

# Voice Disorders in the General Greek Population and in Patients With Laryngopharyngeal Reflux. Prevalence and Risk Factors

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**Summary: Objectives.** To assess the prevalence of voice disorders in the general Greek population and in patients with laryngopharyngeal reflux (LPR) with the use of the reflux symptom index (RSI).

**Study Design.** Prospective epidemiological adult participant survey.

**Setting.** General Greek population.

**Method.** The validated Greek version of the RSI was used to assess the prevalence of voice disorders in the general Greek population, as well as in patients with LPR, which were diagnosed using the RSI. The RSI questionnaire was completed by 340 (183 males and 157 females) randomly selected subjects. Subjects with RSI score of >13 were considered to be LPR patients.

**Results.** The prevalence of voice disorders, which was determined by the participants giving a positive response to the field “hoarseness or a problem with your voice,” was found to be 38.5% in the general Greek population. In patients with LPR, “hoarseness or a problem with your voice” was present in 90.6%. The number of cigarettes smoked daily and the number of alcoholic drinks consumed daily, each correlated with the presence of voice disorders. No relationship was revealed between voice disorders and coexisting diseases and especially with gastroesophageal reflux disease, which was the most frequent reported disorder among peptic diseases.

**Conclusions.** The prevalence of voice disorders, determined by a positive response to the question “hoarseness or a problem with your voice,” is high (38.5%) in the general population and very high (90.6%) in patients with LPR. The number of tobacco cigarettes smoked daily and the number of alcoholic drinks consumed daily were found to be related to voice disorders.

**Key Words:** Voice disorders–Reflux symptom index–Laryngopharyngeal reflux–Gastroesophageal reflux–Reflux–Prevalence.

## INTRODUCTION

Although voice disorders seem to be very common in the general population, affecting nearly one-third of the population at some point of their life,<sup>1,2</sup> the true prevalence of the problem remains undetermined. Epidemiological studies, showing the actual size of the problem, are relatively rare, and the reported prevalence of voice disorders in the existing small number of studies shows substantial variability, ranging from 0.65% to 41.6%.<sup>3–6</sup> This variability in the reported prevalence estimates is mainly because of the different methodological approach selected by each study to define voice disorders, in addition to the differences in sample populations and sizes. The prevalence of voice disorders has been studied more extensively in certain professions, such as teachers, where the prevalence of voice disorders has been found to vary from 7% to 80%, depending on the studied groups, response rate, and the way the question was set.<sup>5,7–15</sup> Most of these studies use general population subjects as a control group, and this is a source of data regarding prevalence of voice disorders in the

general population. Roy et al<sup>1</sup> reported that 58% of teachers experience voice problems at some point during their career, compared with 29% among nonteachers.

Voice disorders are often caused by benign or self-limited conditions but may also be symptoms of serious diseases, and in these cases, early diagnosis is critical for the prognosis of the disease.

Voice disorders have significant public health consequences for the patients' quality of life and their ability to function in social or workplace settings.<sup>16,17</sup> In addition to the impact on health and quality of life, voice disorders lead to frequent health care visits with high health care cost, which is accompanied by diminished productivity because of work absenteeism.<sup>18,19</sup>

Laryngopharyngeal reflux (LPR) seems to be very common in the general population, and one of the main symptoms is hoarseness. Several tests are used to diagnose LPR with different sensitivity and specificity values. The ambulatory 24-hour pH double-probe (simultaneous esophageal and pharyngeal) pH monitoring has an acceptable sensitivity for detecting LPR and has been considered as the gold standard for LPR diagnosis. However, given the invasive nature of the time-consuming method, it is doubtful whether this method will ever become widely used, for not only epidemiological studies but also routine clinical use.

There is need for an easy, reliable, and practical method that can give comparable findings through different populations to carry out large-scale epidemiological studies on the general

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population. The development and evaluation of a standardized and validated patient-reported instrument, based mainly on self-assessment of symptoms, has the potential to facilitate or even establish an LPR diagnosis. Such a diagnostic tool could also be useful for epidemiologic studies.

The reflux symptom index (RSI) introduced by Belafsky et al<sup>20</sup> is a self-administered nine-item questionnaire designed to assess various symptoms related to LPR (Table 1). Each item is rated on a scale from 0 (no problem) to 5 (severe problem), with a maximum total score of 45, indicating the most severe symptoms. An RSI greater than 13 is considered abnormal and strongly indicative of LPR. The RSI has been compared with other LPR diagnostic methods, such as laryngoscopy and the ambulatory 24-hour pH double-probe pH monitoring, and has been proved to share similar diagnostic value.<sup>20-22</sup> In this regard, RSI can be used as an alternative tool for LPR diagnosis.

A key question of RSI is the experience of “hoarseness or other voice problems” during the previous month. Although hoarseness is a very well-defined symptom,<sup>23</sup> the term “other voice problems” is a broader one, leaving space for reporting any kind of voice complaints without specific description and thus, including a heterogeneous grouping of voice-related complaints. In addition, RSI can give information not only about the prevalence of the included items in the questionnaire but also about their severity.

Since the introduction of RSI, many studies have been conducted mainly to detect LPR prevalence, but no further analysis of the prevalence of each item included in the questionnaire has been presented.

The primary aim of this study was to assess the prevalence of voice disorders in the adult general Greek population and in patients with diagnosed LPR, using the RSI.

## MATERIALS AND METHODS

The study was carried out in the general Greek population during the period from September to November 2011. A random sample (n = 1000) of adults living in Athens was initially approached through an “alert” telephone. During the communication, the scope of the study was explained, and permission to send the questionnaire to the subjects’ address was obtained.

The random selection of the participants was made through the telephone catalog of Athens City using a table of random numbers generated for the study. Five different investigators performed the calls 10 days before sending the questionnaire. Of the 1000 approached subjects, 450 accepted to participate and provided their personal details (name and address). The envelop that was sent to the participants involved a more detailed explanation for the scope of the study, detailed instructions for filling out the questionnaires, and a prepaid envelope, so that subjects could easily send back the filled-in questionnaire, and the signed informed consent (also involved) at no cost for them.

Three hundred fifty individuals returned the questionnaires. Data related to voice disorders were gathered through the questionnaire with which information about demographic data of the participants, concomitant diseases, concurrent medication, as well as the RSI questions were acquired. The RSI questionnaire has been translated into Greek and has been validated in the Greek population.<sup>22</sup>

For the purpose of this study, voice disorders and their prevalence were detected on the basis of the response of the participants to the question “hoarseness or a problem with your voice.”

The study protocol was approved by the Scientific Committee and Review Board of Athens Speech and Language Institute. Informed consent was obtained from all participants before inclusion in the study.

## Statistical methodology

Statistical tests were performed using the SPSS statistical software. Descriptive statistics were used to summarize data for the subset of the population with voice disorders. Chi-square tests were used to compare the distribution of category variables among patients with voice disorders compared with those without voice disorders. The *t* test was used to compare continuous variables between patients with voice disorders in comparison to the rest of the population. A *P* value of <0.05 was used to determine statistical significance.

Variables of the analysis were demographic parameters, smoking and drinking habits, health background (concomitant diseases), concomitant medication, and the RSI.

**TABLE 1.**  
**Symptoms Included in the Reflux Symptom Index and Scoring**

Symptom	Score					
1. Hoarseness or a problem with your voice	0	1	2	3	4	5
2. Clearing your throat	0	1	2	3	4	5
3. Excess throat mucus or postnasal drip	0	1	2	3	4	5
4. Difficulty swallowing food, liquids, or pills	0	1	2	3	4	5
5. Coughing after you ate or after lying down	0	1	2	3	4	5
6. Breathing difficulties or choking episodes	0	1	2	3	4	5
7. Troublesome or annoying cough	0	1	2	3	4	5
8. Sensation of something sticking in your throat or a lump in your throat	0	1	2	3	4	5
9. Heartburn, chest pain, indigestion, or stomach acid coming up	0	1	2	3	4	5
Total score						

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