

**VOICE RELATED QUALITY OF LIFE IN INDIVIDUALS WITH DEVIATED NASAL SEPTUM**Prakash T. K<sup>1</sup>, Gopikishore P<sup>2</sup>, Vijaitha V. Soonan<sup>3</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT:** Deviated nasal septum (DNS) is a common disorder which alters the nasal cavity anatomically and physiologically and results in nasal obstruction for breathing, nasal blockage, allergies, allergic rhinitis, and dryness of throat, thus influencing the person's quality of life. Literature indicates that acoustic and resonatory characteristics of voice are negatively influenced in individuals with DNS due to the compensation by laryngeal system to the blockage in the resonatory chamber. In this context, the present study was aimed to investigate the voice related quality of life in individuals with deviated nasal septum. Forty individuals with severely deviated nasal septum confirmed by an Otorhinolaryngologist through anterior rhinoscopy, computerized tomography and twenty five age and gender matched controls filled the Kannada version of Voice Handicap Index-10 (VHI) questionnaire. Results indicated significant impact of deviated nasal septum on voice related quality of life in 55% of the participants with DNS. Results of Mann-Whitney U test indicated significant effect of DNS on VHI scores in individuals with DNS compared to controls ( $p < 0.001$ ). With respect to response to the individual questions under VHI, although response was negative to most of the questions, two questions that received highest score belong to physical domain of VHI and are related to breathing difficulty and variations in voice throughout the day, indicating that they have more difficulty due to nasal blockage to airflow per se than their day-to-day functionality or communication.

**KEYWORDS:** Deviated nasal septum, Voice handicap index, Quality of life.

**INTRODUCTION:** Deviated nasal septum is common disorder which alters the nasal cavity anatomically and physiologically and results in nasal obstruction for breathing. It can arise due to an external trauma or can be caused by the compression of the nose during birth. The degree of septal deviation from the center determines the severity of the disorder. Deformities of nasal septum can be classified into nasal spurs, deviations and dislocations. C-shaped, S-shaped deviations are some of the patterns found in deviated nasal septum.

Septal deviations affect the free aeration and cause nasal obstruction, blockage, allergies, allergic rhinitis, and dryness of throat and hence influence the person's quality of life. Deviated nasal septum (DNS) can lead to sinusitis, affect the sinus drainage and also influence the resonance and voice characteristics of speech. Deviated nasal septum can have a significant impact on the quality of the nasal phonemes as well as on nasal airflow<sup>(1)</sup>.

Further, it has been hypothesized that the larynx undergoes compensatory mechanism to overcome the changes in the voice due to the blockage in the resonatory chamber. This compensatory change in the laryngeal mechanism has been reported to reflect in the acoustic measurements of voice.<sup>(2-4)</sup>

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Voice characteristics of twenty individuals in the age range of 18-60 years before and after septoplasty was analyzed in a study<sup>(2)</sup>. The post-surgical voice was found to be better when compared to pre-surgical voice in terms of acoustic parameters of voice, self-perceptual assessment of voice on Voice Handicap Index as well as in terms of improved nasal airway and nasal resonance. Authors opined that voice abnormalities also should be considered along with the nasal septal deviation before performing surgery.

Effect of septoplasty on 24 individuals with DNS in the age range of 18-49 years was evaluated in a recent study.<sup>(1)</sup> Participants were selected based on clinical evaluation, active anterior rhinomanometry and digital recording of speech samples. Results indicated improvement in the nasal airflow and in the quality of the nasal phoneme /n/ following surgery.

Self-perception and the formant frequencies of voice were analyzed after septorhinoplasty with spreader grafts in 20 individuals with DNS.<sup>(3)</sup> Evaluations performed at pre-surgery and at three months follow up indicated significant difference in the self-perception scores on Voice Handicap Index-10. Also a slight increase in fundamental frequency and decrease in perturbations was observed following surgery.

Although most of the above mentioned studies indicated improvement in voice and resonance characteristics in terms of acoustic analysis, self-perceptual analysis, and nasalance scores following upper airway surgeries, some of the studies revealed converse results with no significant effect of DNS or change following septoplasty.

For instance, voice characteristics on forty four individuals before and after an upper airway surgery.<sup>(5)</sup> Surgeries performed included septoplasty and turbinectomy (n=28) and septoplasty, turbinectomy, uvulopalatopharyngoplasty, and tonsillectomy (n=16). Results indicated improvement in formant amplitudes however, with no significant change in self-perception of voice as measured on voice handicap index. In this context the present study is taken up to investigate voice related quality of life in the individuals with DNS in comparison to the controls.

### **MATERIALS & METHODS:**

**Participants:** The study consisted of 65 participants classified under two groups. First group included 40 individuals with deviated nasal septum and second group included 25 age matched controls. All the participants had severe nasal septal deviation that was confirmed by an Otorhinolaryngologist through anterior rhinoscopic examination, diagnostic nasal endoscopy, and computerized tomography scans.

All the participants in the control group had normal structure and functioning of nasal cavity through clinical examination. It was ensured that none of the participants, under control as well as DNS groups, had upper respiratory tract infections at time of testing. Ability to read and comprehend Kannada language was the other criteria considered for inclusion of participants to the study.

**Procedure:** Kannada version of Voice Handicap Index (VHI-10) was used to investigate the voice related quality of life in the participants. The VHI-10 is a self-administered questionnaire consisting of ten questions under physical, functional and emotional domains. The questionnaire was administered independently to each of the participants under clinical group and control groups.

The participants were instructed to read the instructions on VHI sheet and were asked to rate the each question with choices between 0-4, where zero indicates that particular problem was

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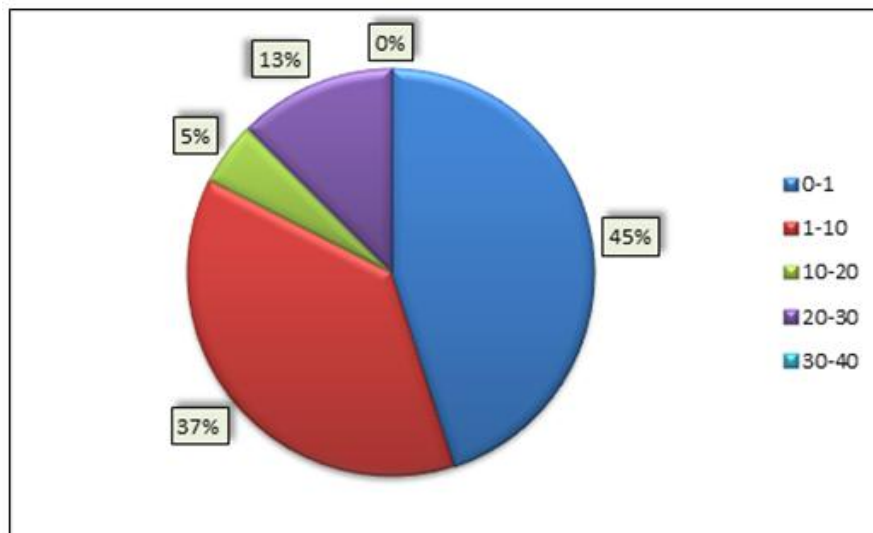
experienced 'never' and four indicates 'always'. The minimum score an individual can obtain is zero and the maximum can be forty.

Filled questionnaires were verified by the researcher for completion, incomplete ones were rejected and the remaining questionnaires were considered for further analysis. From the obtained data, mean and standard deviation values of VHI-10 for each individual under control and clinical groups as well as mean and standard deviation values for each question, across the participants was calculated. Mann-Whitney U test was performed using Statistical Package for Social Sciences (SPSS) software version 17 to verify the statistical significance of difference in mean VHI scores between individuals under control and clinical groups.

**RESULTS AND DISCUSSION:** Deviations in nasal septum can lead to nasal obstruction, blockage, allergies, allergic rhinitis, and dryness of throat and hence influence the person's quality of life. Present study investigated the voice related quality of life in 40 individuals with symptomatic DNS and 25 age matched controls using VHI-10.

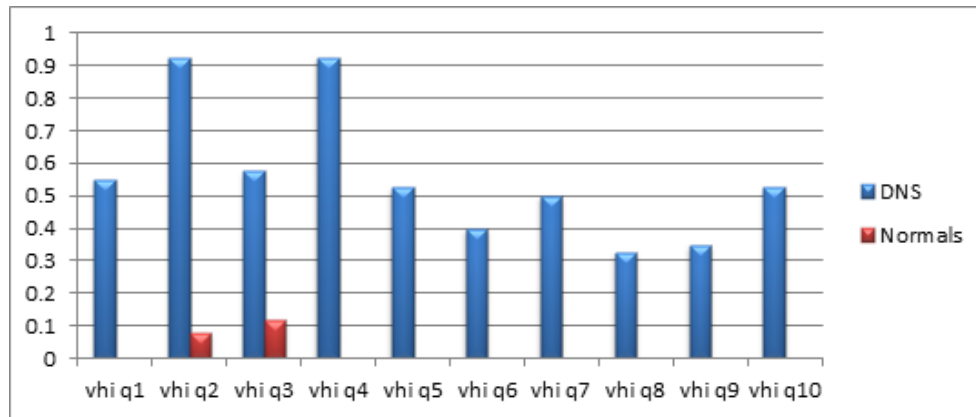
Individuals under control group obtained an average value of 0.20, whereas individuals under clinical obtained an average value of 5.32. The VHI score under control group is comparable with those reported in the earlier studies.<sup>(6)</sup> These authors obtained an average VHI score of 1.12 with standard deviation of 0.82 using VHI-30.

As there is significant within group variation for VHI scores under clinical group (ranging from zero to 26), mean scores cannot be representative, therefore, they are converted to frequency intervals with respect to score and represented under pie chart (figure 1).



**Figure 1: The mean VHI scores for individuals under clinical and control groups**

From the figure 1 it is evident that 45% of the individuals under clinical group obtained an average VHI score of less than one which is within normal limits.<sup>(6)</sup> However, 55% of the individuals under clinical group obtained VHI scores above the reference value, indicating the impact of DNS on their voice related quality of life.



**Figure 2: The mean scores obtained for each VHI question by control and clinical groups**

Results of Mann-Whitney U test indicated significant effect of DNS on VHI scores in individuals with DNS compared to age matched controls ( $p < 0.001$ ). This can be attributed to the compensatory effect of DNS on the laryngeal system and voice production which in turn had an impact on their quality of life.

Participants	Z	p-value
Deviated nasal septum (40)	-3.596	0.000
Age matched controls (25)		

**Table 1: Mann-Whitney U test for VHI score across the groups**

With respect to response to the individual questions under VHI, individuals under clinical group rated high for the second and fourth questions indicating that they go out of air when they speak and their voice varies throughout the day respectively. Presence of deviated nasal septum increases resistance to the nasal airflow and nasal energy in the anterior portion of the nasal cavity.

This presence of increased nasal resistance may force the individual towards shallow inhalation, thus contributing to overall reduction in breath support voice production. Further, both the questions that received highest score belong to physical domain of VHI, indicating that DNS results in more physical difficulty than impact on their day-to-day functionality.

**CONCLUSION:** Present study aimed at investigating voice related quality of life in individuals with deviated nasal septum. Results of the study indicated significantly higher VHI scores in individuals with DNS compared to age matched controls indicating its negative impact on their quality of life.

However, considerable individual variations were observed with respect to VHI scores, including 45% of them obtaining scores under normal limits. Therefore, studies are warranted in future to identify the factors other than voice that might contribute to affected quality of life in these individuals.

**REFERENCES:**

1. Konior M, Klaczynski M, Wszolek W. Reduction of speech signal deformation in patients after nasal septum surgery (septoplasty). *Acta Physica Polonica*. 2011; 119 (6-A): 1000-1004.
2. Mora R, Jankowska B, Dellepiane M, Mora F, Barbara C, Salami A. Acoustic features of voice after septoplasty. *Clinical Research*. 2009; 15(6): 269-273.
3. Celik O, Boyaci Z, Yelken K, Atespare A, Celebi S, Koca O. Septorhinoplasty with spreader grafts enhances perceived voice quality without affecting acoustic characteristics. *Journal of Voice*. 2011; 26 (4): 493-495.
4. Koc EAO, Koc B, Ercan I, Kocak I, Tadihan E, Turgut S. Effects of Septoplasty on speech and voice. *Journal of Voice*. 2014; 28(3): 393.e11-393.e15.
5. Behrman A, Shikowitz JM, Dailey S. The effect of upper airway surgery on voice. *Otolaryngology-Head and Neck surgery* 2002; 127 (1): 36-42.
6. Datta R, Sethi A, Singh S, Nilakantan A, Venkatesh MD. Translation and validation of the voice handicap index in Hindi. *Journal of Laryngology and Voice*. 2011; 1 (1): 12-17.

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