



## ORIGINAL-RESEARCH-ARTICLE



# Laryngopharyngeal Reflux in Medical Professionals

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### Abstract

**Objective:** To determine whether stage of medical training, specialty choice, or other work/training stressors contribute to the presence of laryngopharyngeal reflux in physicians, fellows, residents, and medical students.

**Study Design:** Cross-sectional survey

**Setting:** Urban academic medical center and its affiliated medical school

**Methods:** A 21-item survey was sent out via e-mail to all physicians and medical students. Questions within this survey assessed their level of training and lifestyle risk factors for laryngopharyngeal reflux. The Mini-Z physician burnout scale was also incorporated to assess workplace stressors and burnout. Additionally, participants completed the Reflux Symptoms Index within the survey and each participant was assigned a score that correlated with their probability of having reflux. Patients were considered to have laryngopharyngeal reflux if their Reflux Symptoms Index score  $\geq 13$  or were previously diagnosed with reflux.

**Results:** 106 participants completed the survey. Forty of these had laryngopharyngeal reflux. Training stage and training year were not significantly associated with reflux status. Specialty choice also had no significant association with reflux status. None of the ten parameters of the Mini-Z physician burnout scale were associated with laryngopharyngeal reflux.

**Conclusion:** This study did not find any significant association between level of training, specialty choice, or work- or training-related stressors and the probability of having laryngopharyngeal reflux. However, workplace and training-related stressors are well-documented in having a detrimental effect on physicians and trainees. Further studying this topic in a larger and more varied sample may be beneficial.

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## 1 | INTRODUCTION

Laryngopharyngeal reflux (LPR) is an extraesophageal variant of gastroesophageal reflux disease (GERD), and its specific etiology stems from the retrograde flow of acidic stomach contents into the larynx and pharynx, and often the upper aerodigestive

tract as well.<sup>(1),(2)</sup> Clinical presentation for LPR can be defined as atypical and disruptive GERD symptoms, including cough, hoarseness, vocal fatigue, and frequent throat clearing. These symptoms can be so troublesome that they often encourage patients to seek medical advice from an

otolaryngologist who ultimately diagnoses them specifically with LPR as opposed to an alternative reflux disorder.<sup>(3)</sup> There has been a steady 4% annual increase in LPR prevalence since 1976, culminating in a current 18% to 28% of Americans that are afflicted.<sup>(2)</sup> The most concerning aspects about this reflux epidemic are the secondary chronic and obstructive diseases that can directly result such as subglottic stenosis, contact ulcer, laryngeal carcinomas, and more.<sup>(1)</sup> Psychosocial and psychological strain have been strongly correlated with reflux disease, and it has been documented that groups who experience high stress have almost two times the odds of developing some form of reflux compared to groups scoring lower on various standardized scales of perceived and experienced stress.<sup>(4)</sup> One demographic subpopulation that is well-documented to experience an immense load of chronic stressors are physicians as well as those in training including fellows, residents, and medical students.<sup>(5)</sup> The intense mental and sometimes physical demand of the profession results in increased experience of stress, which in turn manifests as clinical pathologies such as reflux disease. Little to no inquiry has been made on how differing stages within medical training, specialty choice, or other work/training related stressors contribute to the development, prevalence and severity of LPR. This study aims to better quantify and qualify the association between LPR and stressors during training and within the workplace for physicians and medical students.

## 2 | METHODS

This is a cross-sectional, survey study. The survey was created using Red Cap (Research Electronic Data Capture) and was sent out via e-mail to all attendings, fellows, residents, and medical students affiliated with an urban, academic medical center.<sup>(6)</sup> <sup>(7)</sup> Prior to data collection, this study was exempted by the Cooper University Health Care Institutional Review Board. All survey respondents consented to participate in the study at the beginning of the survey; the option to do this was included in the survey as soon as respondents opened the link. Survey responses were completely anonymous. The survey consisted of 21 items that collected data about demographics, information about current status in medical training including specialty, and lifestyle factors. The full survey is provided in Appendix A.

Respondents who were likely to have LPR based on their survey responses were notified of this within the survey. Those respondents were provided with the contact information of the otolaryngology clinic and encouraged to schedule an appointment for a formal diagnostic evaluation. To incentivize participation, all scheduling requests would be honored within two weeks of contacting the clinic. Given that this is a survey study, an availability sample was used and anyone who consented to participate and filled out the survey up to and including level of training, specialty, and RSI were included.

Two specific measures were adapted from the literature and embedded within the survey - the Reflux Symptoms Index (RSI) and the Mini-Z. The purpose of adapting these external screening tools was to incorporate evidence-based questions that have been established as valid and reliable screeners to assess both reflux symptoms as well as symptoms of burnout specific to healthcare workers.

Symptoms of LPR were determined using the RSI. Any patient who had previously been diagnosed with LPR or GERD and/or had an RSI score  $\geq 13$  was considered to be positive for LPR. Our cut-off score of 13 is based upon previously established work by Belfasky et al.<sup>(8)</sup> We chose the RSI to screen for LPR because it is a simple, nine-item questionnaire that is highly reproducible and was found to have excellent criterion-based validity.<sup>(8)</sup>

Workplace related stressors that were assessed included number of hours worked and/or studied as well as the single-item measures of the Mini-Z screening tool for physician burnout. The Mini-Z is a ten-item survey that asks about control over workload, work environment, teamwork, value alignment between worker and department leaders, documentation, and electronic medical record (EMR) use. The Mini-Z has been found to have high reliability and validity and was developed by

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**Supplementary information** The online version of this article (<https://doi.org/10.52845/JORR/2023/4.3.6>) contains supplementary material, which is available to authorized users.

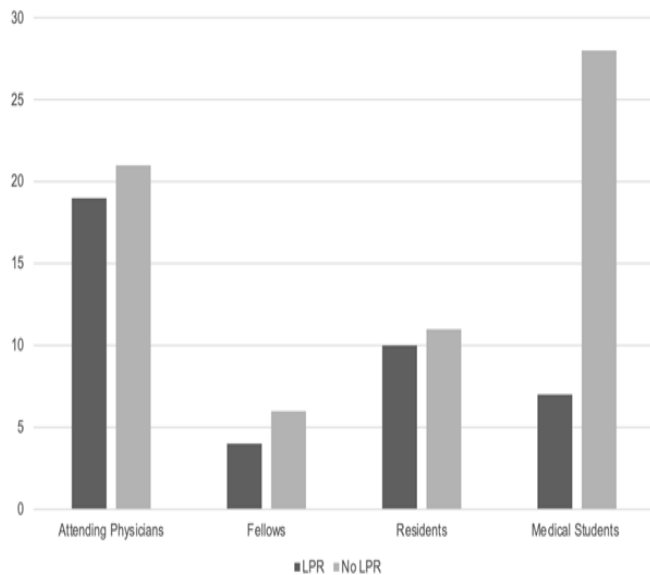
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Linzer et al., at Hennepin County Medical Center in Minnesota.<sup>(9)</sup> For medical students, an additional question was asked about time spent preparing for the United States Medical Licensing Exam (USMLE) and whether this had a significant impact on their stress level. Once data collection was complete, analysis was performed using Fisher’s exact test for categorical variables.

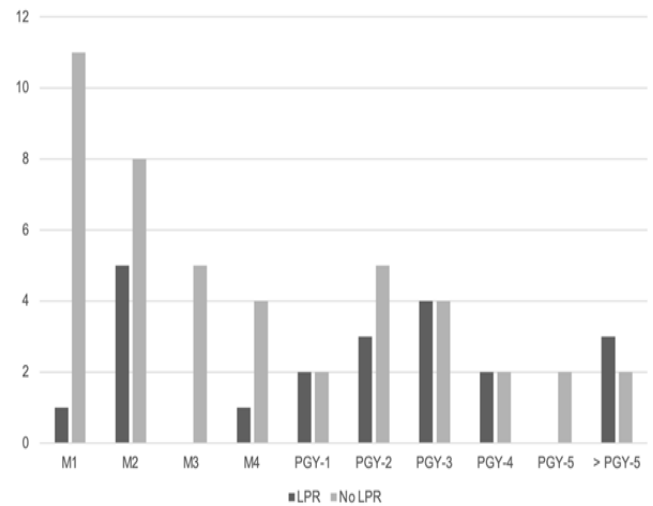
### 3 | RESULTS

A total of 106 participants filled out the survey. Two of these did not fill out the entire survey but met the aforementioned inclusion criteria. Of these, 40 were attending physicians, 10 were fellows, 21 were residents, and 35 were medical students. The proportions of each group that were found to have LPR is shown in Figure 1.



**Figure 1.** Proportion of participants with LPR by level of training

Level of training was not found to be a significant determinant of LPR status ( $p=0.0568$ ). Of all trainees who responded, most were second-year medical students. Year of training results are shown in Figure 2.



**Figure 2.** Proportion of participants with LPR by year of training

Year of training was not significantly associated with LPR ( $p=0.2181$ ). Specialty choice did not play a significant role in participants having LPR ( $p=0.7459$ ). The breakdown of LPR status by specialty is shown in Table 1.

**Table 1.** Proportion of participants with LPR by specialty or intended specialty choice

Specialty	No LPR – no. (%)	LPR – no. (%)
Anesthesiology	3 (75%)	1 (25%)
Cardiology	1 (50%)	1 (50%)
Critical Care Medicine	0	1 (100%)
Dermatology	1 (100%)	0
Emergency Medicine – Adult	7 (70%)	3 (30%)
Emergency Medicine – Pediatrics	1 (100%)	0
Endocrinology	1 (50%)	1 (50%)
Family Medicine	1 (50%)	1 (50%)
Gastroenterology	2 (100%)	0
General Surgery	5 (83%)	1 (17%)
Gynecologic Oncology	1 (100%)	0
Hematology and Oncology	0	1 (100%)
Hospital Medicine	1 (100%)	0
Infectious Disease	0	1 (100%)
Internal Medicine	9 (64%)	5 (36%)
Nephrology	1 (100%)	0
Neurology	1 (100%)	0
Neurosurgery	1 (50%)	1 (50%)
OB/GYN	2 (33%)	4 (67%)
Otolaryngology	3 (60%)	2 (40%)
Pediatrics	4 (67%)	2 (33%)
Pediatric Endocrinology	0	1 (100%)
Pediatric Gastroenterology	2 (100%)	0
Pediatric Infectious Disease	0	1 (100%)
Physical Medicine and Rehabilitation	0	1 (100%)
Plastic and Reconstructive Surgery	3 (75%)	1 (25%)
Podiatry	1 (100%)	0
Psychiatry	2 (67%)	1 (33%)
Pulmonology	0	1 (100%)
Radiation Oncology	3 (100%)	0
Radiology – Diagnostic	1 (33%)	2 (67%)
Rheumatology	1 (100%)	0
Trauma Surgery	2 (50%)	2 (50%)
Urogynecology	0	1 (100%)
Urology	0	2 (100%)
Other	6 (75%)	2 (25%)
Total	66 (62%)	40 (38%)

The number of hours worked or studied per week was not significantly associated with LPR ( $p=0.6622$ ). The majority of medical students ( $n=24$ ) agreed or strongly agreed that they spent a significant portion of their time preparing for and/or thinking about the USMLE and its impact on their placement into residency. However, this was not associated with LPR ( $p=0.7391$ ). The setting where the majority of patient care time is spent – inpatient or outpatient – was also assessed for residents, fellows, and attendings. 59% of physicians reported spending most of their time in the inpatient setting ( $n=41$ ), and 41% reported spending most of their time in the outpatient setting ( $n=28$ ). Patient care setting was not significantly associated with LPR ( $p=1.000$ ).

Each parameter of the Mini-Z was analyzed separately to determine association with LPR. Survey results for individual parameters are presented in Table 2.

*Table 2. Mini-Z results*

Mini-Z Parameter	Responses	N (%)
Work environment	Calm	10 (10%)
	Busy, but reasonable	66 (63%)
Job or school satisfaction	Hectic, chaotic	28 (27%)
	Very high	29 (28%)
	High	63 (61%)
	Neutral	9 (9%)
	Low	3 (3%)
Job or school-related stress	Very low	0
	Very high	16 (15%)
	High	41 (39%)
	Neutral	33 (32%)
Alignment of professional values with departmental/medical school leaders	Low	11 (11%)
	Very low	3 (3%)
	Very high	25 (24%)
	High	62 (60%)
	Neutral	16 (15%)
Control over workload	Low	1 (0.1%)
	Very low	0
	Optimal	9 (9%)
	Good	38 (37%)
	Satisfactory	33 (32%)
	Marginal	17 (16%)
Sufficiency of time for documentation	Poor	6 (6%)
	Not applicable	1 (0.1%)
	Optimal	6 (6%)
	Good	32 (31%)
	Satisfactory	25 (24%)
	Marginal	18 (17%)
Degree to which care team (or small student case-based learning groups) work well together	Poor	3 (3%)
	Not applicable	20 (19%)
	Optimal	37 (36%)
	Good	42 (40%)
	Satisfactory	18 (17%)
	Marginal	3 (3%)
Proficiency with EMR use	Poor	1 (0.1%)
	Not applicable	3 (3%)
	Optimal	22 (21%)
	Good	45 (43%)
	Satisfactory	18 (17%)
	Marginal	6 (6%)
Amount of time spent on EMR at home	Poor	1 (0.1%)
	Not applicable	12 (12%)
	Excessive	2 (2%)
	Moderately high	12 (12%)
	Satisfactory	18 (17%)
	Modest	24 (23%)
Level of burnout	Minimal/none	33 (32%)
	Mild	15 (14%)
	Moderate	17 (16%)
	High	66 (63%)
	Very high	16 (15%)
	Very low	3 (3%)

A more chaotic work environment was not associated with having LPR ( $p=0.0843$ ). Neither satisfaction with work or school nor increased stress because of work or school were associated with having LPR ( $p=0.3618$ ,  $p=0.3849$ ). A higher degree of alignment of professional values between the individual respondent and their department leaders or school administrators was also not associated with LPR ( $p=0.3119$ ). An increased control over workload was not significantly associated with LPR ( $p=0.6897$ ).

Having more time for documentation was also not associated with having LPR ( $p=0.4947$ ). There was no association between LPR having a good team dynamic, whether within a patient care team or a small case-based learning group at school ( $p=0.2169$ ). Neither higher proficiency with the EMR nor spending less time on the EMR at home were associated with having LPR ( $p=0.3203$ ,  $p=0.1610$ ). Respondents were asked to use their own definition of burnout to determine their burnout status. 63% of respondents felt mild burnout, which was qualified as “I am under stress, and don’t always have as much energy as I did, but I don’t feel burnt out” ( $n=66$ ). A higher level of burnout was not associated with having LPR ( $p=0.1719$ ).

## 4 | DISCUSSION

In this study, training status, specialty and workplace-related stressors were not associated with having laryngopharyngeal reflux. There are several limitations to this study. First, since this is a survey-based study, we had to rely on a convenience sample for participation. Whoever had the time and willingness to fill out the survey was included. There are hundreds of attending physicians and trainees within this setting, so a sample of 106 participants is not fully representative of the diverse population working and training in this hospital. Unfortunately, this is the caveat inherent to survey-based studies. While they are a fast and simple way to gather a lot of information, they rely heavily on participation from the respondents. There are many existing studies that analyze ways to increase physician responses to surveys due to chronically suboptimal response rates.<sup>(13),(14)</sup> However this topic is not within the scope of this paper. Rather, this

point is meant to illustrate that questionnaires used for research within the physician population often result in few responses relative to the total population of providers which makes it difficult to draw conclusions from data collected, such as in this study. Another limitation is the inability to track participant responses over time. This is a cross-sectional study, and so it is inherently a snapshot in time. It is not possible to truly quantify risk of developing LPR or characterize what factors may predispose participants to having LPR without using a different study design such as, for example, a cohort study. Lastly, symptom severity and feelings of stress are very subjective and likely vary greatly among participants. There is no true way to objectively gather such data in a survey study, and so this reliance on self-reporting and participant recall leads to an intrinsic bias in questionnaire-based studies. Some ways to ameliorate the effects of these limitations would be to use a larger sample size with more equally sized groups, utilize a study design that can follow participants through time and establish risk, and identify more objective ways to gather information about LPR symptoms and work-related stress.

Despite the lack of significant findings in this study, it is important to continue investigating this topic. One other paper has examined upper gastrointestinal (GI) symptoms in medical professionals. This study found that rates of upper GI symptoms among medical professionals were not significantly different from the general population.<sup>(10)</sup> However, they also found that scores on questionnaires for dyspepsia-related quality of life were inversely proportional to training level, which indicates that there may be some association between training level and ability to identify and self-treat upper GI symptoms.<sup>(10)</sup>

Furthermore, physicians are well-known to be at risk for significant medical and psychological afflictions that are often associated with burnout and stress. One major issue is physician suicide. A study found that male physicians have suicide rates of up to 40% higher than the general population, and female physicians have suicide rates of up to 130% higher.<sup>(11)</sup> Various factors including high-stress work, access to narcotics and other drugs, a culture of stoicism, and unwillingness to admit to history of mental illness for fear of professional repercussions are just some of the factors that contribute to physician suicide.<sup>(11)</sup> Another study found that job burnout was significantly

associated with hypercholesterolemia, type 2 diabetes mellitus, coronary heart disease, and gastrointestinal issues.<sup>(12)</sup> These workplace-related stressors are likely pervasive across specialties and institutions and are present throughout training. It is probable that other diseases associated with stress, such as LPR, are also prevalent among physicians and trainees.

In conclusion, it is important to continue to investigate the effects of stress on medical professionals and trainees. There is not enough evidence at this point to state that these factors conclusively have no effect on LPR status in medical professionals. While LPR is not a fatal condition, it can have a significant impact on quality of life and may put physicians at risk for conditions that could be fatal such as laryngeal carcinoma. Physicians are essential within their communities and act as advocates and stewards of healthcare for their patients. This has never been truer than now - during the global, COVID-19 pandemic. Identifying and minimizing work and training-related stress and associated disease to improve mental and physical health is paramount.

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