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GERD Prevalence and Risk Factors among Alkindey medical student

A research project submitted to the Family & Community Medicine department, Al-Kindy College of Medicine as a partial fulfillment of Research Module * Year III

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Abstract:

Background:

Gastroesophageal reflux disease (GERD) is a chronic condition in which stomach acid flows back into the esophagus, causing a variety of symptoms such as heartburn, regurgitation, and difficulty swallowing. GERD is a common disorder affecting people of all ages and can have a significant impact on their quality of life. It is caused by a malfunction of the lower esophageal sphincter (LES), which is a ring of muscle that acts as a valve between the esophagus and stomach. Risk factors for GERD include obesity, smoking, pregnancy, and certain medications. The treatment of GERD involves lifestyle modifications, such as avoiding trigger foods, and medication to reduce the amount of acid produced in the stomach. In severe cases, surgery may be necessary.

Objectives:

Assess the prevalence and risk factors of GERD in a previously understudied population of AL-Kindy medical student .

Methods:

The researchers achieved data collection by using an online questionnaire form. The questionnaire dealt with various parameters including, gender, age, stage, criteria of GERD such heartburn and regurgitation and GERD risk factors such obesity and NSAID’s use. For categorical variables, we used Chi square. The pie and bar charts are also used to visualize the results.

Results:

the age (46%) were between (20-21) years old. The rest (19 ,22 ,23,24,25,26) years old accounted for a total of (54%). Regarding gender more female participated (70.8%) than male (29.2%) . 87.6 % were smokers , 18% were Frequent use NSAID , 58.8 % were skip the breakfast , 25.6% were overweight , 74.8% were consume coffee or tea , 54% consume carbonated /soft drinks , and 68.8% were consume spicy foods or sour food. Also we found high prevalence of GERD among medical students with a percentage of (44.8%).

Conclusion:

We conclude that the majority of Al-Kindy medical students have GERD prevalence and risks to have this disease.

Keywords: GERD, prevalence, medical students, risk factors

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Introduction:

1a/ GERD:

Gastroesophageal reflux disease (GERD) is a chronic digestive disorder characterized by the reflux of stomach acid and/or bile into the esophagus, leading to symptoms such as heartburn, regurgitation, and chest pain.

GERD can also cause other symptoms such as cough, hoarseness, and difficulty swallowing. The condition is diagnosed through various tests such as upper endoscopy, pH monitoring, and barium swallow[1].

1b/ Prevalence of GERD:

The prevalence of GERD varies depending on the region and population studied. In the United States, it is estimated that approximately 20% of the adult population experiences GERD symptoms at least once a week, while 7% have daily symptoms.

In Europe, the prevalence of GERD symptoms ranges from 9% to 26% in the general population, with a higher prevalence in the elderly. In Asia, the prevalence of GERD is lower, ranging from 2.5% to 7.8%, but it is increasing[2].

1c/ Risk factors of GERD:

There are some risk factors that associated with GERD including:

- Obesity: Obesity is a major risk factor for GERD as it increases the pressure on the stomach and esophagus, leading to acid reflux. Studies have shown that individuals with a higher body mass index (BMI) are more likely to develop GERD symptoms[3].

- Smoking: Smoking is a known risk factor for GERD as it weakens the lower esophageal sphincter (LES), which is responsible for preventing acid reflux. Smoking also increases the production of stomach acid and reduces saliva production, which neutralizes acid[4].

- Alcohol consumption: Heavy alcohol consumption can increase the risk of GERD by causing the lower esophageal sphincter (LES) to relax and allowing acid to reflux into the esophagus[5].

- Certain medications: Certain medications such as non-steroidal anti-inflammatory drugs (NSAIDs), calcium channel blockers, and nitrates can increase the risk of GERD by relaxing the lower esophageal sphincter (LES) or irritating the esophagus[6].

1d/ The impact of GERD on life quality:

GERD has effect on life quality by impact on sleep, work and daily activities:

- Sleep: GERD can significantly impact a person's quality of sleep due to the discomfort caused by acid reflux. Studies have shown that individuals with GERD are more likely to experience insomnia, daytime sleepiness, and poor sleep quality[7].

- Work: GERD can also have a negative impact on a person's work productivity and performance. Individuals with GERD may experience absenteeism, reduced work productivity, and impaired job performance[8].

- Daily activities: GERD can also interfere with a person's ability to engage in daily activities such as exercise, socializing, and eating. Individuals with GERD may avoid certain foods, restrict physical activity, and limit social interactions due to the discomfort caused by acid reflux[9].

1e/ Treatment of GERD:

Current treatments available for GERD, including medications and lifestyle changes:

- Medications: There are several medications available to treat GERD, including proton pump inhibitors (PPIs), H2 receptor antagonists (H2RAs), and antacids. PPIs are the most effective and commonly used medications for GERD. They work by reducing the amount of acid produced by the stomach. H2RAs and antacids are less potent but can provide relief for mild to moderate symptoms[7]

- Lifestyle changes: Lifestyle changes can also help manage GERD symptoms. These include weight loss, avoiding trigger foods, elevating the head of the bed, and avoiding lying down after meals. Quitting smoking and reducing alcohol consumption can also help alleviate GERD symptoms[10].

Objectives:

The aim of a our study about GERD prevalence among medical students is to determine the frequency and distribution of GERD in medical students, and to identify potential risk factors associated with GERD.

Our study provides a general overview regarding the recent knowledge of GERD prevalence and risk factors.

Methodology:

A cross sectional study which means collecting data from a group of people at a single point in time to understand the prevalence of certain characteristics or outcomes in a population, was carried out in the medical school in Baghdad, Iraq namely (university of Baghdad Al-kindy college of medicine). The research team performed the study during the period of October 2022 to April 2023.

Accordingly, the study included 250 consenting third stage medical students. Of these, there was 177 female and 73 male. The research team designed a specific self-completed online questionnaire through Google Forms. The data collected by sharing The link of questionnaire to the students through social media groups.

voluntary response sampling was employed where individuals choose to participate in a study without being randomly selected. Voluntary response sampling can introduce biases into a study, as the individuals who choose to participate may not be representative of the larger population being studied. Therefore, results obtained from voluntary response sampling may not be generalizable to the broader population.

The questionnaire dealt with various parameters including, gender, age, stage, GERD criteria and GERD risk factors.

We used Microsoft Excel to make spreadsheets, tables, graphs, and figures. Also we used SPSS statistics 26 to perform data analysis. For categorical variables, we used Chi square. The pie and bar charts are also used to visualize the results.

Results:

A total number of (n=250) students from Al-kindy college participated in this study.

Table 1: Demographic characteristic (gender)

Gender	Frequency	Percent
Female	177	70.8%
Male	73	29.2%
Total	160	100%

Table 1 and figure 1: A total of 250 medical students participated in the study, of which 73 (29.2%) were male and 177 (70.8%) were female.

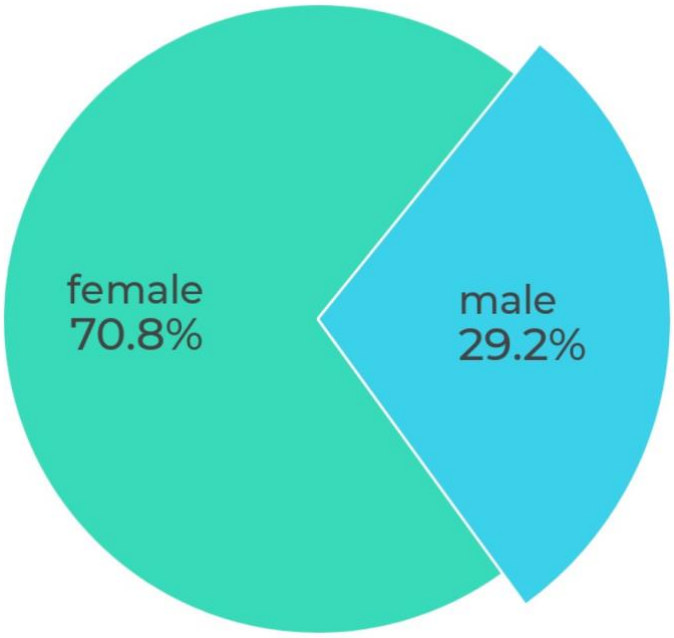

Figure 1 : percentage of each gender

Table 2: Demographic characteristic (Stage)

Grade	Frequency	Percent
1st	30	12%
2nd	52	20.8%
3rd	99	39.6%
4th	33	13.2%
5th	16	6.4%
6th	20	8%
Total	160	100%

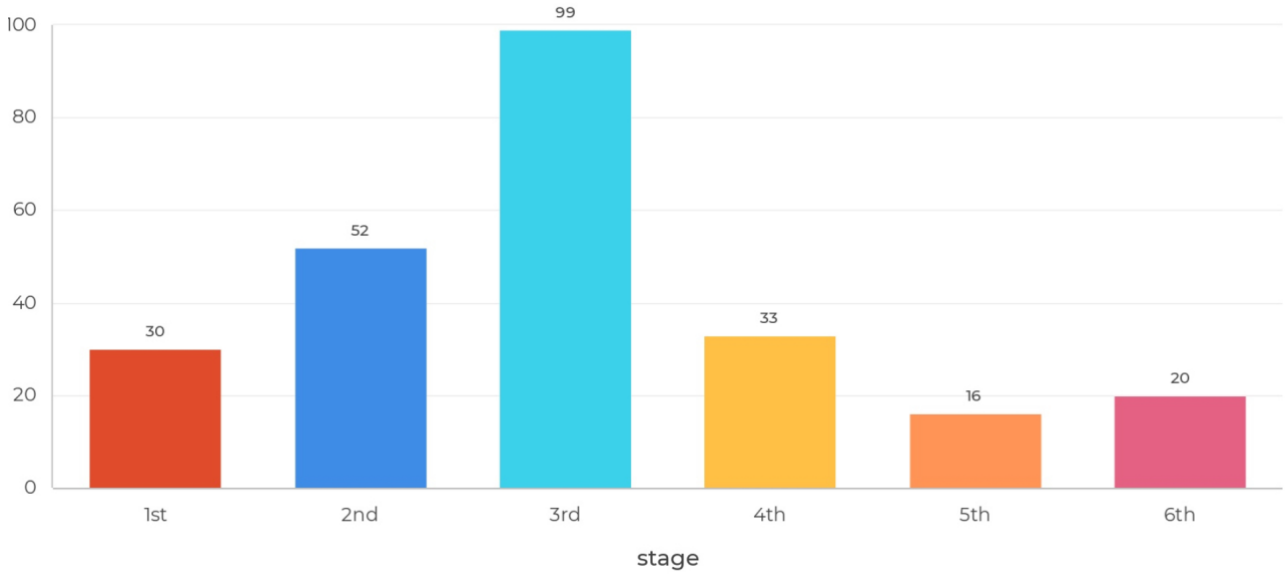

Figure 2: percentage of each stage participants

Table 2 and figure 2: The distribution of participants according to academic stage was as follows: 30 (12%) were in their first year, 52 (20.8%) were in their second year, 99 (39.6%) were in their third year, 33 (13.2%) were in their fourth year, 16 (6.4%) were in their fifth year, and 20 (8%) were in their sixth year.

Table 3: Demographic characteristic (Age)

Age	Frequency	Percent
18 years	16	6.4%
19 years	31	12.4%
20 years	77	30.8%
21 years	38	15.2%
22 years	25	10%
23 years	21	8.4%
24 years	15	6%
25 years	10	4%
26 years	17	6.8%
Total	160	100%

Table 3: A total of 250 medical students participated in the study, with ages ranging from 18 to 26 years old.

The distribution of age groups was as follows: 16 (6.4%) were 18 years old, 31 (12.4%) were 19 years old, 77 (30.8%) were 20 years old, 38 (15.2%) were 21 years old, 25 (10%) were 22 years old, 21 (8.4%) were 23 years old, 15 (6%) were 24 years old, 10 (4%) were 25 years old, and 17 (6.8%) were 26 years old.

Table 4: The criteria of GERD (Heartburn)

How often you experience heart burn?	Frequency	Percent
1 per day	65	26%
>1 per day	138	55.2%
never	47	18.8%
Total	160	100%

Table 4 and figure 3: Out of the 250 participants, 47 (18.8%) reported never experiencing a burning sensation in their chest, while 65 (26%) reported experiencing it once per day. The majority of participants, 138 (55.2%) reported experiencing a burning sensation more than once per day.

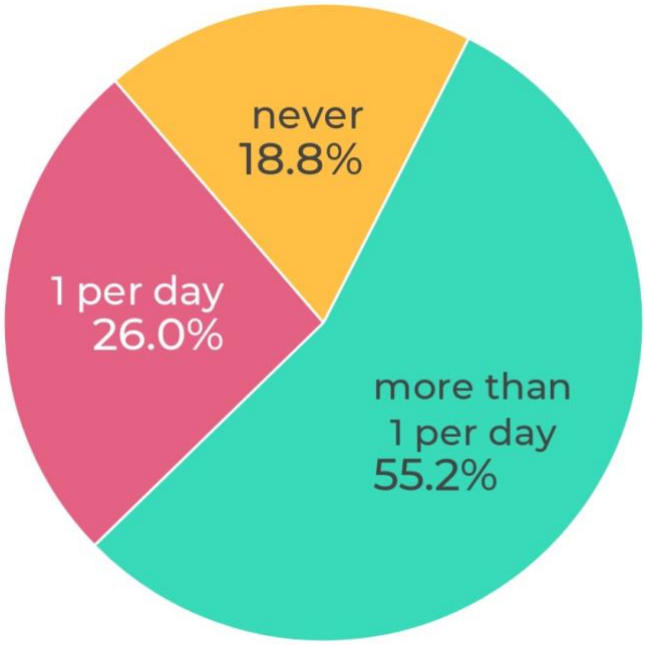

Figure 3: percentage of Heartburning sensation

These results suggest that a significant proportion of medical students experience GERD symptoms on a regular basis, with over half of the sample reporting daily symptoms.

Table 5: The criteria of GERD (Regurgitation)

How often you notice the content of your stomach moving up to your throat?	Frequency	Percent
Always	42	16.8%
Often	53	21.2%
Sometimes	124	49.6%
Never	31	12.4%
Total	160	100%

Table 5 and figure 4:

Out of the 250 participants, 31 (12.4%) reported never noticing this sensation, while 42 (16.8%) reported experiencing it always. A significant proportion of participants, 53 (21.2%) reported experiencing this sensation often, while 124 (49.6%) reported experiencing it sometimes.

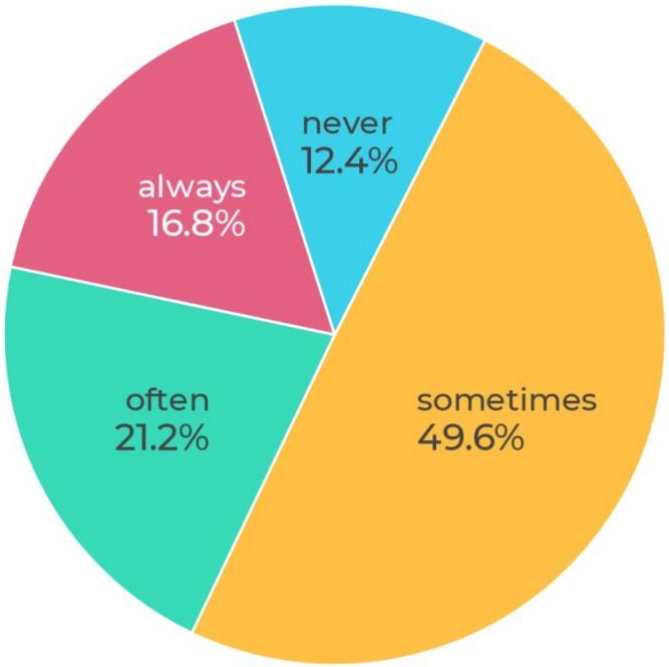

Figure 4: percentage of regurgitation

These results suggest that a large proportion of medical students experience regurgitation, a symptom commonly associated with GERD.

Table 6: The criteria of GERD (sleep disturbances due to heartburn)

Impaired sleep due to heartburn and / or regurgitation	Frequency	Percent
Always	116	46.4%
Often	42	16.8%
Somtimes	73	29.2%
Never	19	7.6%
Total	160	100%

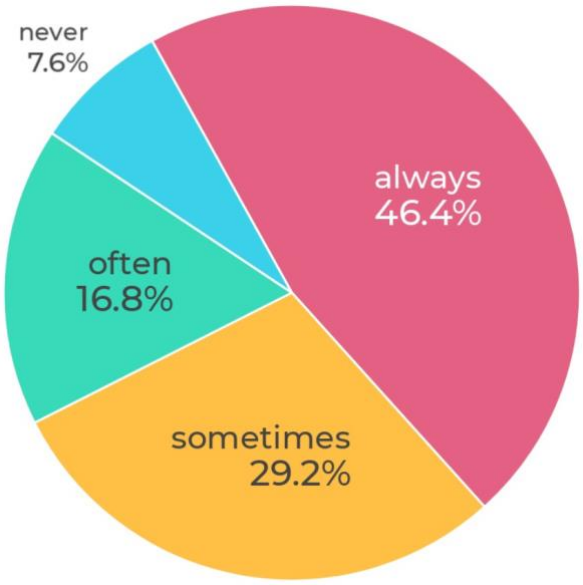

Figure 5: percentage of impaired sleep due to heartburn

Table 6 and figure 5: Out of the 250 medical students surveyed, 19 (7.6%) reported never experiencing impaired sleep due to these symptoms. However, a majority of the participants, 116 (46.4%) reported always experiencing impaired sleep due to heartburn and/or regurgitation. Additionally, 42 (16.8%) participants reported often experiencing impaired sleep due to these symptoms, while 73 (29.2%) reported sometimes experiencing impaired sleep.

These results suggest that GERD symptoms can have a significant impact on the quality of sleep among medical students.

Table 7: The prevalence of GERD among medical students

Prevalence of GERD among medical students	Frequency	Percent
GERD	112	44.8%
No GERD	138	55.2%
Total	160	100%

Table 7 and figure 6: Out of the 250 medical students who participated in the study, 112 (44.8%) were found to have GERD symptoms, while 138 (55.2%) did not report any GERD symptoms. These findings suggest that GERD is a prevalent condition among medical students.

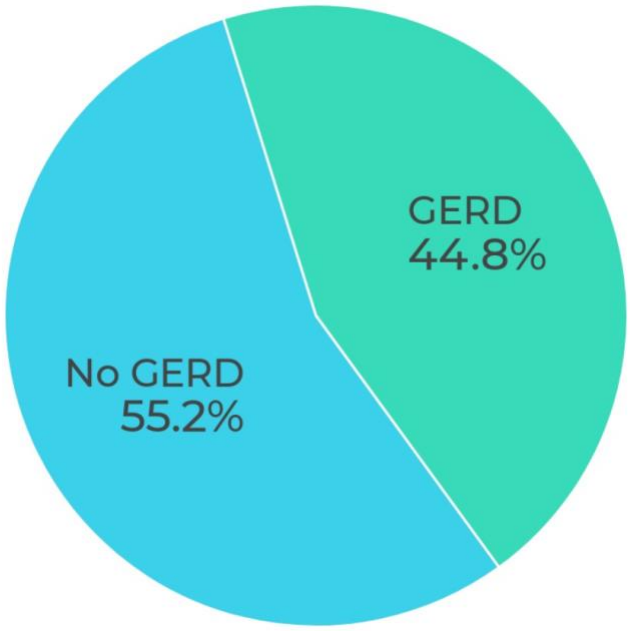

Figure 6: percentage of GERD prevalence

Table 8: Cross-tabulation of GERD and smoking

GERD Prevalence	Are you smoker? No	Are you smoker? Yes	Total	P-Value
GERD	94	18	112	0.113
No GERD	125	13	138	
Total	219	31	250	

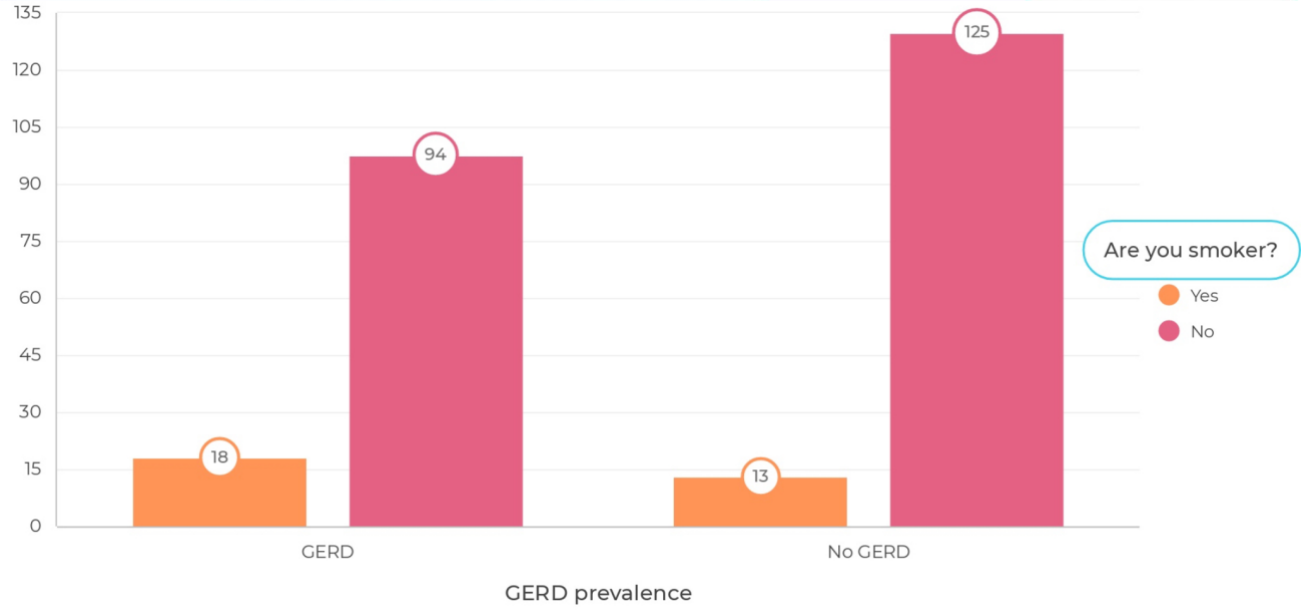

Figure 7: Bar chart reveals association between GERD and smoking

Table 8 and figure 7: The cross-tabulation between GERD and smoking revealed that out of 112 students with GERD, 94 were non-smokers (83.9%) and 18 were smokers (16.1%). Similarly, out of 138 students without GERD, 125 were non-smokers (90.6%) and 13 were smokers (9.4%). The p-value obtained was 0.113, which was not statistically significant, suggesting that there was no significant association between GERD and smoking among medical students in the study sample.

Table 9: Cross-tabulation of GERD and NSAID's use

GERD Prevalence	Frequent use of NSAID's? No	Frequent use of NSAID's? Yes	Total	P-Value
GERD	85	27	112	0.036
No GERD	120	18	138	
Total	205	45	250	

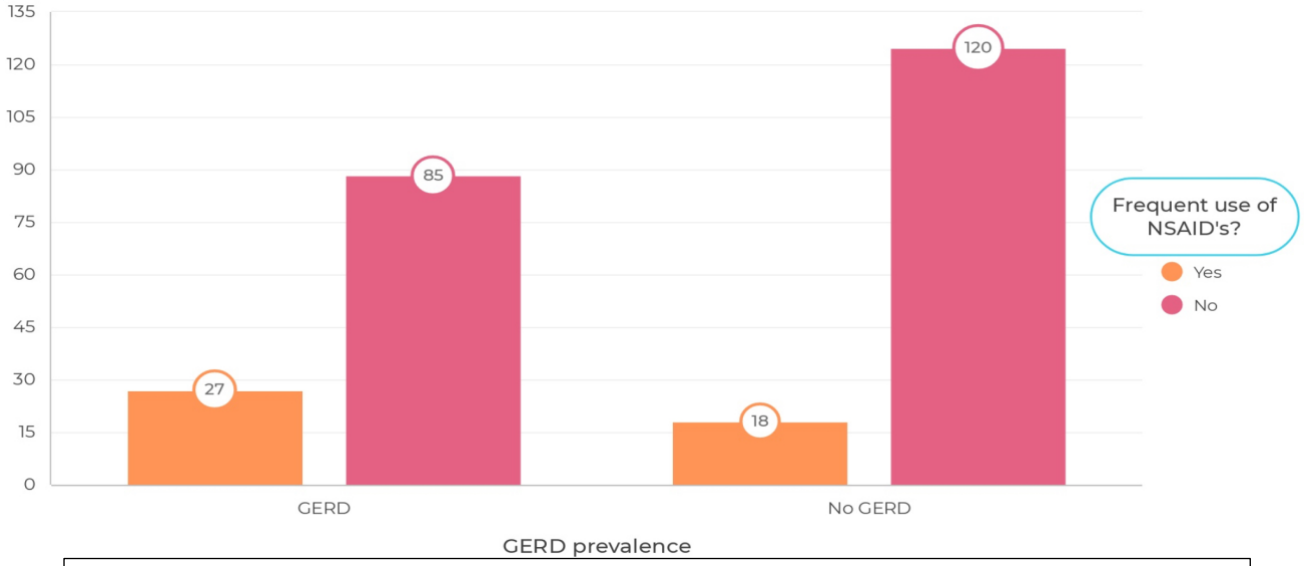

Figure 8: Bar chart reveals association between GERD and NSAID's use

Table 9 and figure 8: The cross-tabulation between GERD and frequent NSAID use revealed that out of the 112 students with GERD, 27 (24.1%) reported using NSAIDs frequently, while 85 (75.9%) did not use NSAIDs frequently. On the other hand, out of the 138 students without GERD, 18 (13%) reported using NSAIDs frequently, while 120 (86,96%) did not use NSAIDs frequently. The difference in NSAID use between those with GERD and those without GERD was statistically significant, with a p-value of 0.036. These findings suggest that NSAID use may be a risk factor for GERD in medical students.

Table 10: Cross-tabulation of GERD and missing the breakfast

GERD Prevalence	Frequently miss breakfast? No	Frequently miss breakfast? Yes	Total	P-Value
GERD	39	73	112	0.065
No GERD	64	74	138	
Total	103	147	250	

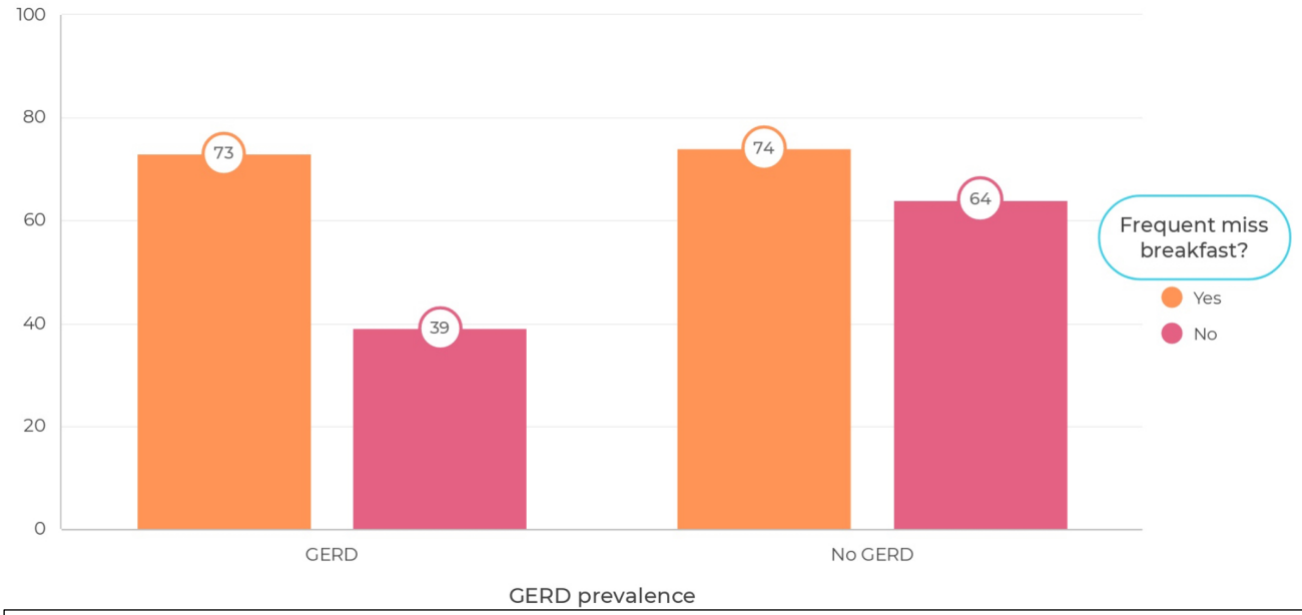

Figure 9: Bar chart reveals association between GERD and missing breakfast

Table 10 and figure 9: Among those who had GERD, 73 (65.2%) reported frequently missing breakfast, while 39 (34.8%) did not. On the other hand, among those who did not have GERD, 74 (53.6%) frequently missed breakfast, while 64 (46.4%) did not.

The chi-square test showed no statistically significant association between GERD and frequently missing breakfast, with a p-value of 0.065.

Table 11: Cross-tabulation of GERD and overweight

GERD Prevalence	Are you overweight? No	Yes	Total	P-Value
GERD	74	38	112	0.010
No GERD	112	26	138	
Total	186	64	250	

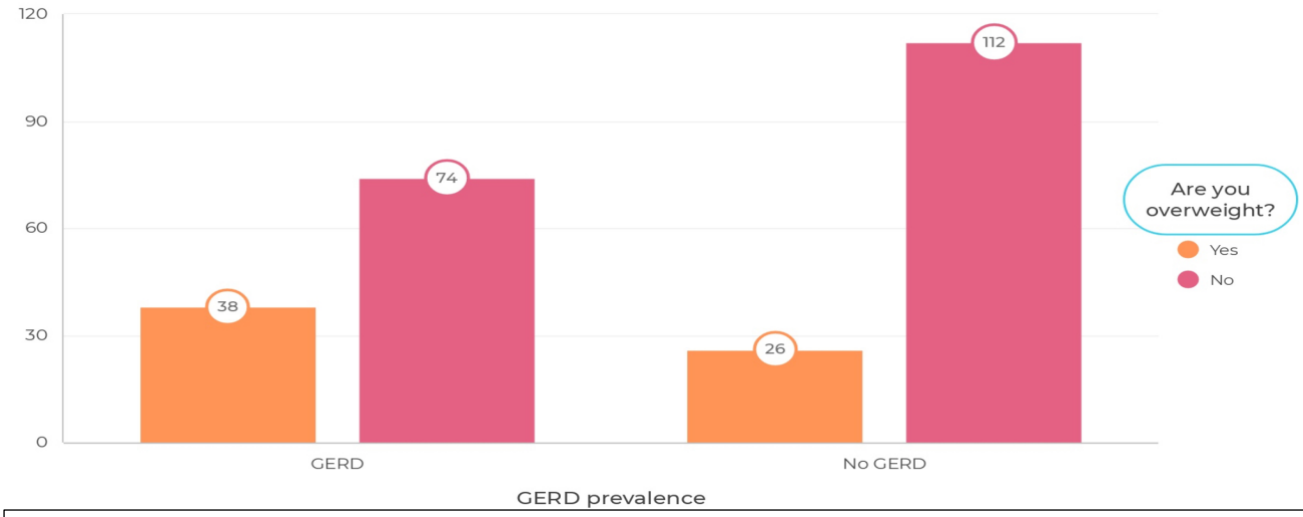

Figure 10: Bar chart reveals association between GERD and overweight

Table 11 and figure 10: The percentage of medical students with GERD who were overweight was 33.9% (38 out of 112), while the percentage of medical students with no GERD who were overweight was 18.8% (26 out of 138). Conversely, among the medical students who were not overweight, 66.1% (74 out of 112) had GERD, compared to 81.2% (112 out of 138) of those who were also not overweight. The results of the chi-square analysis indicated a statistically significant association between GERD and being overweight (p=0.010). These findings suggest that being overweight may be a risk factor for GERD among medical students.

Table 12: Cross-tabulation of GERD and coffee or tea

GERD Prevalence	you consume coffee or tea? No	Yes	Total	P-Value
GERD	24	88	112	0.275
No GERD	39	99	138	
Total	63	187	250	

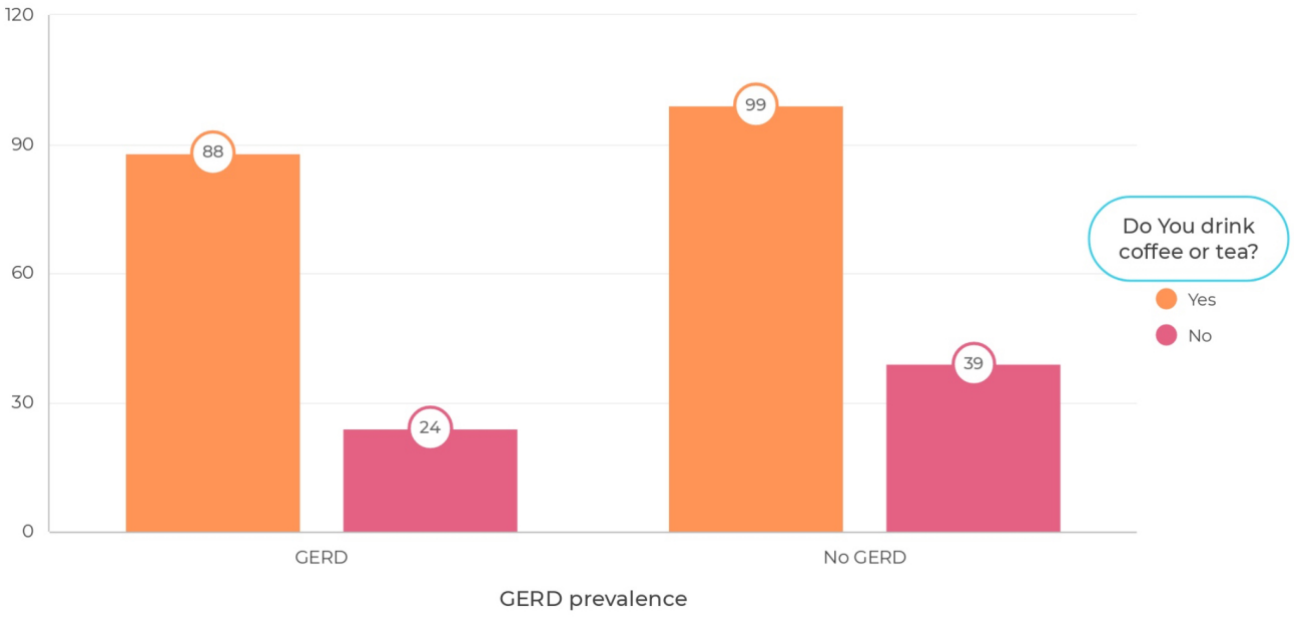

Figure 11: Bar chart reveals association between GERD and coffee or tea

Table 12 and figure 11: Among those who had GERD, 24 (21.4%) reported not drinking coffee or tea, while 88 (78.6%) reported drinking coffee or tea. Among those who did not have GERD, 39 (28.3%) reported not drinking coffee or tea, while 99 (71.7%) reported drinking coffee or tea.

The chi-square test yielded a p-value of 0.275, indicating that there was no significant association between GERD and drinking coffee or tea.

Table 13: Cross-tabulation of GERD and sour or spicy food

GERD Prevalence	consume spicy or sour food? No	Yes	Total	P-Value
GERD	45	67	112	0.380
No GERD	48	90	138	
Total	93	157	250	

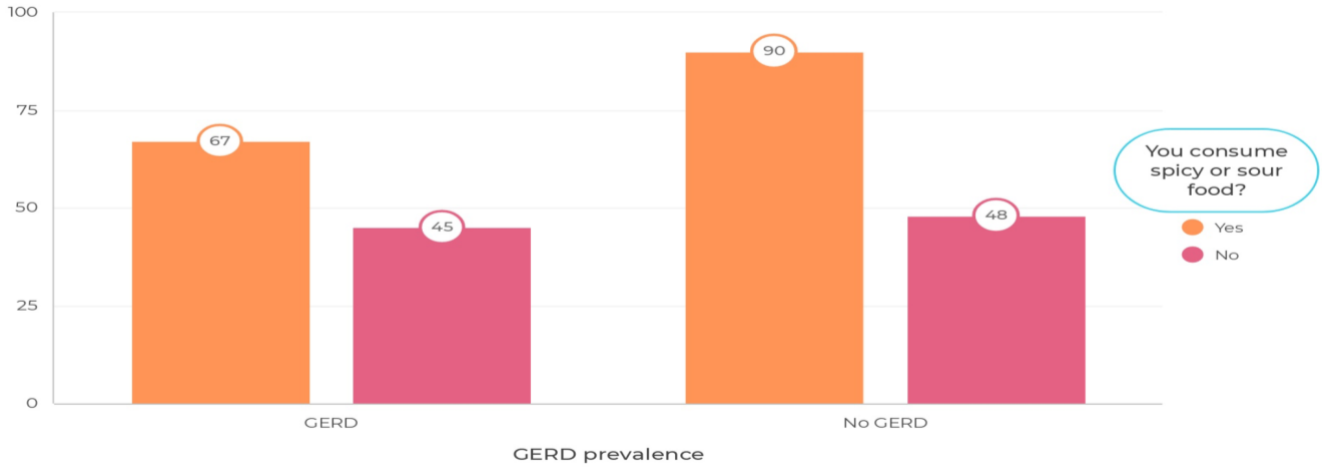

Figure 12: Bar chart reveals association between GERD and sour or spicy food

Table 13 and figure 12: The cross tabulation between GERD and consumption of sour or spicy food showed that out of the 112 participants with GERD, 45 (40.2%) reported not consuming sour or spicy food, while 67 (59.8%) reported consuming such food. Among the 138 participants without GERD, 48 (34.8%) reported not consuming sour or spicy food, while 90 (65.2%) reported consuming such food. The difference was not statistically significant (p=0.380). These results suggest that the consumption of sour or spicy food may not be a significant risk factor for GERD among medical students.

Table 14: Cross-tabulation of GERD and soft drinks

GERD Prevalence	you consume soft drinks? No	Yes	Total	P-Value
GERD	47	65	112	0.249
No GERD	68	70	138	
Total	115	135	250	

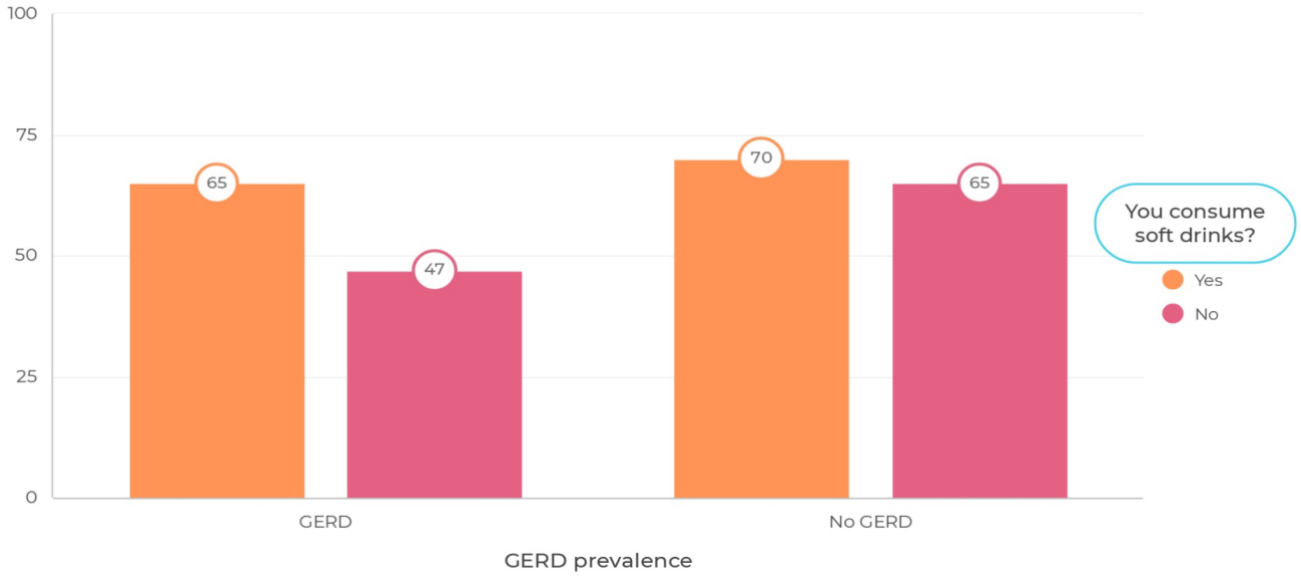

Figure 13: Bar chart reveals association between GERD and sour or spicy food

Table 14 and figure 13: The cross tabulation between GERD and soft drink consumption among medical students showed that 47 (29.17%) of students with GERD did not consume soft drinks while 65 (40.12%) of them did consume soft drinks. On the other hand, 68 (42.02%) of students without GERD did not consume soft drinks while 70 (43.21%) of them did consume soft drinks. The p value for this association was 0.249, indicating that there was no statistically significant association between GERD and soft drink consumption among medical students.

Discussion:

1-Demographic results (gender, stage and age):

In our study the the majority of participants were female (70.8%) while the male were the minority (29.2%), It is possible because that the sample of participants was randomly selected and the number of female participants happened to be the majority by chance.

Also the majority of participants were stage three medical students (39.6%) and the minority were from other stages, this disparity may be because it's our stage and many students are our friends therefore they participated in our study to help us.

The majority of ages in our study were (20 years) with a percentage of (30.8%) that because the most participants were at 3rd stage and this age is the standard age for the third stage medical students.

2-GERD criteria (Heartburn, regurgitation, and sleeping disturbances):

The results of the question "How often do you experience burning sensation in your chest?" indicate that a significant proportion of medical students experience GERD symptoms frequently, with 138 out of 250 respondents reporting experiencing symptoms more than once per day. This finding is consistent with previous study that have shown a high prevalence of GERD symptoms among young adults, including college students [11].

Interestingly, the results of our study also suggest that a significant proportion of medical students (47 out of 250) never experience burning sensation in their chest, despite potential exposure to risk factors such as stress or long periods of sitting during studying. This finding could be related to factors such as genetic predisposition as protective factor that may reduce the risk of GERD in some individuals.

The results of the question “How often do you notice that the content of your stomach have moving upwards to your throat?” indicate that a significant proportion of medical students experience symptoms of gastroesophageal reflux disease (GERD), with a majority reporting the sensation of stomach contents moving upwards towards the throat. Specifically, 42 participants reported experiencing this symptom always, while 177 reported experiencing it at least sometimes. This finding is consistent with previous research that has shown GERD to be prevalent among young adults, particularly in university populations [11].

The results of the question "Impaired sleep due to heartburn and /or regurgitation" showed a high prevalence of impaired sleep due to heartburn and/or regurgitation reported by the medical students in this study which is a concerning finding. A total of 158 students (63.2%) reported experiencing impaired sleep always or often due to GERD symptoms. This is consistent with previous research study that have reported a high prevalence of sleep disturbances among GERD patients [12].

3-GERD prevalence among medical students:

The present study found that 45% of the participants reported symptoms consistent with GERD. This finding is consistent with other studies that have reported a high prevalence of GERD among young adults and medical students [13].

The prevalence of GERD reported in the present study is higher than the general population, which has been reported to range from 10-20% [15]. This may be due to the fact that medical students are under significant academic stress, which has been shown to be a risk factor for the development of GERD [14].

4-GERD risk factors (smoking, NSAID's use, missing the breakfast, obesity, sour or spicy food, coffee, tea, and soft drinks):

The cross tabulation between GERD and smoking showed that there is no significant association between smoking and GERD among medical students.

This result is consistent with previous study that have found no significant association between smoking and GERD [16] However, other study has suggested that smoking may increase the risk of GERD by weakening the lower esophageal sphincter and reducing the rate of gastric emptying [17].

It is important to note that our study had some limitations, such as the use of self-reported data, which may be subject to recall bias and underreporting. Additionally, our sample size was relatively small, and our study was conducted on a single population of medical students, which may limit the generalizability of our findings.

The results of our cross tabulation between GERD and NSAID use showed that there was a significant association between NSAID use and GERD ($p=0.036$). The group of medical students who reported using NSAIDs had a higher prevalence of GERD compared to those who did not use NSAIDs. This finding is consistent with previous study that has reported an increased risk of GERD among individuals who use NSAIDs regularly [18].

NSAIDs are known to cause irritation of the stomach lining, which can lead to the development of GERD [19].

The results of the association between GERD and frequently missing breakfast among medical students. Our findings showed that there was no statistically significant association between GERD and frequently missing breakfast (p=0.065). Although the association was not significant, it is still important to note that there were more students with GERD who frequently missed breakfast compared to those without GERD.

This finding is consistent with a previous study. A study conducted in Japan found no significant association between breakfast skipping and GERD among the general population (Sasaki et al., 2015)[20].

On the other hand, our finding is not in agreement with other study. A study in Iran found that GERD was more prevalent among individuals who skipped breakfast compared to those who did not (Rafiei et al., 2016)[21].

Our study investigate the association between GERD and being overweight among medical students. The results of our study showed a significant association between being overweight and having GERD among medical students (p=0.010).

These findings are consistent with previous study that has identified a link between being overweight and the development of GERD [22]. One possible explanation for this association is that excess body weight increases pressure on the stomach, causing

acid reflux to occur more frequently. In addition, fat cells release hormones that can weaken the lower esophageal sphincter, which is a muscle that helps to keep stomach acid from flowing back into the esophagus [23].

The results of the cross tabulation between GERD and coffee/tea consumption showed that there was no significant association between the two variables (p=0.275). This finding is consistent with a study by El-Serag et al. (2014)[24] which found that coffee consumption was not associated with an increased risk of GERD. However, other study has reported conflicting results. A meta-analysis by Zhang et al. (2013)[25]. found that coffee consumption was associated with an increased risk of GERD.

The lack of significant association in our study may be due to several factors, such as the sample size or the specific population being studied. It is also possible that other factors not accounted for in our study may have influenced the results.

The cross-tabulation between GERD and consuming sour or spicy food showed that there was no significant association between them (p value= 0.380). These results suggest that consuming sour or spicy food may not be a risk factor for GERD among medical students.

This finding is consistent with some previous study that found no significant association between consuming spicy food and GERD [26]. However, other study has reported conflicting results,

with some suggesting that consuming spicy food may increase the risk of GERD [27].

It is important to note that this study was conducted among medical students, and the results may not be generalizable to the general population. Additionally, the frequency and amount of sour and spicy food consumption were not evaluated in this study, which may have influenced the results.

The results of our cross tabulation analysis between GERD and the consumption of soft drinks showed that there was no significant association between the two variables (p=0.249). This finding is consistent with a previous study that reported no significant association between the consumption of soft drinks and GERD [28]. However, other study has suggested that there may be a positive association between the consumption of carbonated beverages and GERD symptoms [29].

It is important to note that while our study did not find a significant association between the consumption of soft drinks and GERD, it is still important to consider the potential negative health effects of excessive soft drink consumption. Soft drinks are often high in sugar and can contribute to weight gain, which is a known risk factor for GERD. In addition, the acidity of some soft drinks can exacerbate symptoms of GERD, particularly if consumed on an empty stomach [30].

Conclusion:

- This research paper has shed light on the prevalence of GERD among medical students and associated risk factors.
- The majority of participants were female medical students (70.8%) compared to only (29.2%) of male.
- The majority of participants were (20) years of age at third stage.
- Our study suggests that there is a high prevalence of GERD and it’s criteria among medical students with a percentage of (44.8%).
- Our study found a significant association between GERD and NSAID’s use and obesity.

Recommendation:

1. We encourage medical students who are experiencing GERD symptoms to seek medical attention and receive proper diagnosis and treatment. This can help prevent complications and improve their quality of life.

2. We Advise medical students who frequently use NSAIDs to minimize their intake or switch to alternative pain management strategies to avoid exacerbating their GERD symptoms.

3. We suggest to Promote a healthy lifestyle among medical students, including maintaining a healthy weight and avoiding dietary triggers such as spicy, sour, or acidic foods and drinks.

4. We Encouraging regular meals, especially breakfast, may also be beneficial.

5. We Emphasize the importance of raising awareness about GERD and its risk factors among medical students and the general public to help prevent its onset and complications.

Limitations:

It is important to note that our study had some limitations, such as the use of self-reported data, which may be subject to recall bias and underreporting. Additionally, our sample size was relatively small, and our study was conducted on a single population of medical students, which may limit the generalizability of our findings.

References:

1. Katz, P. O., Gerson, L. B., & Vela, M. F. (2013). Guidelines for the diagnosis and management of gastroesophageal reflux disease. American Journal of Gastroenterology, 108(3), 308-328. https://doi.org/10.1038/ajg.2012.444

2. El-Serag, H. B., Sweet, S., Winchester, C. C., & Dent, J. (2014). Update on the epidemiology of gastro-oesophageal reflux disease: a systematic review. Gut, 63(6), 871-880. https://doi.org/10.1136/gutjnl-2012-304269

3. El-Serag, H. B., Graham, D. Y., Satia, J. A., & Rabeneck, L. (2005). Obesity is an independent risk factor for GERD symptoms and erosive esophagitis. American Journal of Gastroenterology, 100(6), 1243-1250. https://doi.org/10.1111/j.1572-0241.2005.41512.x

4. Jacobson, B. C., Somers, S. C., Fuchs, C. S., Kelly, C. P., & Camargo, C. A. Jr. (2006). Body-mass index and symptoms of gastroesophageal reflux in women. New England Journal of Medicine, 354(22), 2340-2348. https://doi.org/10.1056/NEJMoa054391

5. Kaltenbach, T., Crockett, S., & Gerson, L. B. (2006). Are lifestyle measures effective in patients with gastroesophageal reflux disease? An evidence-based approach. Archives of Internal Medicine, 166(9), 965-971. https://doi.org/10.1001/archinte.166.9.965

6. Festi, D., Scaioli, E., Baldi, F., et al. (2009). Body weight, lifestyle, dietary habits and gastroesophageal reflux disease. World Journal of Gastroenterology, 15(14), 1690-1701. https://doi.org/10.3748/wjg.15.1690

7. Katz, P. O., Gerson, L. B., & Vela, M. F. (2013). Guidelines for the diagnosis and management of gastroesophageal reflux disease. American Journal of Gastroenterology, 108(3), 308-328. https://doi.org/10.1038/ajg.2012.444

8. Hampel, H., Abraham, N. S., & El-Serag, H. B. (2005). Meta-analysis: obesity and the risk for gastroesophageal reflux disease and its complications. Annals of Internal Medicine, 143(3), 199-211. https://doi.org/10.7326/0003-4819-143-3-200508020-00006

9. Chen, C. L., & Orr, W. C. (2008). Sleep and gastroesophageal reflux disease: a wake-up call for physicians and patients. Journal of Clinical Gastroenterology, 42(2), 128-134. https://doi.org/10.1097/MCG.0b013e31802e5f38

10. Fass, R., & Sifrim, D. (2009). Management of heartburn not responding to proton pump inhibitors. Gut, 58(2), 295-309. https://doi.org/10.1136/gut.2008.167510

11- El-Serag, H. B., Satia, J. A., & Rabeneck, L. (2005). Dietary intake and the risk of gastro-oesophageal reflux disease: a cross-sectional study in volunteers. Gut, 54(6), 11-7.

12- Ruigómez, A., Johansson, S., Nagy, P., Martin-Pérez, M., & Rodríguez, L. A. (2009). Gastroesophageal reflux disease in children and adolescents in primary care. Scandinavian Journal of Gastroenterology, 44(4), 430-435. doi: 10.1080/00365520802600927.

13- Almadi, M. A., Alkhathami, A. M., Alzahrani, A. A., et al. (2015). Prevalence of gastroesophageal reflux disease (GERD) among medical students of University of Jeddah, Saudi Arabia. Journal of Clinical and Diagnostic Research, 9(11), OC01-OC04. doi: 10.7860/JCDR/2015/15888.6754.

14- Shaheen, N. J., Hansen, R. A., Morgan, D. R., et al. (2006). The burden of gastrointestinal and liver diseases, 2006. American Journal of Gastroenterology, 101(9), 2128-2138. doi: 10.1111/j.1572-0241.2006.00825.x.

15- El-Serag, H. B., Sweet, S., Winchester, C. C., & Dent, J. (2014). Update on the epidemiology of gastro-oesophageal reflux disease: a systematic review. Gut, 63(6), 871-880. doi: 10.1136/gutjnl-2012-304269.

16- El-Serag, H. B., Satia, J. A., & Rabeneck, L. (2005). Dietary intake and the risk of gastro-oesophageal reflux disease: a cross-sectional study in volunteers. Gut, 54(1), 11-7.

17- Jacobson, B. C., Moy, B., Colditz, G. A., & Fuchs, C. S. (2008). Postmenopausal hormone use and symptoms of gastroesophageal reflux. Archives of Internal Medicine, 168(16), 1798-1804.

18- Singh, G., & Triadafilopoulos, G. (1999). Epidemiology of NSAID induced gastrointestinal complications. Journal of Rheumatology Supplements, 56, 18-24.

19- Vakil, N., van Zanten, S. V., Kahrilas, P., Dent, J., & Jones, R.; Global Consensus Group. (2006). The Montreal definition and classification of gastroesophageal reflux disease: a global evidence-based consensus. American Journal of Gastroenterology, 101(8), 1900-1920.

20- Sasaki, S., Hattori, Y., & Kuriyama, N. (2015). Skipping breakfast is associated with gastroesophageal reflux disease. Journal of Gastroenterology, 50(4), 387-388.

21. Rafiei, M., Farahmand, F., Ghiasi, S., & Zojaji, H. (2016). Relationship between skipping breakfast and gastroesophageal reflux disease in Iranian adults. Middle East Journal of Digestive Diseases, 8(4), 289-294.

22. El-Serag, H. B., Graham, D. Y., Satia, J. A., et al. (2005). Obesity is an independent risk factor for GERD symptoms and erosive esophagitis. American Journal of Gastroenterology, 100(6), 1243-1250.

23. Jacobson, B. C., Somers, S. C., Fuchs, C. S., et al. (2006). Body-mass index and symptoms of gastroesophageal reflux in women. New England Journal of Medicine, 354(22), 2340-2348.

24. El-Serag, H. B., et al. (2014). Coffee and tea consumption and risk of gastroesophageal reflux disease: a systematic review and meta-analysis. American Journal of Gastroenterology, 109(3), 358-368.

25. Zhang, Y., et al. (2013). Coffee consumption and the incidence of gastroesophageal reflux disease: a systematic review and meta-analysis of prospective cohort studies. Nutrients, 5(6), 2079-2105.

26. Kim, J. H., Rhee, P. L., Lee, J. H., Lee, Y. S., Son, H. J., Kim, J. J., et al. (2015). The Effect of Spicy Food Intake on Gastroesophageal Reflux Symptoms in the General Population. Korean Journal of Gastroenterology, 66(4), 215-220.

27. Okamoto, K., Iwakiri, R., Mori, M., Hara, M., Oda, K., Danjo, A., et al. (2014). Influence of spicy food intake on the symptoms and esophageal function tests in gastroesophageal reflux disease. Journal of Gastroenterology and Hepatology, 29(Suppl 4), 65-68.

28. Aghdam, M. R., Asadi, K., Yaghoubi, M. A., Ansarin, K., & Ahmadpour, F. (2012). Association of carbonated drinks with gastroesophageal reflux disease and related symptoms in Shiraz, southern Iran. Journal of Research in Medical Sciences, 17(10), 929-934.

29. Richter, J. E., Barish, C. F., & Castell, D. O. (1986). Abnormal sensory perception in patients with esophageal chest pain. Gastroenterology, 91(4), 845-852.

30. Tutuian, R. (2011). Soft drinks and gastroesophageal reflux disease: effects on acid pocket formation and reflux. Journal of Neurogastroenterology and Motility, 17(3), 238-243