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ORIGINAL ARTICLE

Effects of Dietary Factors on Gastroesophageal Reflux Disease (GERD) Among the Student and Faculty of Public and Private Medical Universities of Karachi, Pakistan

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ABSTRACT

Aim: Gastroesophageal reflux disease (GERD) results from gastric contents moving into the esophagus, causing distressing symptoms and complications. Its prevalence has surged in the past two decades, notably in Asian countries. While nutritional management is common in clinical practice, definitive recommendations remain unclear. Few studies have explored the link between food and GERD.

Methods: We conducted a descriptive cross-sectional study involving 359 eligible subjects out of 405 participants. We employed purposive sampling, targeting medical students, teachers, and staff aged 18 to 60 from four universities. Data were analyzed using SPSS version 26.0 with a confidence interval of 95% and a significance threshold of $p < 0.05$.

Results: Among participants, 56.5% were female, with an average age of 24.55. Notably, 70.4% tested positive for GERD. Trigger foods included oily (24.2%) and spicy (45.4%) items, while 24.2% reported no specific triggers.

Conclusion: This study underscores the significance of dietary modifications in managing GERD symptoms. Tailoring diets to individual symptoms and adjusting meal size, timing, and composition offer more benefits than elimination diets, particularly focusing on smaller meals and avoiding late-night eating habits.

Keywords: Gastroesophageal reflux disease (GERD), reflux, esophageal disease, diet, nutrition, food intake, heartburn, fast-food.

INTRODUCTION

Gastroesophageal reflux disease (GERD) is a disorder caused by the reflux of gastric contents into the esophagus causing troublesome symptoms and/or complications.[1] It is characterized by decreased lower esophageal sphincter (LES) pressure and low sphincter relaxation span, this mechanism is mostly affected by dietary factors, lifestyles, and demographics. Among these variables, obesity and smoking are considered the most highlighted factors.[2]

The prevalence of GERD is 13-19% worldwide as it is one of the most common gastrointestinal diseases.[4] It was highest in Central and Eastern European countries and was strongly related to socioeconomic factors. Functional digestive disorders are believed to account for up to 50% of gastroenterology consultations.[3] The prevalence was less than 5% throughout Asia. It has been suggested that the occurrence of GERD has been increasing over the last two decades, and that reflux disease is much more common in Asian countries than initially anticipated.[1]

The most typical esophageal symptoms include heartburn, acid regurgitation, dysphagia, and chest pain. However, extraesophageal symptoms like cough, voice change, nausea, and asthma may be related to the condition. Persistent GERD is also known to lead to complications such as Barrett's esophagus, esophageal strictures, and adenocarcinoma.[4] Acid suppression therapy using proton pump inhibitors (PPIs) and H2-receptor antagonists and dietary modification are currently the first-line treatments for people with GERD, as recommended by the National Institutes of Health and the American College of Gastroenterology. Although nutritional management is routinely used in clinical settings, data on definitive recommendations are ambiguous. However, few studies have attempted to analyze the influence of food on GERD.[4,5]

This study aimed to determine the relationship between the consumption of unhealthy food and development of GERD, identify the symptoms of GERD using the validated F-scale and to assess the frequency of GERD among the students and faculty of public and private medical universities of Karachi, Pakistan.

MATERIALS AND METHODS

A total of 405 subjects consented to take part in our descriptive cross-sectional study. Of these, 359 were up to the inclusion criteria while the remaining were excluded. The sample size and demographic characteristics were calculated to be represented using Open EPI software. The samples were taken by using non-probability sampling that is purposive sampling. The study included medical students, teachers, and staff, aged 18 to 60 years, of two public (Sindh Medical College and Dow Medical College) and two private universities (Liaquat National Medical College and Ziauddin University). People above 60 or below 18, those who were not from the selected universities, and those who have undergone an endoscopic procedure, gastrointestinal surgery or had a congenital disease related to the gastrointestinal tract were excluded.

Socio-demographic information and past medical and surgical history were also included in the questionnaire. Age, gender, residence (rural or urban), and educational status were studied as demographic factors. The educational status was categorized into four classes: medical student, graduate, post-graduate, and no formal education. Marital status (married, unmarried, divorced, or widowed), employment status (Student, academic staff, or non-academic staff), and institute of the participant were studied as social factors. Past medical and surgical history included yes or no questions related to gastrointestinal surgery, endoscopy, and congenital diseases for the purpose of excluding the participants from the study.

Assessment of diet-related practices

Diet-related practices were predefined and evaluated in six domains (Large volume meals, rapid food intake, meal pattern, eating between meals, type of food, and late evening meals) using a self- structured questionnaire. Regarding meal patterns, participants were asked to quantify the number of meals they consume per day (one, two, three, or more than three) and if they eat them on a regular basis (yes or no). To assess the volume and time taken to consume the meals, the following questions were asked: 'How many portions do you take in each meal? (Quarter, half, full or double)' and 'How long does it take to eat a regular meal? (Less than ten minutes, ten minutes, fifteen minutes, twenty minutes or more than twenty minutes)'. Late evening meals and eating between meals were evaluated by the following questions:

'Do you eat in the late evening or at night? (Yes, no or sometimes)' and 'Do you eat between meals? (yes, no or sometimes)'. To characterize the type of food intake, the following questions were asked: 'Which food type triggers your heartburn? (Spicy, salty, sweet, oily, sour or none of the above)' and 'how often do you eat fast food? (Daily, once a week, twice a week, more than two times a week, once a month or never)'.

For the symptoms of GERD, FSSG (Frequency scale for the symptoms of GERD) was used. The FSSG consisted of 12 questions, which were scored to indicate the frequency of symptoms as follows: never=0; occasionally=1; sometimes=2; often=3; and always=4. Patients with FSSG scores of more than 8 were considered positive.

Statistical Analysis: All data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0 for Windows. The categorical variables were expressed in frequency and percentages, while the mean standard deviation was computed using descriptive statistics. In terms of percentages, cross- tabulations were done for relevant variables. Because of the qualitative character of the data, the statistical analysis was conducted with a 95 percent confidence interval and a p-value of <0.05 set as a statistical significance threshold.

RESULTS

An overall of 405 subjects participated in the study out of which 229 (56.5%) were females and 176 (43.5%) were males (Table 1). It was established that 4 out of the 229 females had a history of GI surgery and 6 out of 229 females had a history of endoscopic procedure while 11 out of 176 males had a history of GI surgery and 2 out of 176 males had a history of endoscopic procedure (Table 2). The overall mean age was 24.55 + 7.683 out of which 82.96% were under the age of 25 and 17.04% were above 25 (Table 1). Both students and staff (academic and non-academic) of the following medical universities took part in the study I.e. Ziauddin University (ZU), Dow University Health Sciences (DUHS), Jinnah Sindh Medical University (JSMU), Liaquat National Medical College (LNMC) (Table 6).

To determine the relationship between the consumption of unhealthy food and the development of GERD, the participants were asked for food types that triggered their heartburn and it was found that oily foods trigger heartburn in 24.2% of the participants, salty foods in 1.2%, sour foods in 2.7%, spicy foods in 45.4%, and sweet in 2.2% of the participants while 24.2% of the participants had no triggers based on what they ate (Table 3).

Participants were also assessed for the development of GERD based on their intake of fast food and the number of meals taken in a day (Table 4, 5). 15 out of 405 participants were not regular eaters and 9 of them had two meals a day. 251 of the regular eaters (390/405) had three meals a day, 35 of the 390 had more than three meals a day. 102 of 390 participants had two meals a day and 2 had one meal a day. Most of the participants I.e. 115 of 405 had fast food once a month followed by 113 participants who had fast food once a week. 87 of 405 participants had fast food twice a week and 71 participants had more than twice a week while 11 participants had fast food daily.

A validated f-scale was used to identify symptoms of GERD. A total score of 8 and above were considered as GERD positive cases. The frequency of symptoms used to define GERD varies from heartburn in 272 (67.2%) participants, bloating in 299 (73.8%) participants, and regurgitation in 149 (36.8%) participants. It is documented that 345 (85.2%) participants feel full after the meals, 223 (55.1%) participants burp a lot, and 124 (30.6%) participants get heartburn when they bend over.307 (75.8%) participants feel heavy after their meals, 170 (41.9%) participants feel sick after their meals, and 162 (40%) participants subconsciously rub their cheats after meals. 222 (54.8%) participants complained about dysphagia and 159 (39.3%) participants got a burning sensation in their throat and 261 (64.5%) participants got heartburn after their meals. It was found that 285 of the 405 participants (70.4%) were GERD positive while 120 of the remaining participants (29.6%) were GERD negative.

Table 1: Socio-demographics of the Study Participants (n=405)

Characteristics	Percentage	Mean ± SD
Age groups (in years)		24.55 ± 7.683
< 25 years	82.96%	
≥ 25 years	17.04%	
Gender		-
Male	43.5%	
Female	56.5%	
Marital Status		
Married	13.3%	
Unmarried	86.4%	
Employment Status		-
Student	84.7%	
Academic Staff	10.4%	
Non-academic Staff	4.9%	
Educational Status		-
Student	79%	
Graduate	10.9%	
Postgraduate	6.9%	
No Formal Education	3.2%	

Table 2: Cross-Tabulations

Gender

Female			Male	Total
History of Gastrointestinal Surgery	No	225	165	390
	Yes	4	11	15
Total		229	176	405

Gender

Female			Male	Total
History of Endoscopic Procedure?	No	223	174	397
	Yes	6	2	8
Total		229	176	405

Table 3: Which food type triggers your heartburn?

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	None of the above	98	24.2	24.2	24.2
	Oily	98	24.2	24.2	48.4
	Salty	5	1.2	1.2	49.6
	Sour	11	2.7	2.7	52.3
	Spicy	184	45.4	45.4	97.8
	Sweet	9	2.2	2.2	100.0
	Total	405	100.0	100.0	

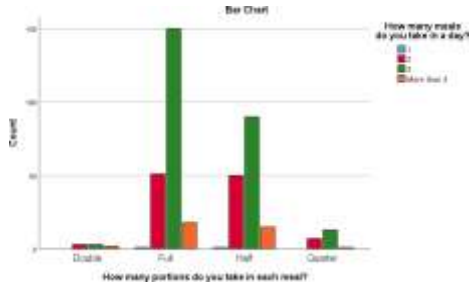


Table 4: How many meals do you take in a day?

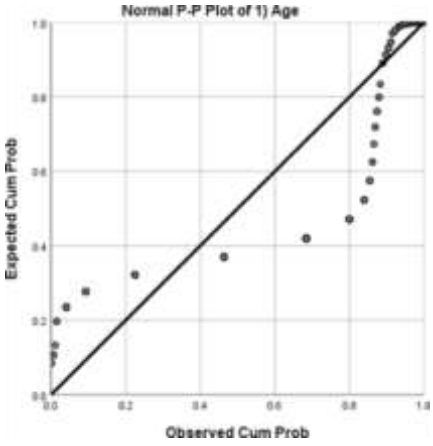
1			2	3	More than 3	Total
Do you eat regularly?	No	0	9	5	1	15
	Yes	2	102	251	35	390
Total		2	111	256	36	405

Table 5: Do you eat between meals?

No			Sometimes	Yes	Total
How often do you eat fast- food?	Daily	2	4	5	11
	More than two times a week	6	34	31	71
	Never	1	5	2	8
	Once a month	19	76	20	115
	Once a week	19	59	35	113
	Twice a week	9	49	29	87
Total		56	227	122	405

Table 6: Institute of the Participants

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	Dow University of Health Sciences	51	12.6	12.6	12.6
	Jinnah Sindh Medical University	276	68.1	68.1	80.7
	Liaquat National Medical College	28	6.9	6.9	87.7
	None of the above	17	4.2	4.2	91.9
	Ziauddin University	33	8.1	8.1	100.0
	Total	405	100.0	100.0	



DISCUSSION

The study aimed to evaluate the effects of dietary factors on Gastroesophageal reflux disease among medical students and faculty (both academic and non-academic) of public and private medical universities in Karachi, Pakistan. Gastroesophageal reflux disease also referred to as 'heart burn' by a layman, has a long-standing history. The condition typically presents with damage to mucosa (inner most lining) secondary to abnormal reflux of gastric contents in the esophagus.[6] A person who suffers from GERD commonly complains about a feeling of burning in the chest (heartburn) and regurgitation of the recently eaten meal.[6] Understandably, GERD tends to disturb the normal routine of the affected person, as shown by different studies (6). GERD has many risk factors. However, one of the risks that stand out is bad eating habits. People who take them irregularly or consume fatty meals very often are prone to developing GERD over time.[6] There are contradicting studies present regarding the effects of dietary factors on GERD, but most of them show that alteration in eating lifestyles improves a GERD patient.[6] GERD can occur due to genetic and environmental factors, including age, body weight, physical activity, and dietary lifestyle.[7] The current study does not discuss the effects of body weight and physical activity on the appearance of symptoms of GERD as compared to another study.[7] However, age and dietary lifestyles were given exceptional significance. Under the category of 'dietary lifestyle,' we discussed regularity of meals, numbers of meals during the day, time taken to have a meal, eating between the meals, eating in the evening or late at night, frequency of fast food intake, and the type of food that triggers the heartburn. The present study supports that people who eat between meals or eat late at night may suffer from symptoms of GERD; however, this discussion is not supported by other studies. Moreover, this study strongly believes that the number of meals consumed during the day matters greatly when it comes to GERD and related symptoms, which is also supported by another study.[7] The present study found that people who consume a greater number of meals are prone to have GERD symptoms, which contradicts the other study.[7] The difference in observation could be due to the studies done in different world regions among diverse populations. This study evaluated that intake of fried fatty, spicy or sour food can aggravate GERD symptoms, as supported by another study.[7] Our study did not discuss the relationship between general obesity and GERD. However, it had been concerned that diet and GERD are certainly interlinked with each other. People who eat larger portions and many meals are more likely to encounter GERD symptoms, i.e., heart burn, which is supported by another study based on die effects on GERD.[8] Moreover, the type of food has an incredible association with the occurrence of symptoms of GERD; the relationship between frequent intake of spicy and fried fatty foods is exceptional, as also supported by other research.[8] The present study also discussed whether posture is related to the appearance of symptoms of GERD. It was found that many people complained about symptoms of GERD appearing with bending forward posture, as mentioned in other studies.[8] According to a similar survey done among the medical students of a northern Indian medical school [9], developing GERD increases with age; since medical students are at middle age, therefore, chances are they may suffer from GERD as supported by the present study as well. Furthermore, we found out that people who consume large portions of meals and consume spicy, oily, or sour items frequently tend to aggravate their GERD symptoms, supported by other studies.[10] Besides, this study did not establish any relationship between marriage and GERD. However, data collected was majorly from unmarried people. Moreover, oddly, the study evaluated that people with high medical education status had poor dietary lifestyles, opposite to what other study suggests.[10]

CONCLUSION

GERD is one of the most commonly encountered medical diseases in both general and specialty care settings. The cost of diagnosing and managing the disease is high, and pharmacologic therapy may have negative effects. The purpose of this study is to emphasize the role of diet in disease control.

Despite the fact that the data supporting dietary intervention in GERD is inconsistent, similar themes have arisen that potentially help in patients' care. To begin, diets should be adjusted for individuals based on their symptoms, with foods and habits being reintroduced if symptoms are not controlled effectively. Furthermore, altering meal size, time, and the type of food appears to be more beneficial than elimination diets, with a focus on smaller meals and late-night eating behaviors. As individuals seek non-pharmaceutical treatments for their illnesses, well-designed randomized controlled trials are needed to investigate the effects of dietary factors on GERD.

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