

# COMPARATIVE STUDY BETWEEN SUBJECTIVE AND OBJECTIVE VOICE ASSESSMENTS IN PATIENTS WITH GASTROESOPHAGEAL REFLUX DISEASE

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## INTRODUCTION

Gastroesophageal reflux disease (GERD) and Laryngopharyngeal reflux (LPR) both are interlinked.

Laryngopharyngeal reflux (LPR) refers to the backflow of stomach contents into the throat, that is, into the laryngopharynx.

Its pathological effect occurs through either direct contact between stomach content and mucosal structures or indirect vagal reflex responses elicited from the oesophagus.

LPR has pleomorphic presentation and its symptoms and signs are un-specific. The most common symptoms are dysphonia, chronic throat clearing, chronic cough, Globus sensation, dysphagia and granuloma of the vocal process.

Authors proposed that dryness; keratosis of the vibratory margin of the vocal folds, thickening of the epithelium, ulcerative lesions, granulomas and modifications of the Reinke's space would form the basis of the alteration of the vibratory function of the vocal folds and leads to dysphonia.

There are no agreed upon diagnostic criteria for LPR due to the variability of its clinical presentation, confusing sets of symptoms, and lack of reliable testing methods, as a result, it is often under diagnosed and undertreated in spite of being a very common condition.

Reflux symptoms index (RSI)and Reflux finding score (RFS) are the most popular clinical LPR tools developed for the diagnosis and the evaluation of treatment effectiveness.

Diet and lifestyle modifications are an important part of treatment in addition to PPIs for better improvement with respect to LPR symptoms and vocal affection.

## AIM OF THE WORK

- The aim of this study was to investigate the effects of GERD on voice quality.
- To compare the reliability of subjective versus objective voice assessment in diagnosing voice changes in patients with GERD..

## PATIENTS AND METHODS

**Patients:** This prospective study was carried on (60) patients, diagnosed with GERD and was assessed at the unit of Phoniatrics, ORL Department, University of Alexandria. Inclusion criteria: Adult patients. Exclusion criteria: Voice misuse or abuse, upper respiratory tract infections, addictions to tobacco, alcohol and patients with MAPLs, patients with history of laryngeal trauma, previous head and neck surgeries, presence of head and neck neoplastic disorders, neurological disorders, patients with connective tissue diseases.

Methods:

### I. Elementary diagnostic procedures:

**A.** Personal data, complaint and analysis of symptoms related to (LPR), a detailed history concerning dysphonia was recorded using voice problem self-assessment scale (VPSS)

**B. Audiory perceptual assessment (APA):** Evaluation by GRBAS scale.

**C. General examination, ENT examination.**

**D. Laryngeal examination.**

**II. Clinical diagnostic aids:** Clinical diagnoses of laryngeal pathology by video laryngostroboscopy. Reflux finding score (RFS) was used to provide a more consistent way of reporting findings.

**III. Additional instrumental diagnostic measures:**

1. Multi-Dimensional Voice Program (MDVP) software

2. Acoustic parameters used to assess voice quality were:

\* **Fundamental frequency FO**

\* **Frequency perturbation parameters**

1. Pitch Perturbation Quotient (PPQ)

2. Jitter percent (Jitt)

\* **Amplitude perturbation parameters**

1. Amplitude Perturbation Quotient (APQ) 2. Shimmer percent (Shim)

\* **Noise related parameters:** 1. Noise Harmonic Ratio (NHR)

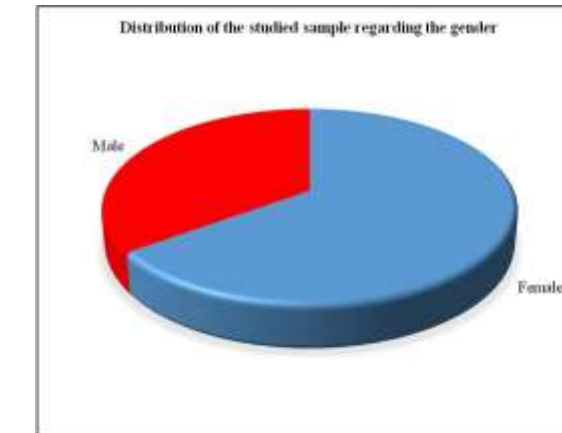
## RESULTS

**Table 1:** Relation between Acoustic measurements and different scores.

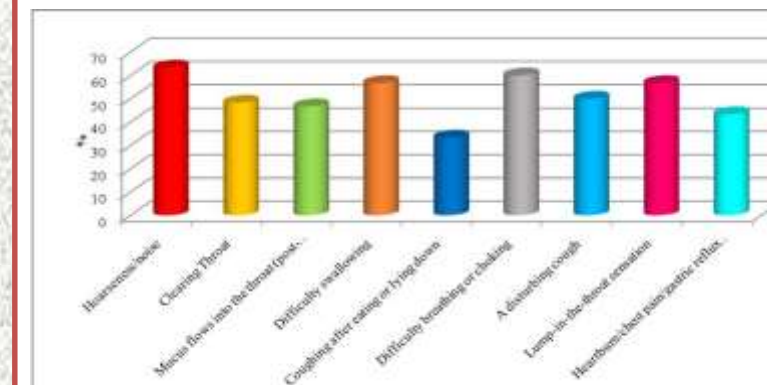
| Acoustical parameters             |         |         | GRBAS Score |           |          |        | Reflux Finding Score R | VPSS Score |
|-----------------------------------|---------|---------|-------------|-----------|----------|--------|------------------------|------------|
|                                   |         |         | Grade       | Roughness | Asthenia | Strain |                        |            |
| Fundamental frequency parameters  | Fo      | R       | 0.015       | 0.161     | 0.047    | -0.006 | 0.069                  | 0.077      |
|                                   |         | P-value | 0.911       | 0.220     | 0.722    | 0.966  | 0.599                  | 0.557      |
| Frequency perturbation parameters | PPQ     | R       | 0.168       | 0.250     | 0.151    | 0.282  | -0.052                 | 0.155      |
|                                   |         | P-value | 0.198       | 0.054     | 0.250    | 0.029* | 0.695                  | 0.238      |
|                                   | Jitter  | R       | 0.165       | 0.239     | 0.146    | 0.273  | -0.047                 | 0.180      |
|                                   |         | P-value | 0.207       | 0.066     | 0.265    | 0.035* | 0.719                  | 0.170      |
| Amplitude parameters              | APQ     | R       | 0.087       | 0.056     | 0.030    | 0.268  | 0.126                  | 0.111      |
|                                   |         | P-value | 0.507       | 0.671     | 0.822    | 0.039* | 0.338                  | 0.398      |
|                                   | Shimmer | R       | 0.080       | 0.048     | 0.028    | 0.262  | 0.130                  | 0.113      |
|                                   |         | P-value | 0.545       | 0.717     | 0.834    | 0.043* | 0.323                  | 0.391      |
| Noise related parameters          | NHR     | R       | -0.139      | 0.018     | 0.002    | 0.164  | 0.085                  | 0.518      |
|                                   |         | P-value | 0.290       | 0.894     | 0.991    | 0.211  | 0.003                  | 0.984      |

**Table 2:** Correlation between subjective tests (VPSS& GRBAS) results and objective tests results (Acoustic measurements).

| Acoustic measurements             | Correlation coefficient (r) | Correlation | Strength |
|-----------------------------------|-----------------------------|-------------|----------|
| Fundamental frequency parameters  | 0.467                       | Positive    | Moderate |
| Frequency perturbation parameters | 0.508                       | Positive    | Moderate |
| Amplitude parameters              | 0.397                       | Positive    | Moderate |
| Noise related parameters          | 0.350                       | Positive    | Moderate |



**Figure 1:** Distribution of the studied sample regarding the gender.



**Figure 2:** Distribution of studied sample according to patient's symptomatic presentation.

## CONCLUSION

- The prevalence of LPR symptoms and signs among GERD patients is high.
- The most common symptom was change of voice (63.3%) of patients.
- Subjective and objective voice quality is affected in GERD patients.
- Subjective tests (VPSS & GRBAS) are moderately good indicators for a LPR findings.
- Objective voice assessment can help to better understand voice disorders in LPR and to detect subtle voice changes which may be difficult to be detected by the usual subjective assessment.
- Subjective voice assessment is complementary to the objectives ones as they are more available, cheaper and easier to apply.