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CORRELATION OF THE AGE OF THE GENERAL POPULATION AND THE FREQUENCY OF LARINGOPHARYNGEAL REFLUX

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Laryngopharyngeal reflux (LPR) is the return of stomach contents through the esophagus into the pharynx and then into the larynx. The aim of the research is to determine the probability of occurrence of LPR among a typical population in relation to age, based on the presence/absence of different types of complaints specific to LPR and other related disorders. In the research, a non-experimental method was used – a self-assessment questionnaire, the "Reflux Symptom Index". The sample consists of 200 adults, divided into 2 groups according to age. The first group includes younger respondents aged 20 to 40 years, and the second group includes older respondents aged 40 to 50 years. Analysis of the research results yielded the following data: a higher percentage of the younger population shows predisposing symptoms for LPR compared to the older population. LPR is a challenging condition, as there is currently no gold standard for diagnosis or treatment, which places a burden on the healthcare system. Given the complexity of these patients and the many treatment options available, we suggest further research in this area to help clinicians more easily diagnose LPR and provide the patient with appropriate therapy.

Keywords: laryngopharyngeal reflux, age of subjects, general population, LPR symptoms, Reflux symptom index, risk factors

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KORELACIJA STAROSTI OPŠTE POPULACIJE I UČESTALOSTI LARINGOFARINGEALNOG REFLUKSA

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Laringofaringealni refluks (LPR) je vraćanje sadržaja želuca kroz jednjak u farinks, a zatim u larinks. Cilj istraživanja je da se utvrdi verovatnoća pojave LPR kod tipične populacije u odnosu na uzrast, na osnovu prisustva/odsustva različitih tipova tegoba specifičnih za LPR i druge srodne poremećaje. U istraživanju je korišćena neeksperimentalna metoda – upitnik za samoocenjivanje – „Indeks simptoma refluksa“. Uzorak se sastoji od 200 odraslih, podeljenih u 2 grupe prema starosti. Prva grupa je označena kao mladi ispitanici od 20 do 40 godina, a druga kao stariji ispitanici od 40 do 50 godina. Analizom rezultata istraživanja uviđa se da je učestalost LPR veća kod mlađe populacije. LPR je izazovno stanje, jer trenutno ne postoji zlatni standard za dijagnozu ili lečenje, što opterećuje zdravstveni sistem. S obzirom na složenost ovih pacijenata i mnoge dostupne opcije lečenja, predlažemo dalja istraživanja u ovoj oblasti kako bismo pomogli kliničarima da lakše dijagnostikuju LPR i pacijentu pruže odgovarajuću terapiju.

Ključne reči: laringofaringealni refluks, starost ispitanika, opšta populacija, simptomi LPR-a, Indeks simptoma refluksa, faktori rizika

Introduction

Laryngopharyngeal reflux (LPR) represents the return of stomach contents through the esophagus into the pharynx and then into the larynx. The mucous membrane of the pharynx and larynx is more sensitive to the effects of acidic stomach contents compared to the esophagus. The esophagus contains protective mechanisms that the larynx and pharynx do not have. The most common symptoms are: varying degrees of hoarseness, feeling of bitterness and a foreign body in the throat, frequent clearing of the throat, difficult and painful swallowing (1).

LPR is thought to be one of the most common causes of laryngeal inflammation in otolaryngologic clinics, with estimates of incidence in 20 to 30% of treatment-seeking patients with laryngeal complaints, although some authors put the incidence rate much higher (2). Symptoms of LPR can be variable as illustrated in Table 1.1. (3).

Table 1. Otolaryngologic symptoms and associations with laryngopharyngeal reflux

Symptoms	Associations
Dysphonia Globus (foreign body) sensation Chronic cough Soreness or burning in throat Throat clearing Excessive mucous production Dysphagia	Rhinosinusitis Otitis media Laryngospasm Granuloma Airway stenosis Leukoplakia Lingual tonsil hypertrophy Obstructive sleep apnea Laryngeal carcinoma

From Fried, MP, Tan M. Clinical Laryngology. 1st edition. New York: Thieme Publishers, 2014

In more severe cases of LPR, the posterior region of the larynx can become visibly edematous at the interarytenoid space, appearing as puffy translucent or white epithelium (some refer to this as “pachydermia”). Treatment typically follows three stages: behavioral and lifestyle changes, pharmaceutical management, and surgery. Behavioral and lifestyle recommendations for inhibiting reflux include modifying diet (e.g., reducing acidic and fatty foods), modifying eating patterns (e.g., no food at least 2 hours prior to sleep), and sleeping with the head elevated. A number of different drugs and drug combinations can be prescribed or recommended by the physician, including proton-pump inhibitors (e.g., Omeprazole, Lansoprazole), H₂-blockers (e.g., Ranitidine,

Famotidine), and over-the-counter antacids. It is accepted that pharmaceutical control of LPR can take months to show effect, so patients must be compliant with medication schedules. When behavioral/lifestyle modifications combined with pharmaceutical management are not effective for controlling LPR, and the diagnosis is certain, some patients may be candidates for surgical management. Currently, the most common surgical procedure for LPR is fundoplication. This surgery adds tone to the lower esophageal sphincter (LES) by twisting the fundus (entry of the stomach) around the lower esophagus (4).

GERD - gastroesophageal reflux is also often mentioned in the literature. Typical symptoms are heartburn, regurgitation (regurgitation of food), feeling of acidity and bitterness, etc. Certain differences exist in relation to LPR. Many patients diagnosed with GERD may not develop symptoms of LPR. There is a general opinion that GERD is the cause and LPR is the consequence. The first patients are treated by gastroenterologists, and the others by otorhinolaryngologists (5).

The treatment of LPR is directed in 2 directions: suppressing the inflammation of the mucous membrane of the larynx and pharynx by neutralizing stomach acid and restoring the defense against reflux. The treatment lasts a long time, and includes the use of drugs whose doses are gradually reduced until the treatment is stopped. It is also necessary for the patient to change his lifestyle - giving up alcohol, tobacco, eating smaller meals, as little spicy and salty as possible (6).

Voice disorders that are primarily common among vocal professionals, but also non-professionals, are abuse of the voice, hyperfunction of the phonation organs. Disorders prevent the efficiency of expression, and everyone reacts to them differently - from mild to moderate to deep concern. This level of concern and anxiety should definitely be taken into account in the process of vocal rehabilitation of the voice. A team of professionals participates in voice rehabilitation, and its success depends on the team's ability to build compromises and work together on the patient's long-term vocal health. Ideally, the vocal professional gains responsibility for the health of his laryngeal mechanism at the end of rehabilitation (7).

Method

The aim of the research

The aim of the research is to determine the probability of occurrence of LPR among the typical population in relation to age, and based on the presence/absence of various types of complaints that are specific to LPR and other related disorders.

Instrument

The research used a non-experimental method - self-assessment questionnaire - "Reflux symptom index". It includes 9 items with a response range from 0 (no complaints) to 5 (severe complaints). A value for the Reflux symptom index greater than 10 is considered a significant indicator of LPR.

Sample

The sample consists of 200 adults divided into two groups according to age. The first group includes younger respondents aged 20 to 40, and the second includes older respondents aged 40 to 50. The youngest participant was 20, and the oldest was 50. All respondents were patients of the Clinical Hospital Center for Ear, Nose and Throat in Zvezdara, who came for routine check-ups or for minor complaints that did not prevent participation in the study. The groups are relatively homogeneous in terms of health status, as all respondents have no history of neurological, vascular and muscular abnormalities. All participants speak Serbian as their native language and reside in the territory of the Republic of Serbia. The control variable is age, and the dependent variables are the questions from the questionnaire. Classification based on relevant habits of the respondents such as smoking status was not conducted, so a comparison of smokers and non-smokers was not performed.

The research hypothesis is: "The older population is more susceptible to the occurrence of LPR".

Table 2 shows the distribution of respondents in relation to age.

Table 2. Structure of respondents in relation to age

Age	N	%
Younger (20-40 years)	110	55%
Elderly (40-50 years old)	90	45%
Total	200	100%

The youngest respondent is 20 years old, and the oldest is 50. There are 110 (55%) younger respondents and 90 (45%) older respondents.

Research procedure

The purpose of the questionnaire was first briefly explained to the respondents, namely to rate the extent to which they had or had not had the listed symptoms associated with LPR in the last month. The questionnaire consists of several items, where each option is scored from 0 to 5, with higher values indicating a higher frequency or intensity of symptoms. Based on the results, the Reflux Symptom Index is calculated, which is used to assess the likelihood of the presence of LPR. The time required to complete the questionnaire was approximately 5 minutes.

The research was conducted between September 2023 and January 2024 at the Clinical and Hospital Center for Ear, Throat and Nose in Zvezdara. As this study was conducted as a non-clinical survey using anonymous self-reported questionnaires, formal approval from the institutional ethics committee was not required according to institutional guidelines. The research was conducted in accordance with the ethical principles for working with human participants, and all respondents provided written informed consent before completing the questionnaire.

Statistical data analysis

Statistical data processing was performed using the statistical processing package in the social sciences SPSS (SPSS, version 21.0). Descriptive and analytical statistical measures were used in statistical data processing. The frequency (number) and percentage (%) were used to evaluate the parameters related to the frequency of reflux in the subjects, and the differences in the frequency of reflux in relation to age were examined using the χ^2 test. The results are shown in the table.

Results

Frequency of LPR symptoms in the general population in relation to age

From Table 3, we see that the Reflux index has a value from 0 to 10 in 36.36% (40 respondents), from 11 to 20 in 45.45% (50 respondents), from 21 to 30 in 9.09% (10 respondent), from 31 to 45 in 9.09% (10 respondent) and from 41 to 45 in 0% (0 respondents).

Table 3 shows the number of respondents of the younger age group in relation to the value of the Reflux Index.

Table 3. Distribution of younger population in relation to the value of the Reflux Index

The value of the reflux index	Number of respondents	
	N	%
0-10	40	36,4%
11-20	50	45,4%
21-30	10	9,1%
31-40	10	9,1%
41-45	0	0%

From Table 4, we see that the Reflux Index has a value of 0 to 10 in 77.77% (70 subjects), from 11 to 20 in 11.11% (10 subject), from 21 to 30 in 11.11% (10 subject), and from 31 to 45 in 0% (0 respondents).

Table 4 shows the number of respondents in the older age group in relation to the value of the reflux index.

Table 4. Distribution of respondents of the older age group in relation to the value of the reflux index.

The value of the reflux index	Number of respondents	
	N	%
0-10	70	77,8%
11-20	10	11,1%

21-30	10	11,1%
31-40	0	0%
41 -45	0	0%

Analysis of the research results yielded the following data: a higher percentage of the younger population (63.63%) shows predisposing symptoms for LPR, compared to the older population (22.22%).

Table 5 presents the differences in the distribution of Reflux Index values between the younger and older age groups.

Table 5. Differences in Reflux Index Distribution Between Younger and Older Participants

χ^2		df	p
	43.28	3	< 0.001

The obtained result shows that there is a statistically significant difference in the distribution of Reflux Index categories between the younger and older population, that is, that the frequency of LPR symptoms differs significantly depending on the age group, which supports the claim that the prevalence of symptoms is higher in the younger population.

Discussion

The aim of this study was to determine the frequency of laryngopharyngeal reflux (LPR) in a typical population in relation to age. Our results indicate that LPR occurs more frequently in the younger population group, which is consistent with previous research reporting higher prevalence in patients aged 21–35 years, while individuals over 65 show lower incidence (8–10).

In our sample, the most common symptoms were burning in the epigastrium, chest pain, and indigestion, whereas sore throat was the least frequent. Notably, LPR symptoms were not more common in the elderly, which contrasts with some earlier studies (11). This finding is further supported by the chi-square test performed in our study, which demonstrated a highly significant

difference in the distribution of Reflux Index categories between age groups ($\chi^2 = 43.28$; $p < 0.001$), indicating that the likelihood of such a difference occurring by chance is extremely low. This strengthens the conclusion that age is an important determinant of LPR symptom burden, with markedly higher symptom expression in younger individuals.

These results align with contemporary epidemiological analyses showing a rising prevalence of LPR among younger adults, often attributed to increased stress exposure, irregular eating patterns, and lifestyle habits common in modern working populations (12-14). Studies have reported that young adults frequently demonstrate higher Reflux Symptom Index (RSI) values and more pronounced laryngoscopic findings compared to older groups, which is consistent with the symptom distribution in our data (14-15).

In addition to age, LPR symptoms were associated with asthma, allergic disorders, and work-related stress, highlighting the role of lifestyle and psychosocial factors. Recent studies (16) support these findings, showing that sociodemographic characteristics, physical activity, sleep duration, and general mental and physical health can influence LPR prevalence, reinforcing the notion that age alone is not the sole determinant. This multifactorial model of LPR etiology is compatible with current expert consensus, which recognizes LPR as a condition significantly modulated by environmental and behavioral variables rather than a disorder confined to traditional gastroesophageal risk groups (12,17).

Furthermore, our research aligns with professional surveys indicating gaps in LPR expertise: approximately 43.2% of otorhinolaryngologists consider themselves knowledgeable in managing LPR, while 37% report no experience, and 19.8% do not feel confident treating these patients (18–19). These data, combined with our findings, emphasize the need for further studies on LPR prevalence and improved professional training to enhance diagnosis and management. Given the high variability of symptom expression across age groups demonstrated in our results, better professional education could contribute to earlier recognition of atypical or age-specific symptom profiles, ultimately improving patient outcomes.

Study limitations

Participants were not stratified by smoking status, so it was not possible to compare smokers and non-smokers. However, smoking is a well-known factor that can influence the

frequency and severity of LPR symptoms. Future studies are planned to include smoking status as a variable to assess its impact in different age groups.

Also, the study did not take into account all possible socioeconomic, lifestyle, or health factors that may influence LPR, such as diet, alcohol, stress levels, physical activity, and sleep duration. Data were collected via questionnaires and relied on subjectively reported symptoms, which may introduce possible reporting error or participant bias.

Although the study provides valuable insights into the frequency of LPR symptoms in a healthy adult population, these limitations should be kept in mind when interpreting the results.

Conclusion

LPR is a challenging condition, as there is currently no gold standard for diagnosis or treatment, and thus this presents a burden to the healthcare system. Strategies for treatment of LPR are numerous. LPR is prevalent among patients attending otolaryngology clinics. Physicians should try to identify patients with risk factors and counsel them about lifestyle modifications, with an emphasis on weight reduction strategies and smoking cessation. Our study shows that LPR symptoms are more frequently reported in younger adults, highlighting age as an important factor in symptom prevalence and distribution.

Given the higher symptom burden in younger populations, clinicians should pay particular attention to early recognition in this age group, especially considering lifestyle and psychosocial risk factors such as stress, diet, and work-related pressures. A multifactorial assessment and individualized counseling approach could improve patient outcomes, as symptom presentation varies substantially across age groups and is not solely determined by chronological age.

Considering the complexity of these patients and the numerous treatment options available, further research is recommended to refine diagnostic criteria, clarify age- and lifestyle-specific risk factors, and help clinicians provide appropriate, individualized therapy for patients with LPR.

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