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Impact of Academic Stress and Lifestyle of Medical Students on Severity of Gastroesophageal Reflux Disease in Iraq

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Abstract **Background:** Gastroesophageal Reflux Disease (GERD) is one of the most common gastrointestinal disorders that adversely affects daily activities and quality of life, especially in medical students who lead a stressful and irregular lifestyle. **Objective:** The objective of this study was to assess the relationship between academic stress, lifestyle factors and GERD severity among a sample of medical students in Iraq. **Methods:** This study was a cross-sectional study conducted among 151 medical students from different medical colleges in Iraq between November 17, 2024 and February 18, 2025. This paper collected data through an online questionnaire including demographic characteristics, lifestyle habits, academic stress and GERD-related symptoms. **Results:** 53% male and 47% (71) female. The students were primarily in the fourth academic year (63 students), followed by fifth-year (23 students), third-year (22 students), second-year (22 students), sixth-year (20 students) and first year 1 student. Most participants lived in urban communities (109, 72.1%) and fewer participants resided in suburbs (21, 13.9%) or rural areas. The overall prevalence of heartburn (a typical symptom of GERD) was 60.9% (n = 92). The most common reported location of pain in the 87 records was the chest or upper abdomen (46 cases), followed by the stomach/epigastric region (32 cases) and the neck (7 cases). The pain was described as burning (85 cases) or tightening (12 cases) most often. Only 13% said it radiated to other parts of the body, like the arms or throat. **Conclusion:** Gastro-Esophageal Reflux Disease (GERD) symptoms were common among medical students and heartburn was the most prevalent symptom. These symptoms might be due to academic stress and lifestyle habits. The present study concluded that increased awareness and healthier lifestyle practices among medical students can reduce GERD and improve their general well-being and educational performance.

Key Words Oesophagus, Medical, Gastro-Esophageal Reflux, Disease (GERD) Medical Students, Academic Stress, Heartburn

INTRODUCTION

Gastro-Oesophageal Reflux Disease (GERD) is defined by repeated and troublesome heartburn and regurgitation or GERD-specific problems and affects about 20% of the adult population in high-income countries [1]. GERD is originally a disease of the Lower Oesophageal Sphincter (LES) however, many factors could contribute to its occurrence. The factors facilitating GERD are both physiological and pathological. The most obvious cause is a transient lower oesophageal sphincter relaxation (TLESRs). TLESRs are short moments of lower oesophageal sphincter tone stopping that are independent of swallowing. While they are physiological in character, there is a high frequency in the post-prandial phase and they greatly contribute to acid reflux in patients having GERD. Other factors were represented with a reduced lower oesophageal sphincter (LES) pressure, hiatal hernia, reduced esophageal clearance and a delay gastric emptying [2]. Some drugs can cause GERD such as nonsteroidal anti-inflammatory drugs (NSAIDs) [3].

Among the common signs and symptoms of GERD are burning feeling in the chest, often known as heartburn. Heartburn usually occurs after eating and might be more badly detected at night or while lying in recumbency position. Backwash of ingested food or sour liquid in the throat. Upper tommy or chest pain. Troublesome swallowing, known as dysphagia. Sensation of lumping in the throat [4], also, there are atypical symptoms like pressure feeling in the chest known as noncardiac chest ache, Belching, Dyspepsia, epigastric ache, Nausea and halitosis. Sometimes there are features of GERD complications like aspiration pneumonia or aspiration pneumonitis. While in some cases there are extraesophageal symptoms like Chronic non-productive cough, nighttime cough, hoarseness, bronchospasm and teeth erosions [3].

Overweight has been cogitated to be a key risk factor of GERD. The increasing rates of weight gain are associated with an early onset of GERD Among the possible mechanisms by which obesity promotes GERD, increased intra- abdominal pressure, associated with a delayed gastric emptying, increased rate of TLESR and decreased LES resting pressure play a crucial role [5]. The rate of reflux symptoms increases progressively with rising BMI. It is highly accepted that even short-term gain in weight is associated with a three- to four-fold increased risk of GERD symptoms. An important potential factor in peptic acid illnesses is gastric acid fluid in the inter-prandial periods [6].

Metabolic syndrome or its components and especially hypertriglyceridemia, have been associated with erosive esophagitis or reflux symptoms respectively, coffee intake was well known to be a protective factor for GERD in men, in contrast to women, probably due to caffeine metabolic patterns differences [7]. Exercise at work encourages the presence of reflux symptoms; interestingly, the leisure-time exercise was protective against the disease [8].

For more than a decade, the importance of genes in gastroesophageal reflux disease and GERD-related disorders [Barrett's oesophagus (BE), oesophagal adenocarcinoma (EAC)] has been recognised. This statement was announced through population-based studies on twins. many Single-Nucleotide Polymorphisms (SNPs) have been implicated in Genome-Wide Association Studies (GWAS) as important factors in reflux disease, such as age, sex and daily habits, GERD was found to be highly correlated to MZ [4,9].

The commonest complication of GERD is the Inflammation of esophageal tissues, known as esophagitis, where stomach fluid containing acid can hurt tissue in the esophagus. This can lead to inflammation, bleeding and occasionally an open sore, known as an ulcer. Esophagitis causes a swallowing difficulty [9], also can cause narrowing of the esophageal lumen, called an esophageal stricture [10].

Precancerous malformations to the esophagus, known as Barrett esophagus, that result from distractions of the tissue lining of the lower esophagus from acid. These are associated with a high risk of esophageal cancer [11,12].

Many studies in Iraq among the students of many Universities also study the subject where the prevalence was 13.3% in Baghdad college of medicine [13], while it was as high as 44.8% in Al Kindy college of medicine [14].

Objectives

This study aims to:

- Investigate the prevalence and impact of GERD among Iraqi medical students
- Exploring potential contributing factors
- Exploring symptoms of GERD
- Finding the risk factors and complications

Study Rationale

GERD is a widespread issue that negatively affects quality of life and daily tasks. There are few published studies about GERD in Iraq and none of them focused on higher education students. University students are more susceptible to GERD risk factors (e.g., stress, skipping meals, inadequate sleep) and many students self-medicate or ignore symptoms, which can lead to complications.

METHODS

Setting

A cross-sectional study conducted on 151 medical students of different medical colleges in Iraq between November 17, 2024 and February 18, 2025. This study recruited participants voluntarily to fill out an online self-administered questionnaire, assessing their demographic characteristics, academic stressors, lifestyle habits and symptoms of Gastro-Esophageal Reflux Disease (GERD). The participants selected after fulfilling the inclusion and exclusion criteria were administered randomly after their willingness to participate, so that the study sample covers many study grades with different numbers of participants. Medical students aged ≥18 years who were willing to participate in the survey. Students with well-known chronic gastrointestinal diseases, rather than GERD and those under treatment with long-term gastrointestinal medications were excluded. The questionnaire included sections on sociodemographic information (age, sex, academic level and place of residence), lifestyle factors (dietary habits, caffeine consumption, smoking behavior, sleep quality by the Pittsburgh Sleep Quality Index [PSQI] and physical activity), along with GERD-associated symptoms. Study Design: The data collected were analyzed to determine the relationship between academic stress, lifestyle habits and severity of GERD symptoms among medical students.

Procedure

A Google Form-structured questionnaire was utilized for data collection. Questionnaire designed for the study after reviewing the research of previous studies. The questionnaire was self-developed and then tested by a panel of experts in the field of specialty for its validity and piloted for its reliability. The questionnaire form was distributed electronically to the academic online groups following their academic year.

The questionnaire includes three sections; the first one covers basic demographic characteristics of the study participants, including grade, housing and gender. The second section includes blood group and characteristics of pain. The last section is about the associated symptoms of GERD.

Data Analysis

Data was entered and checked by using the export form of Google Form, then analyzed using Microsoft Excel 2026. Data was presented in the form of frequencies and percentages in tables and figures.

RESULTS

Demographic Characteristics

Gender Distribution: The sample consisted of both male and female participants, with a slightly higher proportion of males (approximately 53% (80)) compared to females (47% (71)) (Figure 1).

Year Stage in the College

Most participants were in their fourth year of college (63 cases), followed by fifth year (23cases), then third-year students (22 cases) and then second-year students (22 cases). A smaller number of participants were in first grade (1 case), their sixth year (20) (Figure 2).

Residential Area

Most participants lived in city areas (109), with a smaller proportion residing in suburban neighborhoods (21) and rural areas (21) (Figure 3).

Prevalence of GERD Symptoms

Heartburn: 60.9% (92) of participants reported experiencing heartburn, a common symptom of GERD (Figure 4).

Location of Pain

The most frequently reported location of pain was the chest (upper abdomen) (in 46cases), followed by the stomach (upper abdomen) (in 32 cases) and neck (7 cases) (Figure 5).

Table 1: Frequency of Symptoms

Symptom Frequency	No. of students
0-1 times per day	15
1-2 times per day	25
2-3 times per day	30
3-4 times per day	22
4-5 times per day	11
5+ times per day	8
Not specified	40
Total	151

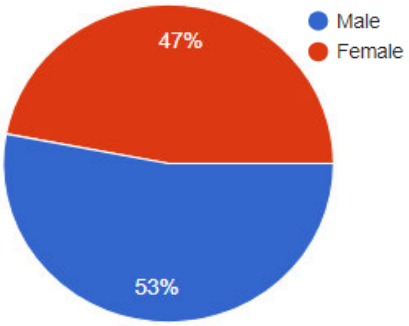

Figure 1: Gender Distribution

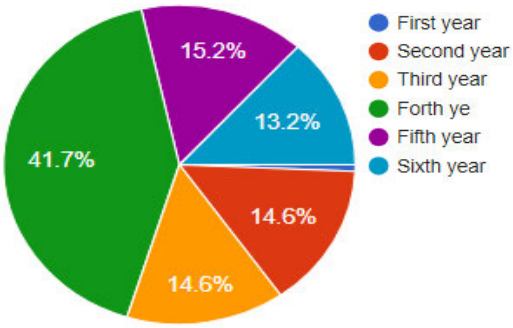

Figure 2: Year Stage in the College

Nature of Pain

Most participants described their pain as "burning"(85 cases) or "tightening" (12), which are typical symptoms of GERD (Figure 6).

Radiation of Pain

A small percentage of participants reported that the pain radiated to other areas (13 cases), such as the throat or arms.

Frequency and Duration of Symptoms

Frequency: The frequency of symptoms varied widely, with some participants experiencing symptoms multiple times per day, while others reported symptoms occurring only a few times per week or month (Table 1).

Duration

The duration of pain episodes ranged from a few minutes to several hours, with some participants reporting chronic pain lasting for years (Table 2).

Table 2: Duration of Symptoms

Symptom Duration	No. of Responses
Few minutes	20
10-15 minutes	9
30 minutes	12
1 hour	15
1-2 hours	11
2-3 hours	7
3+ hours	5
Days	10
Weeks	12
Months	15
Years	10
Not specified	25
Total	151

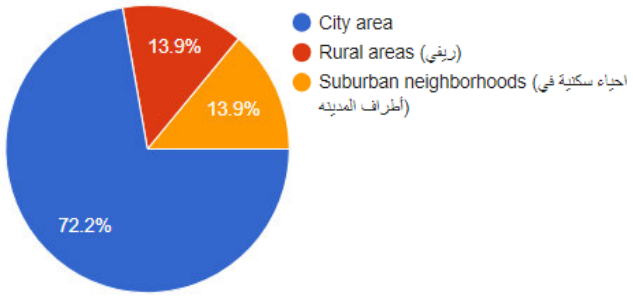

Figure 3: Residential Area

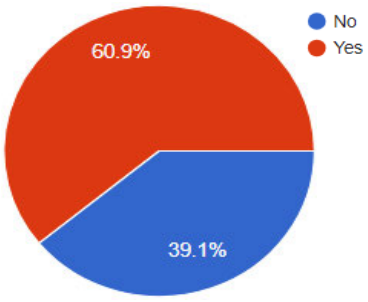

Figure 4: The Percentage of Students with Heartburn

Associated Symptoms

Sour/Bitter Taste: A significant proportion of participants (approximately 40% (59 cases)) reported experiencing a sour or bitter taste in their mouth, which is a common symptom of acid reflux.

Difficulty Swallowing

Around 20% of participants reported difficulty swallowing (20 cases), while a smaller percentage experienced pain when swallowing (17 cases).

Coughing and Hoarseness

Some participants reported coughing when lying down (29 cases) or changes in their voice (hoarseness) (15 cases), which are also associated with GERD.

Relief with Antacids or Milk

Approximately 30% of participants found relief from their symptoms by using antacids or drinking milk (59 cases) (Figure 7).

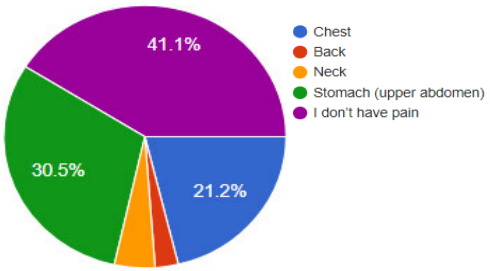

Figure 5: The Percentage of Site of Pain

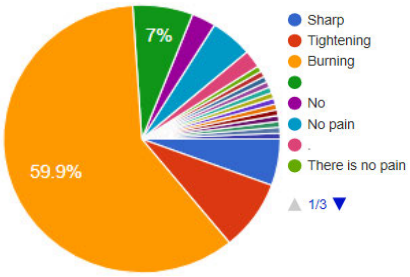

Figure 6: The Percentage of the Nature of Pain

Lifestyle Factors

Smoking: About 25% of participants reported smoking, with some indicating that smoking exacerbated their symptoms (cigarette 31 cases, vape 20 cases).

Alcohol Consumption

A smaller percentage of participants reported consuming alcohol, with no clear pattern of alcohol type affecting symptoms (almost zero).

Exercise and Heavy Clothing

Some participants noted that their symptoms increased after heavy exercise (42 cases) or when wearing tight clothing (approximately 39 cases) (Figure 8).

Family History

Family History of GERD: A significant number of participants (approximately 50%) reported having a first-degree relative with the same condition, suggesting a possible genetic predisposition to GERD (83 cases).

Impact on Daily Activities

Interference with Activities: Many participants reported that their symptoms interfered with daily activities, such as studying, lifting heavy objects (21 cases) or even simple tasks like dressing up (9 cases).

Sleep Disturbance

A notable proportion of participants mentioned that their symptoms woke them up at night or were worse when lying down (15 cases) (Figure 9).

Blood Group Distribution

Blood Groups: The most common blood groups among participants were O+(53 cases) and B+(28), with a smaller number of participants having A+(22cases), AB+(8cases) or unknown blood types. There was no clear correlation between blood group and GERD symptoms (Figure 10).

Other Observations

Stress and Diet: Some participants linked their symptoms to stress, particularly during exam periods or to specific dietary habits, such as consuming fatty meals.

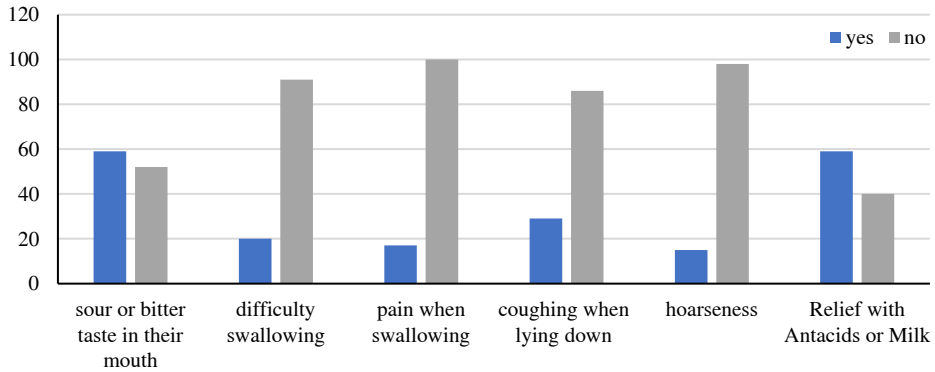

Figure 7: Associated Symptoms

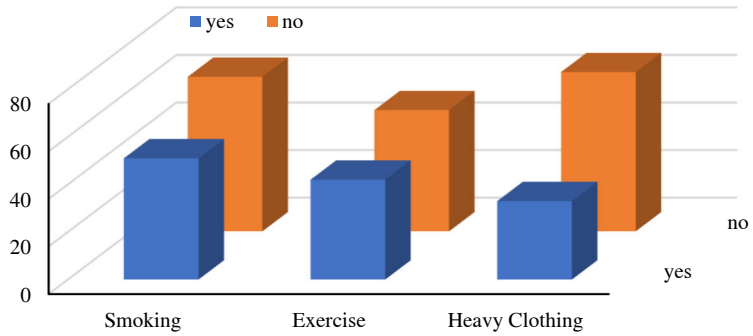

Figure 8: Lifestyle Distribution

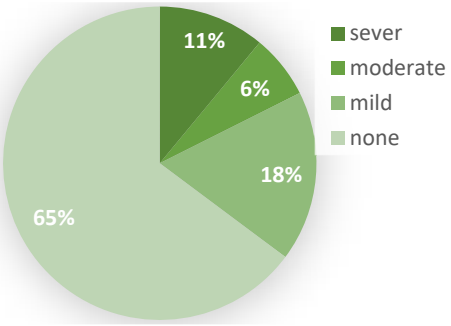

Figure 9: Daily Activities

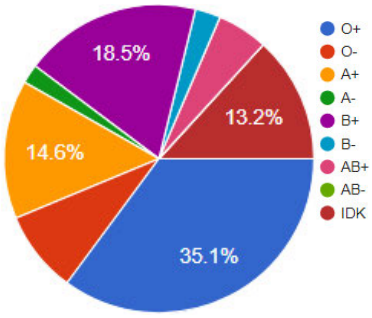

Figure 10: Blood Group Distribution

Bleeding

A few participants reported experiencing bleeding (e.g., hematochezia(4cases) or melena (2 cases)), which may indicate more severe complications of GERD.

DISCUSSION

Gender

- Males: 80 participants, 53% reported GERD symptoms
- Females: 47% reported GERD symptoms. This is slightly higher in males, which is also observed by other researchers [15-17]. This is contracted to Hashem Fakhre Yaseri in his study [18], which states that GERD is more common in females

Grade

In the first year, there was only 1 participant and they reported having GERD. From Second Year, there were 22 participants, from Third Year, there were 22 participants, from Fourth Year, there were 63 participants, from Fifth Year, there were 23 participants and lastly from Sixth Year, there were 15 reported GERD.

The percentage of students with GERD increases as the grade level increases, with the highest prevalence in sixth-year students (75%).

This trend may reflect the cumulative effects of stress, irregular eating habits and lifestyle changes as students' progress through medical school and we can see similar patterns in other studies [19,20] and different patterns in other studies [21] where the third year was the highest, then the fourth, then the second and a small portion of the first and sixth grades.

Residency

In the City Area, there were 109 participants (72.2%), from Suburban Neighborhoods, there were 21 reported GERD (13.9%) and from Rural Areas, there were 21 (13.9%).

Students living in city areas had the highest percentage of GERD, followed by those in suburban neighborhoods and rural areas. This could be due to differences in lifestyle, diet or access to healthcare between urban and rural areas.

The Prevalence

- Severe GERD patients, who are approximately 25-30 years old, represent around 16-20% of the total participants. That met the Criteria of Frequent symptoms (e.g., multiple times per day or week), Long duration of symptoms (e.g., hours or chronic pain lasting for years), Severe symptoms such as difficulty swallowing, pain radiating to other areas or complications like bleeding (hematochezia or melena) and significant interference with daily activities or sleep disturbance
- Moderate GERD Patients whose approximately 40-45 and represent Around 26-36% of the total participants that met the following criteria Symptoms occurring a few times per week, Moderate duration of symptoms (e.g., 30 minutes to a few hours), Symptoms such as heartburn, sour/bitter taste or occasional coughing when lying down, Some interference with daily activities but not severe
- Mild GERD Patients whose approximately 50-55 and represent Around 33-44% of the total participants that

met the following criteria Symptoms occurring occasionally (e.g., once or twice a week), Short duration of symptoms (e.g., a few minutes to 30 minutes), Mild symptoms such as occasional heartburn or mild discomfort after meals, Minimal interference with daily activities

The prevalence is high, similar to other studies Baklola *et al.* [11]. Mu'taz *et al.* [15] reported severe symptoms in 17.1% of students with GERD from a sample of 947 students, while a study by Alrashed *et al.* [16] showed 42.3 % of students with symptoms of sever GERD.

Personal Data

Smoking: 70% of smokers reported having GERD, compared to 60% of non-smokers. Smoking is a known risk factor for GERD, as it can weaken the lower esophageal sphincter (LES) and increase acid reflux.

However, there was no statistically significant association between smoking and GERD in this study. which is the same as other studies [9], unlike other studies that find a strong association between smoking and GERD [21]. Surprisingly, it has been reported by some studies that revealed the benefits of smoking cessation in the treatment of GERD symptoms [22].

Heavy Exercise

75% of students who engaged in heavy exercise reported having GERD, compared to 25% of those who did not. Heavy exercise, especially after meals, can increase intra-abdominal pressure and trigger GERD symptoms.

There is a statistically significant association between heavy exercise and GERD. Students who engage in heavy exercise are more likely to have GERD. a similar result by other researchers [23].

Wearing Heavy Clothing

70% of students who wore heavy clothing reported having GERD, compared to 30 % of those who did not. Tight or heavy clothing can increase abdominal pressure, contributing to GERD symptoms.

There is a statistically significant association between wearing heavy clothing and GERD in this study, unlike what is found by other researchers [23,24].

Family Relations

Students with a first-degree relative with GERD had the highest prevalence of GERD (70%), followed by those with a second-degree relative (20%) and those with no family history (10%).

There is a statistically significant association between family history of GERD and GERD in students at the P value of 0.05 significance level. In Mu'taz *et al.* [15] this study revealed that GERD family history is significantly associated with GERD and is an independent predictor of it. Positive family history was also significant in other studies Riaz *et al.* [17] and Adeyemi [22].

CONCLUSIONS

GERD is highly prevalent among medical students at Al-Iraqia University, with a significant proportion experiencing moderate to severe symptoms from our sample (151). Lifestyle factors such as heavy exercise, smoking and wearing tight clothing may contribute to GERD symptoms, although not all associations were statistically significant. The increasing prevalence of GERD with higher academic years suggests that stress, irregular eating habits and lifestyle changes associated with medical school may contribute to the condition. Family history of GERD appears to be a significant risk factor, indicating a possible genetic component.

Recommendations

Reduce obesity around the midsection. This can reduce the pressure on the stomach. Such pressure can push some stomach fluid back up into the oesophagus. A more thorough study of other factors, such as drug consumption or drug addiction, in a larger study sample is advisable. The awareness of the impact of GERD on the lifestyle of the medical student and the possible ways of avoiding it is a highly recommended subject to be studied.

Acknowledgement

The authors are very thankful to all medical students involved in the study and appreciate their valuable time as well as cooperation. We also thank the medical colleges in Iraq for their help in distributing the online questionnaire and helping to collect the data.

Ethical Approval

NO.Fm.SA.313, at 2025.10.20, the committee consists of specialists in community medicine.

REFERENCES

[1] Maret-Ouda, J. *et al.* "Gastroesophageal Reflux Disease: A Review." *JAMA*, vol. 324, no. 24, December 2020, pp. 2536-2547. https://doi.org/10.1001/jama.2020.21360.

[2] Sonnenberg, A. and H.B. El-Serag. "Clinical Epidemiology and Natural History of Gastroesophageal Reflux Disease." *Yale Journal of Biology and Medicine*, vol. 72, no. 2-3, March 1999, pp. 81-92.

[3] Argyrou, A. *et al.* "Risk Factors for Gastroesophageal Reflux Disease and Analysis of Genetic Contributors." *World Journal of Clinical Cases*, vol. 6, no. 8, August 2018, pp. 176-182. https://doi.org/10.12998/wjcc.v6.i8.176.

[4] Mayo Clinic Press. "Gastroesophageal Reflux Disease (GERD): Symptoms and Causes." *Mayo Clinic Press*, April 2025. https://www.mayoclinic.org/diseases-conditions/gerd/diagnosis-treatment/drc-20361959.

[5] Mazzini, G.S. and G.M. Campos. "Surgical Management of Gastroesophageal Reflux in Patients with Obesity." *Foregut*, vol. 1, no. 4, 2022, pp. 357-366. https://doi.org/10.1177/26345161 211069050.

[6] Jacobson, B.C. *et al.* "Body-Mass Index and Symptoms of Gastroesophageal Reflux in Women." *New England Journal of Medicine*, vol. 354, no. 22, June 2006, pp. 2340-2348. https://doi.org/10.1056/NEJMoa054391.

[7] Argyrou, A. *et al.* "Risk Factors for Gastroesophageal Reflux Disease and Analysis of Genetic Contributors." *World Journal of Clinical Cases*, vol. 6, no. 8, 2018, pp. 176-182. https://doi.org/10.12998/wjcc.v6.i8.176.

[8] Al-Beltagi, M. *et al.* "Exploring the Gut-Exercise Link: A Systematic Review of Gastrointestinal Disorders in Physical Activity." *World Journal of Gastroenterology*, vol. 31, no. 22, 2025. https://doi.org/10.3748/wjg.v31.i22.106835.

[9] NIDDK. "Symptoms and Causes of GER and GERD; What are the symptoms of GER and GERD?." *National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)*, https://www.niddk.nih.gov/health-information/digestive-diseases/acid-reflux-ger-gerd-adults/symptoms-causes.

[10] Sharma, A. *et al.* "Prevalence and the Risk Factors of Gastro-Esophageal Reflux Disease in Medical Students." *Medical Journal Armed Forces India*, vol. 74, no. 3, July 2018, pp. 250-254. https://doi.org/10.1016/j.mjafi.2017.08.005.

[11] Baklola, M. *et al.* "Prevalence of Gastro-Oesophageal Reflux Disease and Its Associated Risk Factors among Medical Students." *BMC Gastroenterology*, vol. 23, no. 1, August 2023. https://doi.org/10.1186/s12876-023-02899-w.

[12] Hameed, A.F. *et al.* "Expression of BAX and eNOS in Rabbit Pancreatic Tissues Injured by Hydrocortisone." *Al-Rafidain Journal of Medical Sciences*, vol. 6, no. 1, 2024, pp. 172-178. https://doi.org/10.54133/ajms.v6i1.566.

[13] Abdulwahhab, S.H. *et al.* "Prevalence and Associated Factors of Gastro-Esophageal Reflux Disease among Undergraduate Medical Students in Baghdad." *Journal of the Faculty of Medicine Baghdad*, vol. 63, no. 4, 2021, pp. 163-169.

[14] Al-Kindy Medical Students Research Team. "GERD Prevalence and Risk Factors among Al-Kindy Medical Students." *Al-Kindy College Medical Journal*, vol. 20, no. 1, 2024.

[15] Mu'taz, M. *et al.* "Gastroesophageal Reflux Disease in Medical Students: A Cross-Sectional Study." *Przeglad Gastroenterologiczny*, vol. 19, no. 3, 2024, pp. 303-310. https://doi.org/10.5114/pg.2024.143155.

[16] Alrashed, A.A. *et al.* "Prevalence and Risk Factors of Gastroesophageal Reflux Disease among Shaqra University Students." *Journal of Family Medicine and Primary Care*, vol. 8, no. 2, February 2019, pp. 462-467. https://doi.org/10.4103/jfmpc.jfmpc_443_18.

[17] Riaz, H. *et al.* "Gastroesophageal Reflux Disease (GERD) in Medical Students." *Journal of the Pakistan Medical Association*, vol. 60, no. 2, February 2010, pp. 147-150.

[18] Yaseri, H.F. "Gender Is a Risk Factor in Patients with Gastroesophageal Reflux Disease." *Medical Journal of the Islamic Republic of Iran*, vol. 31, September 2017. https://doi.org/10.14196/mjiri.31.58.

[19] Al Ghadeer, H.A. *et al.* "Prevalence of Gastroesophageal Reflux Disease and Associated Risk Factors in Saudi Arabia." *Cureus*, vol. 13, no. 11, November 2021. https://doi.org/10.7759/cureus.19599.

[20] Kohata, Y. *et al.* "Long-Term Benefits of Smoking Cessation on Gastroesophageal Reflux Disease." *PLoS One*, vol. 11, no. 2, February 2016. https://doi.org/10.1371/journal.pone.0147860.

[21] Healthline. "Can Exercise Help My Acid Reflux?" *Healthline*, April 2025. https://www.healthline.com/health/digestive-health/acid-reflux-exercise.

[22] Adeyemi, Maxwell. "The Effects of Tight Clothing on Health." *Trinidad and Tobago Newsday*, 2024. https://newsday.co.tt/2024/11/05/the-effects-of-tight-clothing-on-health/.

[23] Shukri, M.E.G. *et al.* "Effect of Palmaris Longus on Handwriting Skills." *Al-Kindy College Medical Journal*, vol. 19, no. 3, December 2023, pp. 31-35.

[24] Alkhathami, A.M. *et al.* "Risk Factors for Gastroesophageal Reflux Disease in Saudi Arabia." *Gastroenterology Research*, vol. 10, no. 5, October 2017, pp. 294-300. https://doi.org/10.14740/gr906w.