Results in Table 4.2 revealed that there were non-significant group differences on the basis of treatment and control groups. The difference between the medians is not statistically significant. Table 4.2

Mann Whitney U Test results for group Differences in Pre assessment and Post assessment of VHI and VRQOL

Variables	**Treatment Group N=10**		**Control Group N=10**		**U(10)**	**Z**	**P**
	Mr	**Mdn**	**Mr**	**Mdn**			
Pre assessment VHI	13.3	54.0	7.65	42.0	21.5	-2.16	.029
Post assessment VHI	10.40	41.5	10.60	42.0	49.0	-.076	.971
Pre assessment VRQOL	12.85	30.0	8.15	24.0	26.5	-1.78	.075
Post assessment VRQOL	8.0	18.0	13.0	23.5	25.0	-1.90	.063

Note: Mr: Mean rank; Mdn: Median; z: Standardized T-Statistics; P: Level of Significance

Table 4.2 shows that Pre assessment of voice handicap index scores in the treatment group (Md=54, n=10) compared to the control group (Md=42, n=10), U=21.5, z=-2.16, p= .029 with an effect size r=0.6 Post assessment of voice handicap index scores in the treatment group (Md=41.5, n=10) compared to the control group (Md=42, n=10), U=49, z=-.076, p=.97 with an effect size r=.0007 Pre assessment of voice related quality of life (VRQOL) scores in the treatment group (Md=30, n=10) compared to the control group (Md=24, n=10), U=26.5, z=-1.78, p=.075 with an effect size r=0.4 Post assessment of voice related quality of life (VRQOL) scores in the treatment group (Md=18, n=10) compared to the control group (Md=23.5, n=10), U=25, z=-1.90, p= .06 with an effect size r=0.4

Table 4.3

The Wilcoxon Signed Ranks Test Comparison with in Treatment Group

Variables	Pre-Assessment		Post-Assessment			
	M	Mdn	M	Mdn	T(10)	p
VHI	56.6	54.5	41.6	41.5	-2.80	.005
VRQOL	29.2	30.0	19.1	18.0	2.70	.007

Note: M: Mean; Mdn: Median; T: Wilcoxon Signed Rank Test; p: Level of Significance; VHI: Voice Handicap Index Questionnaire; VRQOL: Voice Related Quality of Life Questionnaire

It was assumed that there are likely to be significant differences in voice disorder intensity and voice related quality of life before and after treatment. Results in Table 4.3 shows that there is a significant difference in the pre assessment and post assessment of the treatment group. The participants who were in the Treatment Group (VHT+VFE) were significantly different on their post treatment scores in comparison to pretreatment.

Table 4.4

The Wilcoxon Signed Ranks Test Comparison with in Control Group

Variables	Pre Assessment		Post Assessment			
	M	Mdn	M	Mdn	T(10)	p
VHI	42.2	42.0	42.2	42.0	.00	1.00
VRQOL	24.4	24.0	23.6	23.5	2.53	.01

Note: M: Mean; Mdn: Median; T: Wilcoxon Signed Rank Test; p: Level of Significance; VHI: Voice Handicap Index Questionnaire; VRQOL: Voice Related Quality of Life Questionnaire

According to Table 4.4, there are no significant differences between the post-treatment and pre-treatment scores of the participants in the control group (VHT).

Discussion

The current study examined effectiveness of vocal hygiene training and vocal function exercises in primary school teachers. The determination for this study was to find whether or not these two treatment approaches are helpful in reducing voice disorders in primary school teachers. Hypothesis to check the differences and effectiveness of therapies were proposed and analysed. First of all, it was assumed that there are likely to be significant differences in voice disorder intensity and voice related quality of life between treatment group (VHT+VFE) and control group (VHT). The results showed there were non-significant differences in voice disorder intensity and voice related quality of life between treatment group (VHT+VFE) and control. However, median of the treatment group was reduced in post assessment as comparison with the control group. It means that difference was present but it was not too high to be considered significant. The results were non-significant because time duration of the therapy was less. Other extraneous variables could also be the cause of non-significant results e.g. teachers concentration and home practice. It was also assumed that there are likely to be significant differences in voice disorder intensity and voice related quality of life before and after treatment. The findings supported that there were significant differences in voice disorder intensity and voice related quality of life before and after treatment. That means vocal hygiene training and vocal function exercises were effective in treatment group. Stemple (2017) showed that VFEs are effective at improving vocal function in people with usual and disorderly voices, presbylaryngeus, and skilled voice users. The usage of VFEs for a range of vocal disorders is suggested to be supported by moderate to good evidence. Vocal hygiene training is a crucial part of vocal healing, according to a number of studies (Murry & Woodson, 1992; Mcfarlane & Watterson, 1990; Lancer, et al., 1988). Regarding vocal hygiene, Wait (1999) also discovered promising outcomes. As a result of vocal hygiene instruction and vocal function exercises, results also demonstrate a progress in voice-related quality of life. Resulting therapy, vocal abnormalities became less severe as well. The results of control group revealed that there were non-significant differences in voice disorder intensity and voice related quality of life before and after treatment. It indicates that vocal hygiene training was not solely effective as compared to experimental group.

Conclusion

This data indicates that VFE and VHT are a useful treatment for enhancing voice problems in primary school teachers, while additional research is required to corroborate the findings of this work.

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