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Original Research Paper

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VOICE PROFILING IN YOUNGSTERS FOLLOWING CLUB PARTY

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ABSTRACT

Introduction. Club parties are becoming very common among youngsters at present days. They tend to shout, yell, scream and indulge in other vocally abusive behaviors beyond their vocal range and for a long period during club parties. Vocal abuse in presence of high background noise with poor vocal hygiene and various other environmental factors have a disastrous effect on one's voice. **Objective.** The present study aimed to show and correlate the effect of vocal abuse (during vocally demanding situations like club parties) on the perceptual and objective vocal features of youngsters. **Methodology.** This study included a total of 20 youngsters with equal gender distribution, age range 18-23 years. Pre-test and post-test research designs were applied. Perceptual scales such as GRBAS, Video laryngoscopic examination(otopront 1CCD), and Acoustic voice analysis (CSL-4500) were used for all the candidates. Appropriate statistic analysis was done for the values obtained to measure and compare pre and post-club-party effects on samples. **Result.** The post-party effect represented vocal effects on the GRBAS scale, VLS examination, and acoustic values on CSL. However, changes that were more prominent and statistically significant for Females ($P<0.05$- SPI, jitter, shimmer, APQ) may be due to laryngeal precipitating factors in female vocal cords. Changes in vocal margins were evident on VLS examination with are correlated with CSL. However, the non-significance on a few parameters was also found, concluding that few parameters were less suspectable to the temporary effects on vocal function. **Conclusion.** Youngsters who shout very loudly during club parties have throat pain, hoarseness, and breathiness following the party in our present study. Females have more prominent changes as compared to boys may be due to boys having more hyaluronic acid which prevents vocal folds from scarring. However, any significant changes are not reported in just one day of exposure but if such a situation persists it may lead to permanent change altering their vocal range. It is thought that attending club parties once in a while may not be altering vocal symptoms but youngsters must abstain from continuing such activities in the long run, to avoid permanent vocal pathologies. Meanwhile, youngsters should follow vocal hygiene to avoid such vocal conditions.

KEYWORDS : Voice profiling, VDL, GRBAS, CSL-4500, Club-party.

INTRODUCTION

In today's scenario club parties are becoming very common among the young population. Almost every youngster of a metro city attends club parties, exposing themselves to loud noise, unhealthy food, drinking, and smoking which ultimately has a disastrous effect on their voice. In long term, this over range, hyperfunction of voice on shouting at high intensity, place them at high risk for vocal changes. In addition, students with reduced vocal range and limited vocal capacity also try to imitate and shout with inappropriate vocal power and pitch. Given the vocal demands placed during club parties, vocal pathologies may manifest.

Vocal cords in the throat have muscle fibers in them, prolonged or improper use can lead to injuries to these vocal cord muscles. It may come from yelling in a bar or shouting while dancing, which causes the maximal force of vocal fold adduction resulting in friction, thermal damage, mucosal breakdown, and partial or even complete loss of the voice.

Gelfer and Andrew,1991, studied the effect of loud reading on singers and reported increases in fundamental frequency and intensity. Scherer et al, 1991, studied the effect of loud phonation and reported vocal fold edema and symptoms of vocal fatigue following a strenuous vocal task.

Among primary vocal symptoms, changes in voice quality, hoarseness, and vocal fatigue along with throat pain are most commonly reported. In addition, these vocal demands may be a significant causal factor in diminishing the vibratory motion of the vocal folds.

At present voice-pathologist have been primarily focusing on the rehabilitation of patients reporting vocal symptoms which are sudden in youngsters following overnight parties and aimed at preventing such voice disorders in the general population in this situation. Education of youngsters for maintaining vocal hygiene will enhance the student's awareness of vocal usage in the long run by controlling several factors. These precautions for voice diseases will further act as stepping stones in planning appropriate health measures. Therefore, research focusing on the pre and post-vocal changes through objective, acoustic measures along with perceptual parameters is mandatory for planning appropriate preventive as well as management strategies for this budding population.

Review Of Literature

Youngsters use their voices at excessively loud intensities and long durations during club parties. Following studies prove the various vocal conditions in different age groups, post vocal abuse.

Anuradha Sharma et al, in 2020, studied "Accumulative effect of vocally abusive behaviors in college students post-college fest", where female participants were included and reported incomplete glottis closure, asymmetric vibration of vocal folds, and aperiodicity of vocal folds increased significantly post-college Fest and concluded a high risk of vocal disorders among college students post Fest.

Mehmet Ozgur Pinarbasli et al, 2017 in the study "Acoustic Analysis of Soccer Fans in Acute Phonotrauma After the Match" investigated the acute changes in the vocal folds and voices of soccer fans, who attended the soccer match and were engaged in acute phonotrauma. They reported an increase in jitter, shimmer, and normalized noise energy values measured after the match and concluded that people using intense voice

during the match reported a change in voice.

Rebecca L. Hancock & Joseph C. Stemple,2014 studied "Vocal fold hemorrhage" and reported, that phonotrauma (shouting, screaming, yelling, effortful/extreme voice production over a prolonged period) is the common risk factor associated with vocal fold hemorrhage.

Thomas Murry and Clark A. Rosen, 2000, in the study "Phonotrauma Associated With Crying" investigated three cases in which the traumatic event was crying and reported that crying as a traumatic vocal behavior may result in vocal fold hemorrhage.

Eric A. Mann et al, 1999, in the study, "The Effects of Excessive Vocalization on Acoustic and Video stroboscopic Measures of Vocal Fold Condition" studied the consequence of acute vocal abuse and reported that abnormal levels of jitter, shimmer, and significant increases in vocal fold edema, erythema, and edge irregularity, and decreases in vocal fold mucosal wave and amplitude of excursion.

Stemple et al, in 1996, obtained acoustic, aerodynamic, and video stroboscopic data from 10 female graduate students following a 2-hour loud reading task and reported significant changes in fundamental frequency and anterior glottal chinks in a majority of subjects following prolonged voice use.

Aim

This present study aimed to know the effect of vocal abuse on perceptual and objective voice parameters of youngers after being exposed to vocally demanding situations like club parties.

Objectives-

- To show and correlate the effect of vocal abuse (during vocally demanding situations like club parties) on the perceptual and objective vocal features of youngsters.
- To study and present the effect of vocal changes in male vs female following Parties.
- To provide the need for vocal hygiene at amusement zones or in any other vocally demanding situation.

Hypothesis

Null Hypothesis (H_0) - There will be no significant changes in youngsters' voices post-club-party Alternate Hypothesis (H_a)- There will be significant changes in youngsters' voices post-club-party.

Methodology

This study included 20 Graduating youngsters with equal gender distribution, ages ranging from 17-23 years (mean age=19.55, standard deviation=1,93). Any history of vocal pathology, fluency or articulation disorder, GERD, hearing loss, systemic disease, hormonal disturbances, or any history of a voice disorder or systemic issues were excluded from this study. Participants with a history of alcohol consumption, smoking, throat clearing, or any other substance abuse were also excluded. Pre-evaluation of Voice inclusive of informal screening, formal GRBAS scale, VDL, and CSL were recorded 1 day following a club party.

The selected participants attended a 5-6 hours long club-party and were exposed to screaming/shouting at approximately 90-100 dB throughout the party, which were monitored by the co-author of this study. Optimal quality perceptual and objective audio recordings were obtained on the immediate next day to observe the effect instruments used for this study were Video laryngoscopic (VDL) examination (otopront 1CCD), GRBAS scale, and acoustic analysis i.e Multidimensional Voice Program (MDVP) in CSL software (Model 4500. Inc) done in Speech Lab.

All the participants were screened with a case history and followed to a preliminary ENT examination. Video Laryngoscopic examination was performed by using a 70° rigid endoscope connected to the otopront 1CCD (REF 1156.08) laryngoscopy unit. The presence of any vocal fold pathology, glottic closure, and vocal edge irregularity was examined during the examination.

Then GRBAS rating scale used which is a perceptual rating scale developed by the Japanese society of Logopedics and Speech Phoniatrics was administered. The Hoarseness Grade (G)- reveals the overall perception of voice, Roughness (R) reveals the degree of irregular pronunciation, Breathiness (B) reveals the degree of breathy sound, Asthenia (A) reveals weak pronunciation, and Strain (S) muscle tension. Perceptual vocal measures were scored on a 4-point rating scale as 0-normal, 1-mildly abnormal, 2-moderately abnormal, and 3- severe abnormalities.

Then Acoustical analysis i.e MDVP was done and suspected parameters i.e Smooth phonation index, Average fundamental frequency, Jitter percent, Shimmer percent, and noise to harmonic ratio were recorded. The subjects were asked to phonate vowel /a/ three times at their comfortable pitch and loudness level with a microphone held at a fixed distance from the mouth.

The above-mentioned test procedures were repeated for all the participants of this study following the club party, on the immediate next day and scores were recorded. The judges were blindfolded toward the aim of the study and analyzed the randomized recordings. Each judge gave an independent rating for every parameter, the final decision was made by their report.

Data processing

Descriptive statistics consisted of mean and standard deviation for all continuous variables and frequency and percentage for discontinuous variables. Chi-square law was applied to VLS findings to check whether differences were statistically significant or not. Acoustic data were analyzed with paired t-test. The pre and post-test data were analyzed by comparing the scores obtained from each participant. The Sign test was used to check the difference between pre-test and post-test median values for GRBAS. A P value less than 0.05 was considered statistically significant.

RESULTS

Twenty youngsters participated in the study, with equal gender distribution. Results of VLS findings reported inadequate glottal closure (in 30% of females and 10% of males) and vocal fold hemorrhage (10% of males and 20% of females). The difference in pre and post-glottal closure was statistically significant in girls, as denoted in TABLE 1. The vocal fold haemorrhage in both the groups i.e. male and female is nonsignificant with P values 0.3 and 0.13 respectively. However glottal closure value is significant in females as compared to counterpart with a P value of 0.05. This is an indication of increased glottal closure in females than males following vocal abuse.

TABLE 1: Videolaryngoscopy Analysis Results (N = 20)

Vocal Pathology		Pre-exposure		Post-exposure		*P-Value*	
		Male	Female	Male	Female	Male	Female
Vocal Fold Haemorrhage	Present	0	0	1	2	0.3	0.13
	Absent	10	10	9	8		
Glottal closure	Adequate	0	0	1	3	0.3	**0.05***
	Inadequate	10	10	9	7		

***P*-Value ≤ 0.05 = Significant *P*-Value > 0.05 = Not Significant**

In TABLE2. GRBAS scores were denoted, representing increased post-party effects. Parameters represented

changes were Grade (increased in 40% male and 50% female), Roughness (increased in 20% male and 30% female), Breathiness (increased in 30% male and 40% females), Asthenia (increased in 10% male and 10% females), Strain (increased in 40% male and 40% female).

TABLE 2: Pre and Post-club party GRBAS scores

Participant	Grade		Roughness		Breathiness		Asthenia		Strain	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Male										
1	0	1	0	0	0	1	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0
3	0	2	0	1	0	2	0	1	0	2
4	0	1	0	0	0	0	0	0	0	0
5	0	2	0	1	0	1	0	0	0	1
6	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0
P-value	**0.04***		0.15		0.08		0.31		**0.04***	
Female										
1	0	1	0	0	0	1	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0
3	0	3	0	1	0	1	0	1	0	3
4	0	0	0	0	0	0	0	0	0	0
5	0	1	0	1	0	2	0	0	0	1
6	0	2	0	1	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0
8	0	1	0	0	0	1	0	0	0	1
9	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0
P-value	**0.02***		0.08		0.45		0.31		0.04	

*P-Value ≤ 0.05 = Significant P-Value > 0.05 = Not Significant

All the GRBAS values increased in post-party and the changes in Grade and Strain were statistically significant (P-value in male: G=0.04, S=0.04 and female: G=0.02, S=0.04, respectively) for both the Groups. However, the raw scores for breathiness represented more changes in female. As denoted in TABLE 2.

On the MDVP test of CSL software, all the acoustic parameters increased post-club-party. Acoustic values of females showed more increment as compared to males. Significant changes were found in SPI, Shimmer, NHR, and APQ in females with a P-value of 0.048, 0.01, 0.046, and 0.029 as denoted in TABLE 3.

Table 3 : Pre- and Post-exposure Comparison on Acoustic Parameters

Parameter	Pre-exposure				Post-exposure				P. Value	
	Mean		SD		Mean		SD			
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
Average Fundamental Frequenc	127.864	233.043	14.202	14.869	126.644	229.391	19.635	19.235	0.753	0.328
Jitter percent	0.554	0.618	0.394	0.51	0.953	0.779	0.696	0.43	0.09	0.438
Shimmer percent	3.257	2.214	1.715	0.845	4.243	3.407	1.61	1.298	0.17	**0.01***
RAP	0.324	0.422	0.241	0.313	0.574	0.474	0.439	0.266	0.08	0.631
APQ	2.527	1.667	1.402	0.508	2.969	2.404	0.921	0.957	0.379	**0.029***
NHR	0.145	0.114	0.02	0.011	0.146	0.123	0.013	0.008	0.843	**0.046***
SPI	6.872	5.02	2.928	2.478	8.453	8.186	3.874	5.506	0.131	**0.048***

*P-Value ≤ 0.05 = Significant P-Value > 0.05 = Not Significant

DISCUSSION

To the best of the researchers' review, this is the only study addressing the vocal changes to post-club parties The result of this study reported significant differences in subjective as well as objective vocal parameters of youngsters in pre and post-club parties. The most significant findings were inadequate glottal closure followed by vocal fold hemorrhage. As mentioned above, works of literature reported long-term misuse of the vocal folds leads to edema and vocal fold hemorrhage, which is evident in the present study. However, vocal changes post-club were more prominent in females, which may be due to the structural, functional, and psychological differences of voicing in the groups which make their vocal cords more prone to scarring.

The acoustic and perceptual assessment results reported that every participant have at least one vocal symptom. Although all were not statistically significant, a change that was of clinical significance was observed in the acoustic and perceptual parameters of voice in the expected direction. The significant changes in youngster's voice, like vocal fatigue, harshness, breathiness throat pain, and other vocal pathologies provided measures to form appropriate vocal hygiene measures for youngsters before attending such events.

Moreover, in this study, the increase in post-fest shimmer values indicates the inability of the vocal folds to support a periodic vibration for a distinct period and conform to the existence of turbulent noise in the voice signal. Vocal fatigue and vocal pathology are associated with a decrease in fundamental frequency following a period of vocal abuse, as reported in this study. Increased RAP values indicated that noise energy was contributing more to signal than acoustic energy. An increase in values of other acoustic parameters like SPI, NHR, and APQ indicates decreased vocal effectiveness post-club-party.

The result of the present study was significant and all the participants reported the effects and its impact on their vocal performance following club party. There is an emerging need to provide an appropriate vocal education for youngsters in order to preserve their voice.

Moreover, it also emphasized the need to develop appropriate safety limits concerning duration and intensity during such occasional voice abuse to prevent vocal pathologies.

Summary And Conclusion

Youngsters who shout and use their voices at high intensity during club-party are exposed to post-party voice changes. If such a situation persists, organic pathologies may develop in vocal folds, and permanent voice pathologies may occur in the budding group. Further research must be done with a larger sample size and Video Stroboscopic examination (VSS) may be used further to know the status of vocal physiology. However, any severe vocal changes were not reported in youngsters in just one day of exposure but if such a situation persists it may lead to permanent change altering their vocal range. It is thought that attending club parties once in a while is not a big issue but youngsters must abstain from continuing such activities in the long run to avoid permanent vocal pathologies. Meanwhile, youngsters must receive vocal hygiene education to avoid such vocal conditions.

Limitations

1. The post-party analysis could not be done immediately after the party, it was done after 7 hours, due to which the immediate effect on voice could not be observed.
2. Video laryngoscopic examination was done which limits to the assessment of the presence or absence of a vocal pathology or to report of the vibratory characteristics of the vocal folds.

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