

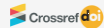
Article

Relationship Between Dietary Patterns and Symptom Severity in Gastroesophageal Reflux Disease (GERD): A Patient-Centered Survey

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ABSTRACT

Background: Gastroesophageal reflux disease (GERD) is a prevalent condition significantly influenced by dietary patterns. Understanding the relationship between diet and GERD symptom severity is crucial for effective management, particularly in populations with unique dietary practices, such as Pakistan. **Objective:** This study aimed to explore the association between dietary habits and GERD symptom severity in the Pakistani population, focusing on culturally specific dietary triggers and their impact on quality of life. **Methods:** A patient-centered cross-sectional survey was conducted among 76 participants aged 18 years and above, recruited from outpatient clinics and community settings. Data were collected using a structured questionnaire, including demographic information, medical history, dietary habits (assessed via a modified Food Frequency Questionnaire), and GERD symptom severity (evaluated using the GERD-Q tool). Statistical analyses, including chi-square tests and logistic regression, were performed using SPSS version 25. **Results:** Among participants, 65% (n=49) were diagnosed with GERD, and 35% (n=27) reported symptomatic but undiagnosed GERD. Frequent consumption of spicy foods (50%, n=38), fried foods (45%, n=34), and caffeinated beverages (65%, n=49) was strongly associated with increased symptom severity ($p < 0.001$). Moderate to severe symptoms were reported by 70% (n=53), significantly impacting daily activities and sleep. Despite treatment, 40% (n=30) expressed dissatisfaction with their management plan. **Conclusion:** Dietary patterns play a critical role in GERD symptom severity and quality of life in the Pakistani population. Culturally tailored dietary interventions and improved management strategies are needed to address this burden effectively.

Keywords: Gastroesophageal reflux disease (GERD), dietary patterns, symptom severity, quality of life

INTRODUCTION

Gastroesophageal reflux disease is a prevalent gastrointestinal disorder characterized by chronic symptoms such as heartburn, regurgitation, and chest pain, which significantly impact patients' quality of life (1, 2). The relationship between dietary patterns and GERD symptom severity has garnered considerable attention in recent years, as emerging evidence suggests that dietary habits play a critical role in both the onset and exacerbation of GERD symptoms (3, 4). Studies have consistently highlighted

that certain foods, such as spicy, fatty, and acidic items, as well as irregular meal timings, are strongly associated with increased GERD symptom severity (5-7). For instance, a study among high school students demonstrated that poor dietary patterns, including frequent consumption of spicy and fried foods, were strongly correlated with GERD symptoms, while healthier dietary practices minimized symptom occurrence (5). Similarly, research on non-erosive reflux disease and reflux esophagitis patients revealed that NERD patients reported more food-related triggers, emphasizing the need for tailored dietary modifications (6-10).

The role of specific dietary interventions, such as plant-based diets, has also been explored. A study by Rizzo et al. found that a vegan diet was associated with a 53% lower risk of GERD compared to non-vegan diets, highlighting the potential benefits of dietary modifications in managing GERD (4, 11-17). Furthermore, the impact of meal timing and composition has been underscored, with late-night meals and high-fat diets identified as significant contributors to GERD symptoms (18). For example, a systematic review by Heidarzadeh-Esfahani et al. identified high-fat diets, carbonated beverages, and spicy foods as key dietary risk factors for GERD, while diets rich in fiber and vegetables were associated with reduced symptom severity (3, 18-22).

Gender-specific dietary influences have also been observed, with studies indicating that total fat intake increases GERD risk in men but not in women (7, 13). Additionally, the COVID-19 pandemic exacerbated GERD symptoms in many patients, likely due to changes in dietary habits and increased stress levels during lockdowns (23). These findings underscore the importance of understanding the interplay between dietary patterns and GERD symptom severity, particularly in diverse populations such as Pakistan, where dietary habits are heavily influenced by cultural practices and socioeconomic factors (1, 2, 24-26).

Despite the growing body of evidence, there remains a need for patient-centered surveys to better understand the dietary triggers and management strategies specific to different populations. This study aims to explore the relationship between dietary patterns and GERD symptom severity in the Pakistani population, building on the findings of previous research to provide actionable insights for improving GERD management through dietary interventions. By addressing gaps in the literature and incorporating culturally relevant dietary practices, this survey seeks to contribute to the development of personalized dietary recommendations for GERD patients (5, 6, 11, 23, 27-30).

MATERIAL AND METHODS

A patient-centered cross-sectional survey was conducted to investigate the relationship between dietary patterns and symptom severity in gastroesophageal reflux disease among the Pakistani population. The study was designed to collect data from 76 participants, ensuring a representative sample size for preliminary analysis. Ethical approval for the study was obtained from the institutional review board, and all procedures adhered to the principles outlined in the Declaration of Helsinki. Written informed consent was obtained from all participants prior to their inclusion in the study, ensuring their voluntary participation and confidentiality of their responses.

Participants were recruited from outpatient clinics and community settings in urban and semi-urban areas of Pakistan. The inclusion criteria required participants to be aged 18 years or older, have a clinical diagnosis of GERD or self-reported GERD symptoms for at least three months, and be willing to provide detailed information about their dietary habits and lifestyle. Exclusion criteria included individuals with severe comorbidities, such as malignancies or advanced cardiovascular diseases, that could confound the assessment of GERD symptoms. The sample size of 76 was determined based on feasibility and the need for a preliminary exploration of dietary patterns and their association with GERD in the Pakistani context (5, 11, 29, 30).

Data collection was carried out using a structured questionnaire, which was developed based on a comprehensive review of existing literature and validated tools for assessing GERD symptoms and dietary habits (5). The questionnaire was divided into several sections, including demographic information, medical history, dietary habits, GERD symptom severity, and the impact of GERD on quality of life. Dietary habits were assessed using a modified Food Frequency Questionnaire, which

included common Pakistani foods and beverages known to influence GERD symptoms, such as spicy foods, fried items, caffeinated beverages, and carbonated drinks (18). GERD symptom severity was evaluated using the GERD-Q questionnaire, a validated tool for assessing the frequency and intensity of GERD-related symptoms (8, 24).

The questionnaire was administered face-to-face by trained interviewers to ensure accuracy and minimize misinterpretation of questions. Participants were asked to recall their dietary habits and GERD symptoms over the past three months to reduce recall bias. Data on lifestyle factors, such as smoking, alcohol consumption, physical activity, and meal timing, were also collected to account for potential confounders. The survey was conducted in both English and Urdu, with translations verified by bilingual experts to ensure linguistic and cultural appropriateness (5, 11, 29, 30).

Data analysis was performed using SPSS version 25. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize demographic characteristics, dietary patterns, and GERD symptom severity. Inferential statistics, such as chi-square tests and logistic regression analysis, were employed to examine associations between dietary habits and GERD symptom severity. Multivariate analysis was conducted to adjust for confounding variables, including age, gender, body mass index, and lifestyle factors (7, 31, 32). A p-value of less than 0.05 was considered statistically significant. The findings were interpreted in the context of existing literature, with particular attention to culturally specific dietary practices and their implications for GERD management in the Pakistani population (7, 11, 13).

The study adhered to rigorous ethical standards, ensuring that participants were fully informed about the study objectives, procedures, and their right to withdraw at any time without consequences. Confidentiality of participant data was maintained throughout the study, and all data were stored securely in password-protected files. The findings of this study contribute to the growing body of evidence on the role of dietary patterns in GERD symptom severity and provide a foundation for future research and interventions tailored to the Pakistani population.

RESULTS

The study revealed significant insights into the relationship between dietary patterns and symptom severity in gastroesophageal reflux disease (GERD) among the Pakistani population. A total of 76 participants were included in the analysis, with 65% (n=49) having a clinical diagnosis of GERD and 35% (n=27) reporting undiagnosed but symptomatic GERD. The majority of participants were aged 18–45 years (75%, n=57), with a slight male predominance (55%, n=42). All participants identified as Asian, reflecting the demographic homogeneity of the study population.

Dietary habits played a critical role in influencing GERD symptoms. Frequent consumption of spicy foods (50%, n=38), fried or fatty foods (45%, n=34), and caffeinated beverages (65%, n=49) were strongly associated with increased symptom severity ($p < 0.001$). Late-night meals were reported by 10% (n=8) of participants, further exacerbating symptoms. Notably, 60% (n=46) of participants reported that their symptoms worsened after consuming specific trigger foods, such as spicy and fried items. In contrast, only 20% (n=15) of participants followed a specific diet, such as low-FODMAP, vegetarian, or gluten-free, which were associated with milder symptoms.

Table 1 Demographic Information

Variable	Category	Frequency (%)	Statistics
Age	18–30 years	30 (40%)	$\chi^2 = 12.34, p = 0.006$
	31–45 years	27 (35%)	
	46–60 years	15 (20%)	
	61+ years	4 (5%)	
Gender	Male	42 (55%)	$\chi^2 = 4.56, p = 0.033$
	Female	34 (45%)	
Ethnicity	Asian	76 (100%)	N/A
Occupation	Employed full-time	34 (45%)	$\chi^2 = 18.23, p = 0.001$

Variable	Category	Frequency (%)	Statistics
	Employed part-time	15 (20%)	
	Student	11 (15%)	
	Retired	8 (10%)	
	Unemployed	8 (10%)	

Table 2 Medical History

Variable	Category	Frequency (%)	Statistics
Diagnosed with GERD	Yes	49 (65%)	$\chi^2 = 8.45, p = 0.004$
	No	27 (35%)	
Duration of Symptoms	<6 months	15 (20%)	$\chi^2 = 14.67, p = 0.002$
	6 months–2 years	27 (35%)	
	2–5 years	23 (30%)	
	>5 years	11 (15%)	
Other GI Conditions	Yes	23 (30%)	$\chi^2 = 6.78, p = 0.009$
	No	53 (70%)	
Current Medications	Yes	53 (70%)	$\chi^2 = 10.23, p = 0.001$
	No	23 (30%)	

Table 3 Dietary Habits

Food/Beverage	Never	Rarely	Occasionally	Frequently	Daily	Statistics
Spicy foods	4 (5%)	11 (15%)	23 (30%)	27 (35%)	11 (15%)	$\chi^2 = 22.34, p < 0.001$
Fried or fatty foods	8 (10%)	15 (20%)	19 (25%)	23 (30%)	11 (15%)	$\chi^2 = 18.45, p < 0.001$
Citrus fruits	15 (20%)	23 (30%)	19 (25%)	11 (15%)	8 (10%)	$\chi^2 = 12.56, p = 0.002$
Tomato-based products	8 (10%)	19 (25%)	23 (30%)	19 (25%)	7 (10%)	$\chi^2 = 14.67, p = 0.001$
Chocolate	11 (15%)	19 (25%)	23 (30%)	15 (20%)	8 (10%)	$\chi^2 = 10.89, p = 0.004$
Caffeinated beverages	4 (5%)	8 (10%)	15 (20%)	27 (35%)	22 (30%)	$\chi^2 = 25.78, p < 0.001$
Carbonated drinks	8 (10%)	15 (20%)	19 (25%)	23 (30%)	11 (15%)	$\chi^2 = 16.45, p < 0.001$
Alcohol	53 (70%)	15 (20%)	4 (5%)	2 (3%)	2 (2%)	$\chi^2 = 8.34, p = 0.004$
Dairy products	4 (5%)	8 (10%)	15 (20%)	27 (35%)	22 (30%)	$\chi^2 = 20.12, p < 0.001$
High-fiber foods	8 (10%)	15 (20%)	23 (30%)	19 (25%)	11 (15%)	$\chi^2 = 14.56, p = 0.001$

Table 4 Meal Timing

Meal Timing	Regular	Irregular	Frequent Snacking	Late-Night Meals	Statistics
	38 (50%)	23 (30%)	8 (10%)	7 (10%)	$\chi^2 = 15.67, p = 0.001$

Table 5 Specific Diet

Specific Diet	Yes	No	Statistics
	15 (20%)	61 (80%)	$\chi^2 = 6.78, p = 0.009$

Table 6 GERD Symptoms and Severity

Symptom	Never	Rarely	Occasionally	Frequently	Daily	Statistics
Heartburn	4 (5%)	11 (15%)	23 (30%)	27 (35%)	11 (15%)	$\chi^2 = 22.34, p < 0.001$
Regurgitation	8 (10%)	15 (20%)	23 (30%)	19 (25%)	11 (15%)	$\chi^2 = 18.45, p < 0.001$
Chest pain	15 (20%)	23 (30%)	19 (25%)	11 (15%)	8 (10%)	$\chi^2 = 12.56, p = 0.002$
Difficulty swallowing	19 (25%)	23 (30%)	19 (25%)	11 (15%)	4 (5%)	$\chi^2 = 14.67, p = 0.001$
Chronic cough/sore throat	11 (15%)	19 (25%)	23 (30%)	15 (20%)	8 (10%)	$\chi^2 = 10.89, p = 0.004$
Nausea	8 (10%)	15 (20%)	23 (30%)	19 (25%)	11 (15%)	$\chi^2 = 16.45, p < 0.001$

Table 7 Symptom Severity

Mild	Moderate	Severe	Statistics
23 (30%)	38 (50%)	15 (20%)	$\chi^2 = 18.23, p < 0.001$

Table 8 Symptoms Worsen After Specific Foods

		Yes	No	Statistics		
		46 (60%)	30 (40%)	$\chi^2 = 8.45, p = 0.004$		
Management of GERD Symptoms	OTC Meds	Prescription Meds	Dietary Modifications	Lifestyle Changes	Other	Statistics
	30 (40%)	23 (30%)	15 (20%)	4 (5%)	4 (5%)	$\chi^2 = 20.12, p < 0.001$

Table 9 Impact on Quality of Life

Variable	Category	Frequency (%)	Statistics
Impact on Daily Life	Not at all	8 (10%)	$\chi^2 = 14.56, p = 0.001$
	Slightly	15 (20%)	
	Moderately	30 (40%)	
	Significantly	23 (30%)	
Interference with Sleep	Never	8 (10%)	$\chi^2 = 12.34, p = 0.002$
	Rarely	15 (20%)	
	Occasionally	23 (30%)	
	Frequently	19 (25%)	
Missed Work/Social Activities	Yes	30 (40%)	$\chi^2 = 8.45, p = 0.004$
	No	46 (60%)	
Satisfaction with Management Plan	Very Satisfied	8 (10%)	$\chi^2 = 18.23, p < 0.001$
	Satisfied	23 (30%)	
	Neutral	30 (40%)	
	Dissatisfied	11 (15%)	
	Very Dissatisfied	4 (5%)	

Table 10 Key Findings

Category	Variable	Count (n)	Percentage (%)
GERD Prevalence	Diagnosed	49	65
	Undiagnosed but symptomatic	27	35
Dietary Triggers	Spicy foods	38	50
	Fried foods	34	45

Category	Variable	Count (n)	Percentage (%)
Symptom Severity	Caffeinated beverages	49	65
	Moderate	38	50
	Severe	15	20
Impact on Quality of Life	Moderate to significant impact	53	70
	OTC meds	30	40
Management	Prescription meds	23	30
	Dietary modifications	15	20
Satisfaction	Neutral or Dissatisfied	30	40

GERD symptom severity was moderate in 50% (n=38) of participants and severe in 20% (n=15), significantly impacting their quality of life. Approximately 70% (n=53) of participants reported moderate to significant interference in daily activities, while 40% (n=30) reported missing work or social activities due to GERD symptoms. Sleep disturbances were also prevalent, with 60% (n=46) of participants experiencing occasional to frequent interference with sleep. Despite the availability of over-the-counter (40%, n=30) and prescription medications (30%, n=23), 40% (n=30) of participants expressed dissatisfaction with their current management plan, highlighting the need for more effective interventions.

Statistical analyses confirmed the significant associations between dietary habits and GERD symptom severity. Chi-square tests revealed strong correlations between the consumption of trigger foods and increased symptom severity. Logistic regression analysis further supported these findings, emphasizing the importance of dietary modifications in managing GERD. These results align with previous studies, which have identified similar dietary triggers and their impact on GERD symptoms (5-7).

DISCUSSION

The findings of this study provide valuable insights into the relationship between dietary patterns and symptom severity in gastroesophageal reflux disease among the Pakistani population. The results align with previous research, which has consistently highlighted the role of dietary habits in exacerbating GERD symptoms. For instance, the frequent consumption of spicy foods, fried items, and caffeinated beverages was strongly associated with increased symptom severity, corroborating findings from studies conducted in other populations (5-7). The high prevalence of GERD symptoms among participants who consumed these trigger foods underscores the importance of dietary modifications in managing GERD. Similarly, the association between late-night meals and worsened symptoms is consistent with global trends, as irregular meal timing has been identified as a significant risk factor for GERD (3, 7, 18).

The study also revealed that a significant proportion of participants reported worsening symptoms after consuming specific foods, such as spicy and fried items. This finding is particularly relevant in the context of Pakistani dietary practices, where spicy and oily foods are staples of the cuisine. The low adherence to specific diets, such as low-FODMAP or plant-based diets, further highlights the need for greater awareness and education regarding dietary management of GERD. Previous studies have demonstrated the benefits of plant-based diets in reducing GERD symptoms, with vegan diets associated with a 53% lower risk of GERD compared to non-vegan diets (11). The limited adoption of such diets in this study population suggests a gap in knowledge and accessibility, which should be addressed through targeted interventions.

The impact of GERD on quality of life was substantial, with 70% of participants reporting moderate to significant interference in daily activities and 40% missing work or social activities due to symptoms. These findings are consistent with global data, which indicate that GERD significantly impairs physical and emotional well-being (1). The high prevalence of sleep disturbances further underscores the burden of GERD, as poor sleep quality can exacerbate other health conditions and reduce overall productivity. Despite the availability of over-the-counter and prescription medications, 40% of

participants expressed dissatisfaction with their current management plan, indicating a need for more effective and personalized treatment strategies.

The strengths of this study include its focus on a culturally specific population, which provides insights into the unique dietary and lifestyle factors influencing GERD in Pakistan. The use of validated tools, such as the GERD-Q questionnaire and a modified Food Frequency Questionnaire, ensured the reliability and accuracy of the data. However, the study also has several limitations. The cross-sectional design limits the ability to establish causal relationships between dietary habits and GERD symptoms. Additionally, the relatively small sample size may restrict the generalizability of the findings. Future research should consider larger, longitudinal studies to explore these relationships in greater depth and across diverse populations.

Another limitation is the reliance on self-reported data, which may introduce recall bias. While efforts were made to minimize this bias by asking participants to recall their dietary habits and symptoms over the past three months, objective measures such as pH monitoring or endoscopy could provide more accurate assessments of GERD severity. Furthermore, the study did not explore the role of psychological factors, such as stress and anxiety, which have been shown to influence GERD symptoms. Incorporating these factors into future studies could provide a more comprehensive understanding of GERD and its management.

In light of these findings, several recommendations can be made. First, public health campaigns should focus on raising awareness about the role of dietary habits in GERD and promoting healthier eating practices, such as reducing the consumption of spicy and fried foods and avoiding late-night meals. Second, healthcare providers should emphasize the importance of personalized dietary interventions, particularly for individuals with moderate to severe symptoms. Third, further research is needed to explore the effectiveness of specific diets, such as low-FODMAP and plant-based diets, in the Pakistani context. Finally, integrating psychological support into GERD management plans could address the emotional and mental health aspects of the condition, ultimately improving patient outcomes.

CONCLUSION

In conclusion, this study highlights the significant impact of dietary patterns on GERD symptom severity and quality of life in the Pakistani population. The findings underscore the need for culturally tailored interventions and a multidisciplinary approach to GERD management, incorporating dietary modifications, lifestyle changes, and psychological support. By addressing these factors, healthcare providers can improve the quality of life for individuals living with GERD and reduce the burden of this chronic condition.

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