

Effect of Teaching Guidelines on Outcomes of Patients with Laryngopharyngeal Reflux Disease

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Abstract

Background: Laryngopharyngeal reflux (LPR) is referred to the supra-esophageal reflux. It describes a condition where stomach contents flow backward into the esophagus, impacting the aerodigestive tract and causing symptoms in the throat, particularly in the laryngopharynx. **Aim:** The study aimed to evaluate the effect of teaching guidelines on outcomes of patients with laryngopharyngeal reflux disease. **Design:** A quasi experimental research design (pre /post) test design. **Settings:** The current research was carried out in the Ear, Nose and Throat Department (ENT) and ENT outpatient clinic at Benha University Hospital, Qaliobia, Egypt. **Subjects:** A purposive sample of 100 adult patients with laryngopharyngeal reflux disease. The study employs four data collection tools. They were structured interview questionnaire, patients' attitude assessment sheet, and patients' self-reported practices assessment sheet, and physical symptoms assessment sheet. **Results:** reveals that 58.0% of the patient had average knowledge level before teaching guidelines implementation. However, 92.0% of them had good knowledge one month after guidelines implementation, which declined to 60.0% at follow up phase. Regarding patients' attitude, highly statistically significant differences were revealed between attitude items through the three study phases at $p < 0.001$. Also, the overall mean score of reported practices was 52.58 ± 5.01 pre teaching guidelines implementation, which increased to 92.83 ± 3.23 and 92.95 ± 2.24 post one month and at follow up respectively. Regarding physical symptoms, there were statistically, and highly statistically significant differences for all physical symptoms throughout the three study phases at $p < 0.001$. **Conclusion:** Implementing teaching guidelines for patients with LPR disease has a positive effect in improving knowledge, attitude, self-reported practices and reduce severity of physical symptoms. **Recommendation:** Activate the role of nurse as educator to teach patients with LPR about lifestyle modifications and its positive effect on improving patients' physical outcomes.

Keywords: Laryngopharyngeal Reflux Disease, Teaching Guidelines and Outcomes

Introduction

Laryngopharyngeal reflux (LPR) is an inflammatory condition that affects the upper aerodigestive tract, resulting from the direct and indirect effects of refluxed contents from the stomach and duodenum. Reflux tends to rise further into the larynx and pharynx, leading to structural abnormalities in the upper part of aerodigestive tract, including areas like the nasopharynx, oropharynx, laryngopharynx, and larynx. Typical LPR symptoms comprise excessive mucus production, hoarseness, throat clearing frequently, a persistent cough, a lump sensation in the throat (globus sensation), postnasal drip, and a sore throat, among others (Wu et al., 2022).

Causes of laryngopharyngeal reflux occurs in condition that allow stomach contents to flow back into the esophagus include disorders like a hiatus hernia, elevated abdominal pressure, smoking, the use of antihistamines, and obesity. Without proper treatment, individuals with LPR may experience extended periods of discomfort. An otolaryngologist typically diagnoses LPR through listening to patients' symptoms, larynx endoscopy, upper gastrointestinal endoscopy and PH testing to determine signs of inflammation or tissue damage or any complications occurred (Xiao, et al., 2022).

Managing LPR involves using acid-suppressing medications like proton pump inhibitors (PPIs), adopting dietary adjustments, and making lifestyle changes such as losing weight, stopping smoking, quitting alcohol,

refraining from eating before bedtime, and limiting foods like chocolate, caffeine, carbonated drinks, fatty foods, and tomato-based products. LPR can contribute to various laryngeal conditions, including reflux laryngitis, vocal cord lesions, subglottic stenosis, silent aspiration, bronchial inflammation, laryngeal cancer, contact ulcers, granulomas, and vocal nodules (Krause et al., 2022).

Patient education in form of teaching guidelines has proved beneficial in several chronic diseases; so, it is recommended to use teaching guidelines in laryngopharyngeal reflux disease that promotes health and reduce symptoms if patients followed the instructions. Targeted educational interventions through understanding what contents and methods are most suitable with regard to patient learning is very important that enhancing knowledge, practice, attitude, and physical symptoms for managing of LPR and improving the patients' quality of life (Zhang, et al., 2023)

Patients' outcomes are the results for the patients receiving care as physical signs, knowledge, attitude, and patients' practices or any other important tests. Use of patient-reported outcomes by nurses is an essential aspect for improving clinical care, because it will lead to an understanding of the effects of treatments on outcomes and improving patients' knowledge, attitude, practices and signs and symptoms regarding their diseases, so it is important to provide teaching guidelines to laryngopharyngeal reflux patients to use their healthy habits through their life (Junaid, et al., 2020).

Significance of the study

Laryngopharyngeal reflux disorder (LPR) is an increasingly prevalent condition worldwide, affecting approximately 5% to 30% of the general population. Its prevalence is higher in specialized settings, reaching up to 30% in otolaryngology departments and 50% in laryngology clinics. Regional data show that LPR symptoms are reported in 32.0% of Europeans, 12.5% of North Americans, 26.2% of South Americans, 15.7% of East Asians and Oceanians, and between 24.5% and 88.4% of Africans. Given the large number of individuals affected and the significant impact of LPR on health, greater efforts are needed to improve treatment approaches, manage physical symptoms effectively, and enhance patients' quality of life (Lechien et al., 2021).

One Egyptian study revealed that the most common clinical symptoms of LPR included halitosis and chronic cough in 76% of patients, sensation of postnasal discharge in 56%, and laryngeal pain in 40%. Additional symptoms observed were dysphonia, mild cervical dysphagia, hoarseness of voice, non-productive frequent sense of throat clearing, excessive mucus production, and sialorrhea, each affecting 20% of patients. Laryngoscopic examination showed abnormal findings, such as mucosal hyperemia and inflammation, in 16% of the cases (Sabry et al., 2021).

At Benha University Hospital, there are no published statistics on the incidence of LPR, but it is noticeable increase the number of LPR patients that reach up to 10% of cases in otolaryngology departments and outpatient diagnosed with laryngopharyngeal reflux disease and there is many health problems accompanied with LPR patients in that endure prolonged symptoms that may lead to severe complications if not treated properly, Thus, this study aimed to assess the impact of implementing teaching guidelines on the outcomes of patients diagnosed with laryngopharyngeal reflux disease.

Aim of the study:

The aim of this study is to evaluate the effect of teaching guidelines on outcomes of patients with laryngopharyngeal reflux disease

Operational definition:

Outcomes: Patients' outcomes in the current study refers to patients' knowledge, self-reported practices, attitude, and physical symptoms of LPR.

Research Hypotheses

H1: The knowledge levels of patients with laryngopharyngeal disease will significantly improve following the application of the teaching guidelines compared to their levels beforehand.

H2: Patients' attitudes will show significant improvement after the teaching guidelines are implemented compared to before.

H3: Patients' self-reported practices will exhibit enhancement after the implementation of teaching guidelines compared to prior to their implementation.

H4: Severity of physical symptoms of LPR disease will be reduced after teaching guidelines implementation compared to before.

Subject and Method

Research Design:

A quasi-experimental (pre/post-intervention) design was employed to fulfill the objectives of the this study.

Settings: The study was implemented in the Ear, Nose, and Throat Department and Outpatient Clinic, Benha University Hospital, located in Qalyubia, Egypt.

Subjects:

Purposive sample of (100) patients with laryngopharyngeal reflux disease who are presenting in the above-mentioned settings from both genders.

Sample size:

Stephen Thompson's equation was used to determine the required size of the sample. The equation used is as follows:

$$n = \frac{N \times p (1-p)}{((N-1) \times (d^2 + z^2)) + p (1-p)}$$

N represents the size of the population, which is 280.

p denotes the proportion, with a neutral value of 0.12.

d is the margin of error, set at 0.05.

z corresponds to the standard value for the confidence level, which is 1.96. Based on these parameters, the total sample size required is 100 patients.

The study included patients who were enrolled over a period of five months, from June to November 2024, sticking to the following inclusion criteria: They were adult individuals of both genders with confirmed diagnosis of LPR disease, aged between 20 and 60 years, capable of communication, and accept particularization in the study. Individuals with chronic sinusitis and chronic tonsillitis, laryngopharyngeal malignancy or refused to participate were excluded.

Tools of data collection:

Tool I: Structured Interviewing Questionnaire for Patients with LPR disease. It was designed by the researchers based on Ahmed and Khalil (2021), Wang et al. (2022), Zhang et al. (2023) Abohelaibah et al. (2024) to evaluate patients' knowledge of

laryngopharyngeal reflux disorder. It includes the subsequent parts

Part I: Patients' demographic features: It aimed to identify the patients' demographic characteristics, and comprises six questions such as patients' age, their gender, their place of residence, their level of education, their occupation, and their marital status.

Part II concerned with the assessment of patients' medical data, it comprises five questions related to onset of diagnosis, chronic diseases, previous surgery, smoking and family history of LPR disease.

Part III: Patients' Knowledge Assessment Questionnaire: It used to assess patients' knowledge relevant to LPR disease. It included fifteen multiple choice questions as definition of LPR disease, causes, precipitating factors, symptoms of LPR, diagnostic methods, preventive methods, foods and drinks that stimulate LPR symptoms, foods inhibit LPR symptoms, pharmacological and surgical treatment of LPR, period of treatment and complications.

Scoring System of Patients' Knowledge:

Each knowledge item was graded as one grade for each correct answer and zero grade for incorrect answer. Overall knowledge score was 15 which was summated and converted into percentages and classified into three levels:

- <50 of the total score was considered poor knowledge level,
- ≥ 50 - <75% was considered average knowledge level
- ≥ 75 % was concerned a good level of knowledge

Tool II: Patients' Attitude assessment sheet:

Krause et al., (2022); Zhang, et al., (2023) developed it and was adopted to achieve the aim of this study. It included eight items aimed to assess patients' attitude toward laryngopharyngeal reflux disease.

Scoring System of Patients' Attitude:

The attitude dimensions were assessed against five-point Likert scale, where answers ranged from very positive (5 scores) to very negative (1 score), with options including strongly agree (5 scores), agree (4 scores), neutral (3 scores), disagree (2 scores), and strongly disagree (1 score).

Tool III: Patients' self-reported practices assessment sheet:

This tool was adapted from **Wang et al. (2022); Chen et al. (2023)** to assess patients' self-reported practices towards laryngopharyngeal reflux disease. It included (23) questions related to medication compliance (2 questions), nutrition (8 questions), drinks (2 questions), exercises (2 questions), speaking (1 question), sleep (2

questions), clothing (1 question), fatigue and stress reduction (2 questions) smoking (1 question), weight loss (1 question) and raise awareness about preventive measures of LPR (1 question).

Scoring system: The dimensions of self-reported practices were measured by means of a five-point Likert scale, with patients' responses graded from very positive (5 scores) to very negative (1 score), including strongly agree (5 scores), agree (4 scores), neutral (3 scores), disagree (2 scores), and strongly disagree (1 score).

Tool IV: Physical symptoms assessment sheet:

This tool was adapted from **Junaid et al. (2020); Lechien et al. (2021)**. It aimed to assess severity of physical symptoms accompanying LPR disease. It involved nine symptoms as (hoarseness, lump stuck feeling in patient's throat, throat clearing, difficulty swallowing, chronic sore throat, excessive mucus, chronic cough, postnasal drip and frequent upper respiratory infections).

Symptom severity assessment has four-point Likert scale ranging from severe (3), moderate (2), mild (1), and never (0).

The researcher created the teaching guidelines based on a thorough review of recent literature and credible scientific resources.

Method

Administrative Design:

Authorization was approved by the Dean of the Faculty of Nursing, Benha University and the Director of the ENT Department at Benha University Hospital. A formal letter from the Faculty of Nursing Dean was provided, detailing the study's objectives and the data collection methods.

Ethical Considerations:

Study conduction approval was secured from Scientific Research and Ethics Committee of the Faculty of Nursing before commencing the research (work code: **REC-MSN-P68**). The researchers elucidated the study's aim and objectives to the patients before collecting data and obtained their informed consent. They assured patients of their right to anonymity and confidentiality and emphasized that participation was voluntary, allowing patients the freedom to leave the study at any time.

Preparation of the Tool:

The tools were developed after an extensive review of literature related to the study's scope and were refined based on guidance from supervisors and feedback from experts. Teaching guidelines were created based on the initial patient assessment and translated into Arabic. Researchers familiarized themselves with the study setting and its personnel during this phase.

Tool Validity and Reliability:

The content and face validity of the tools were assessed by a panel of three specialist: Two from the medical-surgical nursing department at the Faculty of Nursing, Benha University, and one from the ENT Department at Benha University Hospital.

The specialists assessed the tools for comprehensiveness, relevance, clearness, simplicity, and pertinence. Reliability was verified using the Cronbach alpha test, yielding scores of 0.855 for the structured interview questionnaire, 0.789 for the patients' attitude assessment sheet, 0.985 for patients' self-reported practices, and 0.789 for the physical symptom assessment sheet.

Pilot Study:

A preliminary pilot study involving ten percent of the participants (10 patients) was conducted to examine the clarity and relevance of the tools and to evaluate the feasibility of the fieldwork and identify potential challenges that could hinder data collection. No changes were necessary, so the sample of the pilot study was encompassed in the final sample.

Field work:

Data for this study were gathered over a five-months, from June to November 2024, in line with the study setting's schedule. The researchers went to the ENT department and outpatient clinic three times a week—on Sunday, Tuesday, and Thursday—during both the morning and afternoon shifts.

Prior to data collection, each patient was warmly greeted and informed about the study's title, objectives, tools, methodology, and expected outcomes. This information was provided to secure their consent and cooperation, which were essential for the study's success. The research was conducted in four distinct phases:

Assessment phase:

After obtaining patients' consent for participation, data collection commenced. The researchers completed the questionnaire forms for each patient individually to assess their knowledge by means of (tool I part 3) associated with their demographic characteristic (part 1) and medical history (part 2). In addition to the researchers gather data related to patients; attitude and self -practices toward LPR disease using tool (II&III). Then assess physical symptoms using (tool IV). It took about 40–45minutes for each patient. Around (2:3) patients were organized daily by the researchers.

Planning phase:

After completing the initial assessment, teaching guidelines were created and tailored to address each patient's unique learning needs. A teaching plan was then organized by the researchers, including both general and specific objectives, as outlined below:

General objective:

The teaching guidelines aimed to enhance knowledge, attitude, and practices and decrease symptom severity among patients with LPR disease.

Specific objectives:

At the end of teaching guidelines implementation, the patients with LPR disease should be able to:

- 1- Define laryngopharyngeal reflex disease.
- 2- List LPR disease risk factors.
- 3- Mention signs and symptoms of LPR disease.
- 4- List diagnostic methods of LPR.
- 5- Recognize preventive methods of LPR disease.
- 6- Mention foods and drinks that stimulate LPR symptoms and foods inhibit LPR symptoms.
- 7- Identify pharmacological and surgical treatment of LPR.
- 8- Enumerate complication of LPR disease.
- 9- Discuss lifestyle changes and home remedies.

The teaching guidelines booklet was prepared based on recent literature and revised following feedback from experts to ensure accuracy and relevance. It was implemented using a variety of educational methods, including explanations and interactive group discussions. Resources and facilities for the guidelines were provided as printed materials, along with a designated session location that met the learners' needs. The researchers collaborated with the patients to schedule session timings.

Implementation phase:

This phase involved delivering two educational sessions on LPR disease to the patient group, scheduled according to their agreed-upon availability. Each session lasted approximately 45 to 60 minutes. These sessions were conducted in training room in ENT department at Benha university hospital and outpatient clinic.

Contents of each session:-**> First Session (Introductory Session):**

This session focused on introducing the purpose and significance of the teaching guidelines, along with providing knowledge about the definition of the condition, causes, precipitating factors, symptoms and signs of LPR, diagnostic methods, preventive methods, foods and drinks that stimulate LPR symptoms, foods inhibit LPR symptoms, pharmacological and surgical treatment, and complication of LPR.

> 2nd session: included information about:

Lifestyle changes, healthy dietary intake, physical activities, and controlling of symptoms.

Each session began with a brief recap of the previous session. Then, an outline of the sessions' objectives was provided. The sessions were conducted in Arabic, tailored to match the patients' educational levels. Reinforcement and motivation techniques were employed to encourage active participation in the study. Patients were encouraged to ask questions and share their insights throughout the sessions. Each session concluded with a summarization of the key points, and participants' feedback was gathered to ensure they had gained maximum benefit.

- Various teaching and learning techniques were employed as: lecture of simplified instruction followed by discussion. Media for teaching included: booklet and pictures. An illustrative booklet was provided to each patient as a resource to reinforce and review the teaching material.

- At the conclusion of the sessions, patients were informed by the researchers that they would be assessed.

Evaluation Phase:

Assessing the impact of the teaching guidelines on the outcomes for adult patients with laryngopharyngeal reflux disorder. Each patient was evaluated two times: The first evaluation post one month and the second evaluation was done post three months of teaching guidelines implementation.

Data analysis:

The data were introduced into a computer and analyzed using IBM SPSS software version 21.0 (Armonk, NY: IBM Corp). Qualitative data were presented in terms of frequencies and percentages, while quantitative data were summarized using the mean and standard deviation. The correlation coefficient (r) test was used to assess the relationship between study variables. Statistical significance was assessed as follows: a p -value greater than 0.05 was considered nonsignificant, a p -value of 0.05 or less was considered significant, and a p -value less than 0.01 was considered highly significant.

Results

Table 1 reveals the LPR patients demographic features, it demonstrates that 48.0% of patients were in the age category from 41-50 years with mean 40.23 ± 7.07 , 53.0% of them were males as well as 70.0% live in rural areas. 60.0% of them had secondary education and 72.0% were workers also, 78.0% were married.

Table (2) displays medical history of the patients. The table shows that 63.0% of the patients were diagnosed with LPR from 1-3 years, 81.0 % of them did not suffer from chronic diseases, 16.0 % had previous surgery as tonsillectomy among 68.7% of them. Also,

50.0% of them were currently smokers, 22.0% of them had family history of LPR.

Table (3) shows the distribution of patients' knowledge about laryngopharyngeal reflux disease (LPR) before, after, and at the three-month follow-up of teaching guidelines implementation. Prior to the implementation, 27.0%, 33.0%, and 32.0% of patients correctly answered questions regarding the definition of LPR, its precipitating factors, and drinks that trigger LPR symptoms, respectively. After one month of implementing the teaching guidelines, these percentages increased to 94.0%, 94.0%, and 91.0%. However, a slight decline in these results was observed at the three-month follow-up. Additionally, highly significant differences were detected in knowledge across all items throughout the three study phases ($p < 0.001$).

Figure (1) compares the overall patients' knowledge levels about LPR before, after, and at the follow-up. It shows that 58.0% of patients had an average knowledge level before the application of the teaching guidelines. One month after the guidelines were implemented, 92.0% of patients had good knowledge, although this dropped to 60.0% at the follow-up.

Table (4) shows studied patients' attitude regarding LPR disease before, after, and at three months follow up teaching guidelines application. It illustrates that pre teaching guidelines implementation, 54.0% of patients strongly disagreed with the propositions that laryngopharyngeal reflux disease needs vigilance and prevention. The symptoms suspected to be related to laryngopharyngeal reflux should be carefully considered to exclude the possibility of more serious underlying conditions and they were willing to reduce weight and fat which reflect a negative attitude, while after one month, and at follow up (51.0%, 50.0%, and 45.0%) and (56.0%, 57.0%, and 48.0%) respectively of patients respond to these items with agree which reflect a positive attitude evidenced by highly statistically significant differences between all attitude variables throughout the three study phases at $p < 0.001$.

Table (5) displays the mean scores of patients' reported practices related to LPR disease before, after, and at the follow-up of teaching guidelines implementation. The overall mean score of reported practices was 52.58 ± 5.01 before the implementation of the teaching guidelines. This increased to 92.83 ± 3.23 one month after implementation and slightly improved to 92.95 ± 2.24 at the follow-up. Furthermore, highly statistically significant differences were detected for all reported practices throughout the three program phases at $p < 0.001$.

Table (6) presents the correlation coefficients between patients' knowledge, reported practices, and attitude after and at the follow-up of teaching guidelines implementation. It shows a positive and highly statistically significant correlation between patients' knowledge and reported practice at both post-implementation and follow-up stages. Additionally, a positive and statistically significant correlation was

revealed between patients' knowledge and attitude, as well as between reported practice and attitude, ($p<0.05$).

Table (7) illustrates the comparison of the studied patients based on the severity of physical symptoms before, after, and at the follow-up of teaching guidelines implementation. It shows that the most severe symptoms which patients suffer from at pre teaching guidelines implementation were (hoarseness, throat clearing, chronic sore throat and mucus with percentage of 36.0%, 48.0%, 37.0%, and 35.0% respectively. While these percentages

decreased post one month and at follow up to (3.0%, 22.0%, 14.0%, and 4.0%), (0.0%, 12.0%, 6.0% and 0.0%) respectively with statistically and highly statistically significant differences between all physical symptoms throughout the three program phases ($p<0.001$).

Table (1): Frequency and percentage distribution of the studied patients demographic features (n=100).

Variables	Class	N	%
Age	20-30	9	9
	31- 40	37	37
	41-50	48	48
	51-60	6	6
X ± SD		40.23 ± 7.07	
Gender	-Male	53	53
	-Female	47	47
Residence	-Rural	70	70
	-Urban	30	30
Level of education	-Read and write	9	9
	-Secondary	60	60
	-University	31	31
Occupation	-Not work	28	28
	-Work	72	72
Marital status	-Single	15	15
	-Married	78	78
	-Widow	7	7

Table (2): Frequency and percentage distribution of the studied patients' medical characteristics (n=100).

Variables	Class	N	%
Onset of diagnosis	<1 years	22	22
	1-3years	63	63
	>3 years	15	15
Suffering from Chronic diseases	Yes	19	19
	No	81	81
If yes (no=19)	-hypertension	12	63.2
	Diabetes	5	26.3
	Cardiac	2	10.5
Previous surgery	Yes	16	16
	No	84	84
If yes (no=16)	Vocal cord syrgery	1	6.3
	Tonsillectomy	11	68.7
	Thyroidectomy	4	25
Smoking	-yes	50	50
	No	50	50
Family history of LPR	yes	23	22
	No	82	78

Table (3) Comparison of patients 'knowledge about laryngopharyngeal reflux disease (LPR) the teaching guidelines implementation phases (n=100).

Items	pre teaching guidelines implementation				Post teaching guidelines implementation(post one month)				follow up (post 3 months)				χ^2 1 (P 1)	χ^2 2 (P 2)
	correct		Incorrect		correct		incorrect		Correct		incorrect			
	No	%	No	%	No	%	No	%	No	%	No	%		
Definition of LPR	27	27	73	73	94	94	6	6	91	91	9	9	93.22 0.000**	84.66 0.000**
Cause of LPR	36	36	64	64	96	96	4	4	91	91	9	9	80.21 0.000**	65.25 0.000**
Precipitating factors of LPR	33	33	67	67	94	94	6	6	86	86	14	14	80.27 0.000**	58.28 0.000**
Risk factors of LPR	61	61	39	39	97	97	3	3	92	92	8	8	28.91 0.000**	26.72 0.000**
Symptoms of LPR	59	59	41	41	90	90	10	10	87	87	13	13	25.29 0.000**	19.88 0.000**
Diagnostic methods of LPR	68	68	32	32	87	87	13	13	82	82	18	18	10.35 0.001*	5.22 0.03*
Preventive methods of of LPR	63	63	37	37	87	87	13	13	84	84	16	16	15.36 0.000**	11.32 0.001*
Foods that stimulate of LPR	61	61	39	39	86	86	14	14	88	88	12	12	16.04 0.000**	19.18 0.000**
Foods that inhibit acidity of stomach	42	42	58	58	93	93	7	7	77	77	23	23	59.28 0.000**	25.41 0.000**
Foods that inhibit LPR	37	37	63	63	90	90	10	10	79	79	21	21	60.59 0.000**	36.20 0.000**
Drinks stimulate of LPR	32	32	68	68	91	91	9	9	75	75	25	25	73.50 0.000**	37.16 0.000**
Pharmacological tratment of LPR	63	63	37	37	86	86	14	14	75	75	25	25	13.92 0.000**	3.36 0.04*
Surgery LPR	57	57	43	43	92	92	8	8	79	79	21	21	32.24 0.000**	11.12 0.001*
Period of treatment	62	62	38	38	89	89	11	11	83	83	17	17	19.70 0.000**	11.060 0.001*
Complications of LPR	62	62	38	38	95	95	5	5	79	79	21	21	32.26 0.000**	6.94 0.01*

χ^2 1(P 1) between pre and post one month implementation

χ^2 2(P 2) between pre and follow up (3 months)

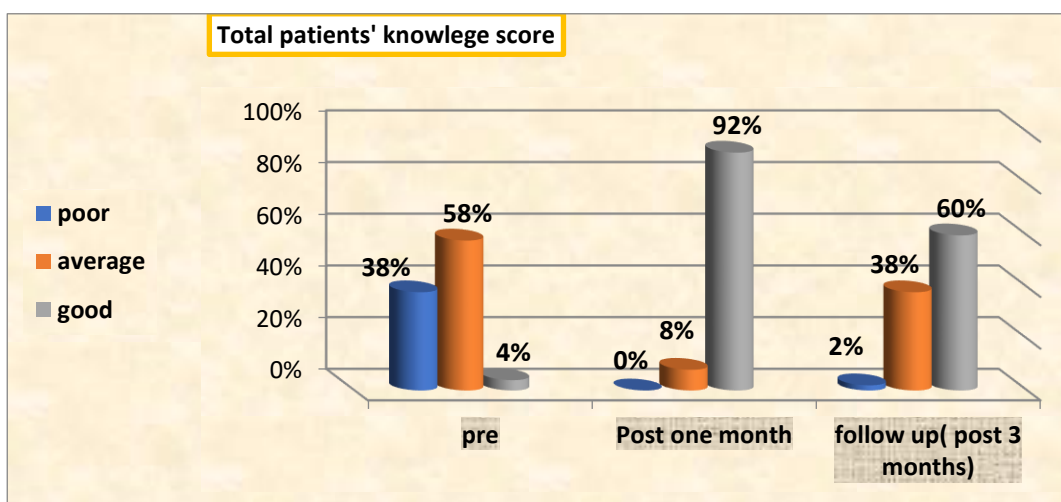


Figure (1): comparison of studied patients' total knowledge level about LPR throughout the teaching guidelines implementation phases (n=100).

Table (4): Comparison of the studied patients 'attitude regarding LPR disease throughout the teaching guidelines implementation phases (n=100)

Attitude	pre teaching guidelines implementation					post teaching guidelines implementation(post one month)					follow up (post 3 months)					χ^2 1 (P 1)	χ^2 2 (P 2)
	Strongly disagree	Disagree	Neutrality	Agree	Strongly agree	Strongly disagree	Disagree	Neutrality	Agree	Strongly agree	Strongly disagree	Disagree	Neutrality	Agree	Strongly agree		
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%		
Laryngopharyngeal reflux is inconsequential and does not impact normal life.	0	10	65	20	5	44	44	12	0	0	57	34	9	0	0	126.88 0.000**	137.49 0.000**
Laryngopharyngeal reflux disease needs vigilance and prevention.	54	25	13	6	2	0	0	17	51	32	1	0	9	56	34	141.53 0.000**	145.56 0.000**
There is a significant gap in understanding the causes, triggers, risks, and treatment of laryngopharyngeal reflux.	7	24	42	16	11	54	30	16	0	0	52	36	12	0	0	75.53 0.000**	80.38 0.000**
The potential symptoms of laryngopharyngeal reflux should be evaluated to exclude other, more severe conditions.	54	25	13	6	2	0	0	22	50	28	1	0	6	57	36	138.41 0.000**	150.35 0.000**
Managing laryngopharyngeal reflux requires more than just medication; it also involves dietary changes and lifestyle adjustments.	0	10	63	20	7	0	0	23	45	32	0	0	9	39	52	54.26 0.000**	90.94 0.000**
It is essential to adhere to the doctor's recommendations and take medication consistently.	7	22	42	18	11	0	0	5	49	46	0	0	1	35	64	93.96 0.000**	110.99 0.000**
I am hesitant to stop smoking due to laryngopharyngeal reflux.	0	7	61	24	8	43	44	13	0	0	53	36	11	0	0	132.97 0.000**	139.28 0.000**
I am open to losing weight and reducing body fat.	54	25	13	6	2	0	0	18	45	37	1	0	11	48	40	141.04 0.000**	143.28 0.000**

χ^2 1(P 1) between pre and post one month implementation , χ^2 2(P 2) between pre and follow up (3 months) , highly significance** (P<0.001) .

Table (5): Comparison of patients' reported practices related to LPR disease pre and post and follow up teaching guidelines implementation (n=100)

Reported practices	Pre	Post (post one month)	Follow up (post 3 months)	T1 P1	T2 P2
	Mean ± SD.	Mean ± SD.	Mean ± SD.		
1-I actively treat laryngopharyngeal reflux.	2.26±0.97	3.80±0.75	3.83±0.79	-12.543(<0.001*)	-12.53(<0.001*)
2- I consume little to no strong coffee, tea, or soda.	2.18±0.96	3.53±0.70	3.34±0.64	-11.28(<0.001*)	-12.55
3-I avoid rich spicy, fat and acidic foods	2.36±1.03	4.06±0.70	3.52±0.75	-13.51(<0.001*)	-11.35(<0.001*)
4- I have adopted the habit of eating small, frequent meals and remaining upright after eating.	2.45±1.01	4.09±0.73	4.30±0.70	-13.02(<0.001*)	-14.94(<0.001*)
5-I avoid excessive burping by eating slowly	2.05±0.78	4.41±0.58	4.49±0.50	-24.09(<0.001*)	-26.21(<0.001*)
6-I eat hot lunch instead of a hot dinner	2.17±0.96	3.88±0.65	3.86±0.65	-14.68(<0.001*)	-14.51(<0.001*)
7-I eat yogurt or milk with each meal	2.22±1.03	3.77±0.96	3.75±0.96	-10.99(<0.001*)	-10.82(<0.001*)
8-I shouldn't lying down after eating	2.33±0.95	3.88±0.68	3.89±0.72	-13.19(<0.001*)	-13.03(<0.001*)
9-I shouldn't exercising after eating	2.88±1.10	4.06±0.73	4.05±0.77	-8.89(<0.001*)	-8.69(<0.001*)
10-I develop the habit of exercising a small amount 30 minutes daily.	2.29±0.67	4.74±0.44	4.75±0.43	-24.90(<0.001*)	-25.06(<0.001*)
11-Wearing loose clothes or avoid belts around abdomen	1.97±0.67	3.86±0.65	3.88±0.70	-20.16(<0.001*)	-19.65(<0.001*)
12- I maintain the habit of fasting for 2–3 hours before going to bed.	2.37±1.22	3.75±0.62	3.68±0.56	-10.01(<0.001*)	-9.68(<0.001*)
13-I take care to avoid staying up late.	2.38±0.95	3.62±0.82	3.67±0.80	-9.84(<0.001*)	-10.35(<0.001*)
14-I raise the head of bed during sleep about 4 to 6 inches to reduce reflux during sleep	2.37±1.07	3.99±0.75	4.13±0.76	-10.04(<0.001*)	-11.09(<0.001*)
15-I take care to avoid overworking.	2.04±0.76	4.23±0.76	4.36±0.59	-20.27(<0.001*)	-25.95(<0.001*)
16- I engage in activities that help reduce life's stress.	2.33±1.18	4.53±0.62	4.29±0.71	-16.36(<0.001*)	-14.12(<0.001*)
17-I pay attention to quitting smoking.	2.38±1.03	3.51±0.67	3.48±0.70	-9.16(<0.001*)	-8.80(<0.001*)
18-I pay attention to lose body weight	1.88±0.68	4.52±0.67	4.46±0.65	-28.74(<0.001*)	-27.15(<0.001*)
19-I use voice gently through avoiding speaking for long periods	2.35±1.06	4.52±0.59	4.40±0.64	-17.76(<0.001*)	-16.08(<0.001*)
20-I stay hydrated by Drinking lots of water at least 12 glasses of water daily.	2.36±0.97	4.07±0.71	4.16±0.7	-14.10(<0.001*)	-14.90(<0.001*)
21-I try chewing gum to increase saliva and neutralize acid.	2.34±0.95	3.73±0.87	3.54±0.67	-10.82(<0.001*)	-10.26(<0.001*)
22-I avoid certain drugs as (non-steroidal anti-inflammatory drugs, corticosteroids, aspirin, progesterone.)	1.91±0.72	4.01±0.81	4.23±0.78	-19.30(<0.001*)	-21.62(<0.001*)
23- I promote awareness about the treatment and prevention of laryngopharyngeal reflux through chat groups, online platforms, public science lectures, and other means.	2.41±1.07	4.26±0.81	4.29±0.82	-13.85(<0.001*)	-13.91(<0.001*)
TOTAL PRACTICES SCORE	52.58±5.01	92.83±3.23	92.95±2.24	-66.85(<0.001*)	-73.39(<0.001*)

t₁(P 1) between pre and post one month implementationt₂(P 2) between pre and follow up (3 months)

Table 6) Correlation between patients' knowledge, attitude and reported practices post and follow up teaching guideline implementation

Correlation	r	P-value
Knowledge with practice		
Post implementation	0.202	0.04*
follow implementation	0.303	0.002**
Knowledge with attitude		
Post implementation	0.261	0.009**
follow implementation	0.222	0.026*
Practice with attitude		
Post implementation	0.273	0.006**
follow implementation	0.199	0.047*

Table (7): Comparison of the studied patients regarding severity of physical symptoms throughout the teaching guidelines implementation phases (n=100).

Physical symptoms	Pre teaching guidelines	After one month	After three months	$\chi^2 1$ (P 1)	$\chi^2 2$ (P 2)
	%	%	%		
Hoarseness				41.40	58.75
- Never	13	19	26	0.000**	0.000**
- Mild	16	43	49		
- Moderate	35	35	25		
- Sever	36	3	0		
Feeling of a lump stuck in throat	9	13	22	10.93	33.36
- Never	13	29	35	0.012*	0.000**
- Mild	55	48	42		
- Moderate	22	10	1		
- Sever					
Throat clearing				18.27	37.03
- Never	8	19	26	0.000**	0.000**
- Mild	12	24	27		
- Moderate	32	35	35		
- Sever	48	22	12		
Difficulty swallowing				9.91	34.85
- Never	9	12	26	0.012*	0.000**
- Mild	18	27	39		
- Moderate	48	52	31		
- Sever	25	9	4		
Chronic sore throat.				24.06	47.78
- Never	1	15	26	0.000**	0.000**
- Mild	14	21	32		
- Moderate	48	50	45		
- Sever	37	14	6		
Excessive mucus				46.22	37.16
- Never	3	16	22	0.000**	0.000**
- Mild	7	28	38		
- Moderate	55	52	40		
- Sever	35	4	0		
Chronic cough.				17.21	32.42
- Never	7	12	16	0.001*	0.000**
- Mild	10	24	36		
- Moderate	58	57	42		
- Sever	25	7	6		
Postnasal drip.				13.07	28.54
- Never	1	8	13	0.004*	0.000**
- Mild	18	20	30		
- Moderate	48	57	49		
- Sever	33	19	8		
Frequent upper respiratory infections.				16.38	49.04
- Never	7	15	32	0.001*	0.000**
- Mild	14	24	30		
- Moderate	48	51	36		
- Sever	31	10	2		

Discussion

One of the inflammatory disorders to the upper airways is the Laryngopharyngeal reflux (LPR) that is produced by the regurgitation of gastroduodenal contents, including gas and/or liquid, to the upper airway mucosa, leading to effects on the glottis and vocal cords. Manifestations of LPR comprises hoarseness of voice, chronic throat clearing to heartburn, globus sensation, and food regurgitation (**Mahmoud et al., 2021**).

The current study reveals that fewer than half of the patients were between the ages of 41 and 50, with a mean age of 40.23 ± 7.07 . This finding may be linked to the fact that reflux disease is more common in middle-aged and older adults than in younger individuals. This result is corresponded with study of **Alghamdi et al. (2016)**, who reported that over half of the participants in their study on laryngopharyngeal reflux diseases (LPRD) prevalence among male teachers in Jeddah, Saudi Arabia, were over forty years old, with a mean of 40.23 ± 7.07 years. In contrast, **Alrayah et al. (2023)** found that above half of the patients were aged between 21 and 30 years in a study to examine the knowledge and practice of the general practitioners regarding LPR among Saudis.

In terms of gender, the study finds that over half of the patients were males, a trend that may be linked to lifestyle habits such as cigarette smoking and the consumption of fatty or spicy foods, which are more common among men. This finding aligns with **Hassan et al.'s study (2017)**, which reported that above half of the LPR patients were males. However, these findings contrast with **Lechien et al. (2021)**, who stated that over half of their study's patients were females in their international study on the management of LPR.

Regarding residence place, this study finds that over two-thirds of the patients lived in rural areas. This may be because most of the patients originated from the rural areas served by Benha University Hospital. In contrast, **Zhang et al. (2023)** reported that less than three-quarters of their sample were from urban areas in their study in Suzhou, China that examine the LPR patients' knowledge, attitudes, and reported practices toward laryngopharyngeal reflux.

In terms of educational level, the findings of this study declares that fewer than two-thirds of the studied patients had completed the secondary education. This might be referred to the rural culture, which places less emphasis on higher education. Conversely, **Ahbail (2024)** noted in their study that above half of the patients had a bachelor's degree. In a study about the prevalence of LPR among Saudi population.

Regarding occupation, the findings show that less than three-quarters of the patients were employed. This result because many of the patients were in middle age, a period when individuals are typically employed. However, the result contrasts those of **Massawe et al. (2020)**, who stated that above half of the patients in their

study on Laryngopharyngeal reflux disease in Tanzania were unemployed.

As for marital status, this study finding indicate that over three-quarters of the patients were married. This could be influenced by cultural factors, age, and residence. This finding aligns with **Chouhdry and Villwock (2023)**, who noted that most of patients were married when studying the patient perception to adherence to lifestyle modifications after LRP diagnosis.

Regarding the patients' medical history, current study found that below two-thirds of the patients were diagnosed with LPR within 1 to 3 years. This finding could be due to LPR symptoms often being misdiagnosed as regurgitation or heartburn. This result contrasts with the study by **Domakunti and Lamture (2022)**, which reported that nearly three-fifths of their sample had experienced the disease for 5 years.

Furthermore, this study shows that most of the patients had no chronic illnesses, likely due to the middle age of the participants. This supports the findings of **Zhang et al. (2023)**, who informed that above three-quarters of their patients were not dealing with chronic conditions.

Only a few patients in the study had a history of previous surgeries such as tonsillectomy, and about half were smokers. This finding could be attributed to the greater percentage of males in the sample. This finding contrasts with the study by **Chouhdry & Villwock (2023)**, who stated that none of the patients in their study were smokers.

Moreover, over three-quarters of the patients had no positive family history of LPR, possibly because LPR is not typically inherited or passed down through family genes. This is matched with **Horvath et al.'s (2021)** findings, who stated that below half of their sample had no family history of chronic pharyngitis or LPR.

Regarding patients' knowledge of LPR disease, a highly statistically significant differences were revealed between all knowledge items before, after, and during the follow-up of teaching guidelines implementation ($p < 0.001$). From the researcher's perspective, this improvement could be attributed to the clarification of previously unclear knowledge about the disease, or the presence of misunderstanding which contributed positively to the overall knowledge.

These findings align with a study by **Ahmed & Khalil (2021)**, which examined the influence of health education on patients with gastroesophageal reflux disease (GERD). They reported a significant difference in knowledge levels before, after, and during the follow-up period following the educational intervention. Additionally, **Alshahran et al. (2018)** mentioned that most of the sample in their study had acceptable knowledge about GERD, regarding causes, clinical manifestation, and the role of lifestyle modifications in managing the condition.

Concerning patients' attitudes towards LPR disease before, after, and during the follow-up of teaching guidelines implementation, this study discovered a statistically significant enhancement in patients' overall attitudes, with a shift from negative to positive attitudes following the teaching guidelines. This shift from negative to positive attitude could be credited to the impact of the teaching guidelines and the booklet given to the patients. These findings are corresponded with **Gazineo et al. (2021)**, who observed that patients in the study group experienced a significant quality of life improvement following an educational intervention compared to controls.

This result aligns with **Agwa et al. (2023)**, who reported that their studied sample exhibited positive behaviors related to relieving factors for GERD in their study in Al Baha University, Saudi Arabia on the incidence and risks of GERD among university students

Regarding patients' reported practices related to LPR disease before, after, and during follow-up teaching guidelines implementation, the study finds highly statistically significant differences between all practice items ($P < 0.001$). From the researcher's perspective, this could be attributed to the impact of the teaching guidelines, as evidenced by improvements in patients' practices and knowledge. This finding aligns with **Isshi et al. (2021)**, who described that approximately sixty percent of the participants demonstrated satisfactory practices related to GERD in a study about the effect of Upper Gastrointestinal Symptoms on quality of life and Daily Life among Patients with LPR. In contrast, **Naguib et al., (2024)** found that above three-fifths of the studied patients had unsatisfactory practices regarding GERD in studying the life quality of patients with gastroesophageal reflux disease.

The current study demonstrates a statistically significant positive correlation between knowledge and reported practices at both the post-intervention and follow-up stages. Furthermore, significant positive correlations were observed between knowledge and attitude, as well as between reported practice and patients' attitude ($p < 0.05$). This correlation may stem from acquiring more knowledge about the disease and adopting healthier lifestyle choices, which, in turn, positively impact overall health. This finding aligns with **Du et al. (2023)**, who reported a highly significant correlation between healthy lifestyle modifications, and disease knowledge including drinking habits, food choices, and exercise, when studying the level of knowledge among patients with GERD.

Regarding the severity of physical symptoms before, after, and during follow-up of the teaching guidelines implementation, the study revealed that the most severe symptoms experienced by patients before the educational intervention were chronic sore throat, throat clearing, hoarseness, and mucus. The researcher suggests this could be attributed to acid regurgitation affecting the entire throat. This result aligns with that of **Osman et al. (2019)** regarding the effectiveness of Protein Pump

Inhibitors in the medical management of LPR, which found that globus sensation was the most common symptom, followed by frequent throat clearing and annoying coughing in the majority of patients. Breathing difficulties were the least common symptom.

The study also indicated a reduction in symptom severity following the application of the teaching guidelines compared to pre intervention, with statistically and highly statistically significant differences between physical symptoms at the three study phases ($p < 0.001$). This improvement could be referred to the impact of the teaching guidelines, as evidenced by better patient outcomes in terms of symptom relief, practices, and knowledge. Numerous studies have shown a similar change in patients' symptom experiences post-program, including **Karkos et al. (2007)** in a study about relationship between functional dysphonia and LPR, and **Mesallam et al. (2007)**, who study the reflux symptom index and its finding score.

Conclusion:

Implementing teaching guidelines for patients LPR disease has a positive effect in improving knowledge, attitude, self-reported practices and reduce severity of physical symptoms.

Recommendation:

-Activate the role of nurse as educator to teach patients with LPR about lifestyle modifications and its positive effect on reducing physical symptoms of the disease.

- A clear and concise pamphlet containing guidelines for laryngopharyngeal reflux disease should be made available to all patients in the ENT outpatient department.

-It is advised that the study be repeated with a bigger probability sample drawn from various geographic regions in order to get more broadly applicable data.

References

- Abohelaibah, F., Alammam, M., AlAwadh, I., Alsabih, M. I. A., Alharbi, N. S., Alharbi, R. F., & Alelyani, R. H. (2024).** The Prevalence, Clinical Predictors, and Awareness of Laryngopharyngeal Reflux in Gastroesophageal Reflux Disease Patients in Riyadh. *Saudi Journal of Otorhinolaryngology Head and Neck Surgery*.
- Agwa, R. H., Alzahrani, A. M., Alzahrani, Y. M., Alghamdi, S. J., Alzahrani, F. A., Alzahrani, M. A., & Alzahrani, M. A. (2023).** Prevalence and Risk Factors of Gastroesophageal Reflux Disease (GERD) among the Students in Al Baha University–Saudi Arabia. *International Journal of Medical Science and Clinical Research Studies*, 3(02), 177-186.
- Ahbail, A. A., Alhaju, H., Alharbi, T., Alghamdi, A. M., Amoodi, H., Salah, W. M., & Al Sheikah, M. (2024).** A Study on the Prevalence of

- Laryngopharyngeal Reflux in Saudi Arabia. *Cureus*, 16(4).
- Ahmed H., & Khalil, H., (2021):** Impact of educational program for patients with gastroesophageal reflux disease on lifestyle change and home remedies. El-Fayoum University new hospital. *Egyptian Journal of Nursing and Health Sciences*, 2(2), 338-362.
- Alghamdi, K. B., Muhaiwy, S. M., Alvi, M. T., Aljihani, T., Busolaiman, O., & Alnoury, I. S. (2016).** Prevalence of laryngo-pharyngeal reflux diseases (LPRD) in male teaching staff of Jeddah, Saudi Arabia. *Saudi Journal of Otorhinolaryngology Head and Neck Surgery*, 18(1), 13-16.
- Alrayah, M., Alzahrani, R., Alghamdi, M. A., Alghamdi, K. M., Almutairi, F. F., Alghamdi, A. A., ... & Alnafisah, H. A. (2023).** Assessment of the Current Knowledge and Practice of General Practitioners Towards Laryngopharyngeal Reflux in Saudi Arabia. *Cureus*, 15(4).
- Alshahrani, S. M., Alahmari, A. O., & Alobaidi, A. J. N. (2018).** Assessment knowledge and attitude and practice toward GERD among smoker in Riyadh City, 2018. *The Egyptian Journal of Hospital Medicine*, 73(5), 6763-6766.
- Chen, G., Kuang, X., Wang, X., Ye, J., Ren, M., Tang, Y., ... & Zhang, X. (2023).** Psychological Factors, Lifestyles, and Habits of Patients with Laryngopharyngeal Reflux: A Multicenter Survey. *B-ENT*, 19(3).
- Choudhry, H., & Villwock, J. (2023).** Patient Perspective on Adherence to Reflux Lifestyle Modifications: A Qualitative Study. *Journal of Primary Care & Community Health*, 14, 21501319231207320.
- Domakunti, R. & Lamture, R. (2022).** A study on the correlation between endoscopic findings and symptoms of gastroesophageal reflux disease. *Cureus*; 14(4).
- Du, J. I., Park, M. I., Kim, S. E., Kim, B. J., Kim, S. W., & Kim, J. H. (2023):** The Degree of Disease Knowledge in Patients with Gastroesophageal Reflux Disease: A Multi-center Prospective Study in Korea. *J Neurogastroenterol Motil [Internet].*; 23 (3): 385–91.
- Hassan, A. M., Osman, A. M., Ghaliony, M. A., Abd Elhaleem, E. K., & Elbeh, K. A. (2017).** Laryngopharyngeal reflux: an overview on the disease and diagnostic approach. *Journal of Current Medical Research and Practice*, 2(1), 67-72.
- Horvath, L., Haggmann, P., Burri, E., & Kraft, M. (2021).** A novel scoring system for evaluating laryngopharyngeal reflux. *Clinical Otolaryngology*, 46(3), 594-601.
- Isshi, K., Furuhashi, H., Koizumi, A., & Nakada, K. (2021).** Effects of coexisting upper gastrointestinal symptoms on daily life and quality of life in patients with gastroesophageal reflux disease symptoms. *Esophagus*, 18, 684-692.
- Junaid, M., Ahmed, S. Q., Kazi, M., Khan, H. U., & Halim, M. S. (2020).** Laryngopharyngeal reflux disease: Outcome of patients after treatment in otolaryngology clinics. *Cureus*, 12(12).
- Karkos, P. D., Yates, P. D., Carding, P. N., & Wilson, J. A. (2007).** Is laryngopharyngeal reflux related to functional dysphonia?. *Annals of Otolaryngology, Rhinology & Laryngology*, 116(1), 24-29.
- Krause, A. J., Walsh, E. H., Weissbrod, P. A., Taft, T. H., & Yadlapati, R. (2022).** An update on current treatment strategies for laryngopharyngeal reflux symptoms. *Annals of the New York Academy of Sciences*, 1510(1), 5-17.
- Lechien, J. R., Allen, J. E., Barillari, M. R., Karkos, P. D., Jia, H., Ceccon, F. P., ... & Akst, L. M. (2021).** Management of laryngopharyngeal reflux around the world: an international study. *The Laryngoscope*, 131(5), E1589-E1597.
- Mahmoud, N. F., Atta, A. A. E. A., Elhamouly, M. S., Abdelmonem, A. A., & Bassiouny, S. E. S. (2021).** Dietary risk factors and therapy outcomes of swallowing-related problems in laryngopharyngeal reflux: patients' perspectives. *The Egyptian Journal of Otolaryngology*, 37, 1-8.
- Massawe, W. A., Nkya, A., Abraham, Z. S., Babu, K. M., Moshi, N., & Kahinga, A. A. (2020):** Laryngopharyngeal reflux disease, prevalence and clinical characteristics in ENT department of a tertiary hospital Tanzania. *World J Otorhinolaryngol Head Neck Surg.*; 7 (1): 28-33.
- Mesallam, T. A., Stemple, J. C., Sobeih, T. M., & Elluru, R. G. (2007).** Reflux symptom index versus reflux finding score. *Annals of Otolaryngology & Laryngology*, 116(6), 4.
- Naguib, H., El-Deen, F. & Hamido Abosree, T. (2024).** Quality of Life among Patients with Gastroesophageal Reflux Disease. *Journal of Nursing Science Benha University*, 5(1), 292-306. "
- Osman, H. A., Abd Elrhman, N. H., & Shafy, M. A. (2019).** The efficacy of PPI in the treatment of laryngopharyngeal reflux. *Journal of Gastroenterology and Hepatology Research*, 8(1), 2800-2806.
- Sabry, M., Yosef, T. M., Mahmoud, A. M., & George Michael, T. M. (2022).** Fasting salivary pepsin level as a reliable non-invasive method of screening for laryngopharyngeal reflux in Egyptian patients. *The Egyptian Journal of Internal Medicine*, 34(1), 16.
- Wang, M., Mo, T., Tan, J., Dai, Y., & Li, X. (2022).** Risk factor-related lifestyle habits of patients with laryngopharyngeal reflux. *Ear, Nose & Throat Journal*, 01455613221078182.
- Wu, J., Yu, L., Li, J., Ma, X., Zhang, D., & Shang, X. (2022).** Characteristics of Laryngopharyngeal Reflux in the Chinese Nurse Population. *Journal of Voice*.
- Xiao, S., Li, J., Zheng, H., Li, X., Yang, H., Zhang, J., ... & Yu, Z. (2022).** Awareness about laryngopharyngeal reflux disease among Chinese otolaryngologists: a nationwide survey. *BMJ open*, 12(6), e058852.
- Zhang, Q., Huang, H., Li, J., Niu, Y., Sun, P., & Cheng, F. (2023).** Knowledge, attitudes and practices of patients with chronic pharyngitis toward laryngopharyngeal reflux in Suzhou, China. *BMC Public Health*, 23(1), 2542.