ORIGINAL ARTICLE

Inflammatory Bowel Disease and Gastroesophageal Reflux Disease in Asthmatic Patients: A Cross-sectional Study of Prevalence and Clinical Association

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Abstract

Introduction: Gastroesophageal reflux disease (GERD) and inflammatory bowel disease (IBD) are chronic gastrointestinal (GI) conditions that may contribute to respiratory manifestations, including asthma. GERD, in particular, has been associated with extraesophageal symptoms such as bronchospasm, which may exacerbate or mimic asthma. **Objective:** To identify the prevalence of IBD and GERD among patients with Asthma, and to evaluate the possible clinical associations between asthma and these GI conditions. **Materials and Methods:** A cross-sectional study was conducted between July and December 2025 among Saudi male and female patients with asthma. A minimum sample size of 384 participants was calculated using a prevalence-based formula with a 95% confidence level and a 5% margin of error. Data were collected using a structured, self-administered electronic questionnaire reviewed by medical professionals for content validity, and pilot tested on 20 individuals to ensure clarity. Sections covered sociodemographic details, asthma-related clinical history, GI diagnoses, perceived associations between GI conditions and asthma, and asthma symptom control, which was assessed using the 2022 GINA Symptom Control Tool. Data entry was performed using Microsoft Excel (Windows 2021), and statistical analysis was conducted with IBM Statistical Package for Social Sciences Statistics version 25.0, employing descriptive statistics such as frequencies and percentages. **Results:** Among participants, 28.0% were diagnosed with GERD, and 10.7% with ulcerative colitis. A significant correlation was observed between these GI conditions and asthma control, with individuals diagnosed with GERD more likely to have uncontrolled asthma (31.8%) compared to those without GERD (18.8%). Furthermore, 52.8% of participants reported exacerbation of asthma symptoms after consuming heavy meals or lying down, highlighting a strong association between GERD and asthma symptoms. A smaller percentage (7.1%) had IBD, with an associated increase in uncontrolled asthma cases among IBD patients. **Conclusion:** GERD and IBD are prevalent comorbidities in asthma patients, significantly impacting asthma control. The study underscores the importance of considering GI conditions in asthma management, especially in patients with poorly controlled asthma. Further research is needed to explore the underlying mechanisms and potential for integrated treatment strategies.

Key words: Asthma, gastroesophageal reflux disease, inflammatory bowel disease

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INTRODUCTION

Gastroesophageal reflux disease (GERD) results from acidic stomach contents refluxing into the esophagus.[1] It commonly causes heartburn and may lead to extraesophageal symptoms such as hoarseness, Globus sensation, sour taste, and bronchospasm, which can result in asthma.[2] Asthma, a chronic inflammatory respiratory disease, affects 4–9% of the global population and is characterized by wheezing, dyspnea, and chest tightness.[3]

Similarly, inflammatory bowel disease (IBD), encompassing ulcerative colitis and Crohn's disease, results from an abnormal immune response in genetically predisposed individuals, often in response to environmental triggers.[4] Around 20–50% of IBD patients experience extraintestinal manifestations. The embryological similarity between the gastrointestinal (GI) and respiratory systems may explain this.[5]

IBD was conventionally believed to be a Western disease, but research conducted in the past 20 years shows that its prevalence is rising quickly in developing countries in the Middle East, Asia, and South America.[6]

Recent studies have identified strong associations between respiratory diseases and both GERD and IBD. For instance, asthma was more prevalent in IBD patients (14.5% vs. 8.1%), especially among women.[7] In addition, GERD has been linked to asthma (odds ratio [OR] 1.39), chronic bronchitis (OR 1.77), and other respiratory conditions.[8]

This study investigates the prevalence of IBD and GERD among asthma patients and their clinical associations. Limited research exists on the effect of asthma severity on such comorbidities. Understanding these relationships is crucial for better clinical management.

Objective

The objective are to identify the prevalence of IBD and GERD among patients with asthma, and to evaluate the possible clinical associations between asthma and these GI conditions.

MATERIALS AND METHODS

Study design

A cross-sectional study conducted between July and December 2025 based on relevant literature and expert input, adapted to fit the study objectives and population. The study's population consisted of Saudi adults (18 and above), both males and females.

Sample size

Based on a prevalence estimate, with a 95% confidence level and a 5% margin of error, the calculated minimum required sample size was 384.

Inclusion and exclusion

The study included Saudi Patients aged 18 years and above, both male and female, diagnosed with asthma. Participants who were non-Saudi or younger than 18 years of age were excluded from the study.

Method for data collection and instrument (data collection technique and tools)

Data were collected using a self-administered, structured electronic questionnaire developed through Google Forms. The link to the questionnaire was distributed to the target population through social media platforms and direct messaging. The questionnaire was specifically designed for this study, based on relevant literature and expert input, and it was adapted to fit the study objectives and population.[9]

The questionnaire consisted of several sections. The first section collected socio-demographic data, including age, gender, place of residence, and smoking status.

The second section gathered clinical information related to asthma, such as diagnosis status, duration of disease, severity (classified as mild, moderate, or severe), medication use, and the types of medications taken. Participants were also asked whether their work environment contains substances or conditions that may worsen asthma symptoms. In addition, a checklist was included to assess common asthma triggers, such as cigarette smoke or exposure to smokers, animal dander, strong odors (perfumes, cleaning products), and physical activity.

Asthma symptom control was evaluated using the GINA Symptom Control Tool (2022), which consists of four yes/no questions related to symptoms experienced over the past 4 weeks, including daytime symptoms, nighttime awakenings, limitations in daily activities, and the need for rescue inhaler use.

Participants were also asked about GI conditions, including prior diagnosis of GERD, Crohn's disease, or ulcerative colitis. Questions assessed the timing of GI symptoms in relation to asthma diagnosis, the perceived relationship between GI issues and asthma exacerbation, and the use of medications for GI problems.

Scoring system

The number of "Yes" answers to the GINA symptom control questions determined the score. Every "yes" indicates poor

control of asthma. Based on the total number of "yes" responses (which ranged from 0 to 4): 0 indicated well-controlled, 1–2 partly controlled, and 3–4 uncontrolled asthma.

Without using a cumulative score method, all other questionnaire factors, such as asthma triggers, medication use, and the existence of GI symptoms or diseases, were examined descriptively as categorical variables. The data were presented using percentages and frequencies, and where necessary, some categories were combined for statistical analysis. The questionnaire was reviewed by medical professionals to ensure content validity and was pilot tested on a small group to confirm clarity and appropriateness before final data collection.

Pilot test

The questionnaire was administered to 20 individuals as a pilot test to evaluate its clarity and assess the overall feasibility of the study. The data collected during this preliminary phase were excluded from the final analysis.

Analysis and entry method

The collected data were initially entered using Microsoft Excel software (Windows 2021) to ensure accurate data organization and verification. After data cleaning and checking for consistency, the dataset was transferred to IBM SPSS Statistics (Statistical Package for the Social Sciences) software, version 25.0 (IBM Corp., Armonk, NY), where all statistical analyses were performed.

RESULTS

The sociodemographic characteristics of the study sample (n = 422) presuppose a young adult cohort of the study population: almost two-thirds of the population is represented by individuals aged between 18 and 30 years. The largest proportion of participants (62.8% females) might also affect the health-related attitudes or behaviors that were measured during the study. The respondents were mostly well-educated, with most of them having at least a bachelor's degree. Geographical distribution is representative in all the regions, with the western and central region having more representation [Table 1].

This pie chart is used to describe the frequency of asthma severity in a population. Most of the cases include moderate (50.2%) and mild asthma (39.6) with a slight percentage of severe asthma (10.2%). This trend is typical of the asthma epidemiology, with the majority of patients having mild-to-moderate asthma, and only a minority with severe and high-risk asthma [Figure 1].

Table 1: Socio-demographic characteristics of participants (n=422)

Parameter	No.	Percent
Gender		
Female	265	62.8
Male	157	37.2
Age group		
18–30 years old	274	64.9
31–45 years old	76	18.0
46–60 years old	72	17.1
Nationality		
Yes	422	100.0
Residency		
Southern region	69	16.4
Eastern region	43	10.2
Northern region	63	14.9
Western region	129	30.6
Central region	118	28.0
Educational level		
Bachelor	229	54.3
Secondary or less	115	27.3
Diploma	44	10.4
Postgraduate studies	34	8.1

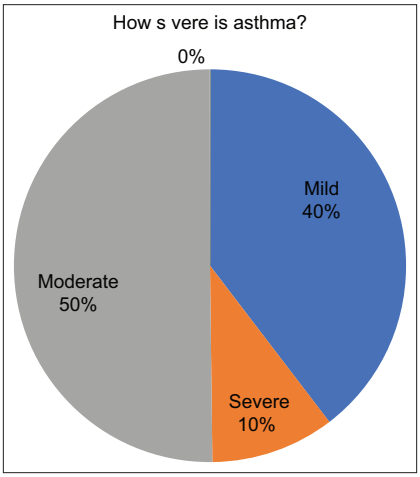

Figure 1: Illustratesseverity of asthma among participants (n = 422)

Based on the clinical profile of surveyed patients with asthma in Saudi Arabia (n = 422), the disease has a long-term burden of disease, and approximately a quarter of patients were diagnosed with the disease more than 10 years ago. The majority of respondents identified their asthma as moderate (50.2%), and the most prevalent triggers were dust (86.0%), strong odors (70.1%), and smoking (45.0), which is evidence of substantial environmental factors. Although the prevalence of symptoms is high, there is poor medication

adherence with only 18.7% taking daily therapy and many of them taking as-needed therapy. The most frequently used medications (69.2%) were bronchodilator inhalers, and a significant percentage (21.8) said they were taking no current medication [Table 2].

Table 2: Parameters related to clinical information related to asthma among participants in Saudi Arabia (*n*=422)

Parameter	No.	Percent
Have you been diagnosed with asthma?		
Yes	422	100.0
When were you diagnosed with asthma?		
Less than a year	59	14.0
Over 10 years	130	30.8
I don't remember	106	25.1
1–5 years	41	9.7
5–10 years	86	20.4
How severe is asthma?		
Mild	167	39.6
Severe	43	10.2
Moderate	212	50.2
Are you a smoker?		
No	363	86.0
Yes	59	14.0
Does your occupation involve working with materials or in environments that may aggravate your asthma symptoms?		
No	216	51.2
I don't work	128	30.3
Yes	78	18.5
Do any of the following factors cause your asthma symptoms to worsen (such as cough, shortness of breath, wheezing, chest tightness)? (More than one choice)		
Smoking	190	45.0
Strong odors (such as perfumes or cleaning products)	296	70.1
Dust	363	86.0
Works out	138	32.7
Animal hair	117	27.7
Do you use asthma medications regularly?		
Only when needed	251	59.5
I am not currently using any medication	92	21.8
Yes, daily	79	18.7
What medications do you use?		
Cortisone spray	112	26.5
Bronchodilator inhaler (Ventolin)	292	69.2
Oral cortisone pills	40	9.5
I am not using any medication	64	15.2

Table 3 indicates that the number of patients who are still having optimum asthma control according to the GINA Symptom Control Tool remains large. Over 50% (53.6) said they suffered the symptoms more than once a week, almost half suffered nocturnal (44.1) or activity restriction (46.7), which demonstrates ongoing functional impairment. Furthermore, the routine necessity to use relievers and nebulizers (50.9%) is an additional indication of poor symptom control.

The number depicts that most of the respondents (64.9) had no history of the mentioned GI diseases. The most frequent diagnosis of those with a diagnosis was GERD (28%), with a smaller percentage of 10.7 having a diagnosis of ulcerative colitis [Figure 2].

Table 4 points out the prevalence and characteristics of GI symptoms in 422 participants in the Saudi Arabian country. The prevalence of GERD was 28.0%, with 10.7% having ulcerative colitis and 64.9 having none. Almost half of the respondents (46.7%), did not have GI symptoms, 13.5% and 11.1% experienced a symptom after and before asthma diagnosis, respectively. A significant percentage (29.9) felt that GI issues increase the symptoms of asthma, and 52.8 reported that the symptoms increased after eating a lot or going to bed after a meal. Only 14.0% indicated that they used medications to address GI problems.

Table 5 illustrates the distribution of the participants based on GINA symptom control scores to control asthma. Most

Table 3: Parameters related to asthma symptom control using the GINA symptom control tool (*n*=422)

Parameter	No.	Percent
Over the past 4 weeks, have you experienced asthma symptoms such as wheezing, coughing, shortness of breath, chest tightness, or chest pain more than twice a week?		
No	196	46.4
Yes	226	53.6
In the past 4 weeks, have your asthma symptoms awakened you at night or caused you to wake up earlier than usual in the morning?		
No	236	55.9
Yes	186	44.1
During the past 4 weeks, has your asthma limited your ability to participate in activities? For example, avoiding rooms with smoke, perfume, or cooking odors, or feeling fatigued while walking or exercising?		
No	225	53.3
Yes	197	46.7
In the past 4 weeks, have you needed to use a nebulizer, nasal spray, or a blue inhaler?		
No	207	49.1
Yes	215	50.9

of the patients did not have optimal control with 41.7% of the patients were considered uncontrolled, and 28% partially controlled, with only 30% being well controlled.

The data presented in Table 6 reveals participants' GINA score was significantly related to age group and residency.

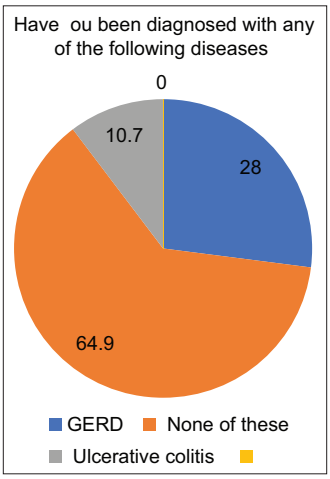

Figure 2: Illustrates if participants have been diagnosed with gastro intestinal diseases (*n* = 422)

Table 4: Parameters related to gastrointestinal symptoms among participants in Saudi Arabia (*n*=422)

Parameter	No.	Percent
Have you been diagnosed with any of the following diseases? (Choose as applicable)		
GERD	118	28.0
None of these	274	64.9
Ulcerative colitis	45	10.7
When did you start experiencing gastrointestinal symptoms?		
After being diagnosed with asthma	57	13.5
Before being diagnosed with asthma	47	11.1
I do not suffer from any gastrointestinal symptoms	197	46.7
I don't remember	121	28.7
Do you think asthma symptoms increase with gastrointestinal problems?		
Not sure	198	46.9
No	98	23.2
Yes	126	29.9
Do you notice that your asthma symptoms increase after eating a heavy meal or when lying down after eating?		
No	199	47.2
Yes	223	52.8
Do you use medications to treat gastrointestinal problems?		
No	363	86.0
Yes	59	14.0

While it showed a statistically insignificant relation with gender and educational level.

The data presented in [Table 7] reveals participants' GINA score was significantly related to if the participant has been diagnosed with GERD, IBD, or both of them.

DISCUSSION

This cross-sectional study assessed the prevalence rate of IBD and GERD in patients with asthma in Saudi Arabia and evaluated the clinical association of GI diseases and control of asthma symptoms. Among 422 Saudi adults with asthma, the study found that the prevalence of both GI (GERD) and ulcerative colitis (10.7%) were 28.0% and 10.7%, respectively, and there were significant associations between both these GI comorbidities with asthma control status (GINA symptom control tool).

The results of this study have shown that GERD is a significant comorbid condition among asthmatic patients, with 28.0% of the participants having the diagnosis of GERD. This prevalence shows a good correlation with other epidemiological data, which says that the prevalence rate of GERD in asthma patients is between 25% and 80%,[2] with many studies showing a rate between 25% and 40%.[2] A recent Mendelian randomization study confirmed the existence of a causally significant relationship between GERD and asthma in which a 39% higher risk of developing asthma was observed in genetically predicted GERD (OR 1.39, 95% confidence interval 1.25–1.56, $P < 0.001$).[8] Furthermore, bidirectional causality analysis has shown that GERD is a risk factor for asthma and that asthma also may worsen the symptoms of GERD due to increased intrathoracic pressure during coughing attacks and medication-induced relaxation of the lower esophageal sphincter.[3] The high rate of co-morbidity of GERD in asthma patients is especially important in view of the worse clinical outcome of patients with coexisting GERD and asthma, including higher frequency of exacerbations, poorer control of symptoms, and decreased quality of life.[2]

The current study showed that 52.8% of participants reported that asthma symptoms increased after heavy meals or lying down after eating, suggesting high patient perception of the association between GERD and asthma. This finding is supported by mechanistic evidence showing that gastric reflux can have multiple pathways of activity in stimulating

Table 5: The GINA symptom control questions score results among the participants (*n*=422)

Asthma control status	Frequency	Percent
Partially controlled asthma	118	28.0
Uncontrolled asthma	176	41.7
Well-controlled asthma	128	30.3
Total	422	100.0

Table 6: Relationship between GINA symptom control questions score and sociodemographic characteristics of Saudi participants (*n*=422)

Parameters	GINA score			Total (*n*=422)	*P*-value*
	Partially	Uncontrolled	Well-controlled		
Gender					
Female	71	112	82	265	0.783
	60.2%	63.6%	64.1%	62.8%	
Male	47	64	46	157	
	39.8%	36.4%	35.9%	37.2%	
Age group					
18–30 years old	80	126	68	274	0.0001
	67.8%	71.6%	53.1%	64.9%	
31–45 years old	8	35	33	76	
	6.8%	19.9%	25.8%	18.0%	
46–60 years old	30	15	27	72	
	25.4%	8.5%	21.1%	17.1%	
Residency					
Southern region	26	28	15	69	0.0001
	22.0%	15.9%	11.7%	16.4%	
Eastern region	3	16	24	43	
	2.5%	9.1%	18.8%	10.2%	
Northern region	14	31	18	63	
	11.9%	17.6%	14.1%	14.9%	
Western region	46	35	48	129	
	39.0%	19.9%	37.5%	30.6%	
Central region	29	66	23	118	
	24.6%	37.5%	18.0%	28.0%	
Educational level					
Bachelor	66	90	73	229	0.301
	55.9%	51.1%	57.0%	54.3%	
Secondary or less	31	57	27	115	
	26.3%	32.4%	21.1%	27.3%	
Diploma	13	18	13	44	
	11.0%	10.2%	10.2%	10.4%	
Post-graduate studies	8	11	15	34	
	6.8%	6.3%	11.7%	8.1%	

*P-value was considered statistically significant if ≤0.05

airway hyperresponsiveness: direct stimulation of the airway by acid entering the lungs through the vagus; aspiration of gastric contents into the airways leading to chronic airway inflammation; and increased airway responsiveness secondary to acidification of the esophagus.[10] A recent analysis of 45 cohort studies found a significant association between GERD and an increased incidence of asthma (pooled OR 1.50, $P < 0.001$), with a particularly strong association between the two conditions being found in individuals with uncontrolled asthma.[11] These findings highlight the critical role of identifying and controlling GERD in asthma patients as part of an overall approach to management of these patients.

Notably, the current study documented that the participants with GERD diagnosis were significantly more likely to have uncontrolled asthma (31.8%) compared to the ones without GERD (18.8%, $P = 0.011$), and this result remained significant after adjusting for age and other demographic variables. This observation is supported by several clinical studies, which have shown that GERD is an important modifiable risk factor for suboptimal asthma control.

Table 7: Relationhip between GINA symptom control questions score and gastrointestinal symptoms of Saudi participants (*n*=422)

Parameters	GINA Score			Total (*n*=422)	*P*-value*
	Partially	Uncontrolled	Well-controlled		
Have you been diagnosed with GERD?					
Yes	23	56	24	103	0.011
	19.5%	31.8%	18.8%	24.4%	
No	95	120	104	319	
	80.5%	68.2%	81.3%	75.6%	
Have you been diagnosed with IBD (UC, CD)?					
No	112	155	125	392	0.003
	94.9%	88.1%	97.7%	92.9%	
Yes	6	21	3	30	
	5.1%	11.9%	2.3%	7.1%	
Have you been diagnosed with both GERD and IBD?					
No	118	163	126	407	0.001
	100.0%	92.6%	98.4%	96.4%	
Yes	0	13	2	15	
	0.0%	7.4%	1.6%	3.6%	

*P-value was considered statistically significant if ≤ 0.05

A cross-sectional study of asthma patients reported that the prevalence of inadequate asthma symptom control in asthmatics with GERD was 71.6%, substantially higher than in the general asthma population.[12] These results support the inclusion of GERD evaluation and management in clinical guidelines for the treatment of asthma because therapeutic interventions directed at the reflux disease have been linked to improvements in pulmonary function tests and asthma-related quality of life measures.

The study also found an association between IBD and asthma control, with 7.1% of the study participants providing a diagnosis of IBD (ulcerative colitis or Crohn's disease) and 3.6% giving both IBD and GERD. Among the patients with IBD, 11.9% had uncontrolled asthma compared to 8.5% without IBD (P = 0.003). This finding expands the current knowledge of the comorbidity of IBD and respiratory diseases. A large Northern European population-based study (RHINE study) among 195 patients with IBD and 11960 controls, documented a significantly higher prevalence of asthma in patients with IBD than in the general population (an association particularly pronounced in women; adjusted OR 2.72, 95% confidence interval 1.67–4.46) but not in men.[7] Furthermore, the association was greater for ulcerative colitis (adjusted OR 2.02 95% confidence interval 1.27–2.19) than for Crohn's disease (adjusted OR 1.66 95% confidence interval 0.69–3.95), a gender-specific finding that needs to be further investigated.[7]

The gender predominance in the present study (62.8% female) may be of importance in view of the finding in the existing literature of an association of IBD with more severe asthma in female patients. The study performed by the research group on human immunodeficiency virus (RHINE) found that among IBD patients, women showed a significantly increased risk of coexisting asthma when compared with men, which results in potential sex specific immunological mechanisms or hormonal influences on the IBD-asthma association.[7] In the current cohort, females accounted for 112 of the 176 uncontrolled asthma cases (63.6%), which reflects the general female predominance of the sample. This male participant underrepresentation restricts our ability to analyze patterns of the IBD-asthma association by gender; however, this is consistent with epidemiological trends highlighting increased prevalence and increased diagnosis rates of asthma among adult women.

The mechanism by which the IBD-asthma link occurs is not fully understood but is likely to involve similar inflammatory mechanisms. The embryological similarity between the respiratory and GI systems and the immune dysregulation of the mucosa in both diseases gives a sound biological basis for this association.[5] Recent Mendelian randomization analysis showed a causal relationship for asthma and risk of ulcerative colitis (OR 1.019, 95% confidence interval 1.001–1.045, P = 0.006) with interleukin-18 being a potential mediator of the association, accounting for about 3.9% of the effect.[13] These results indicate that systemic inflammatory markers and immunological dysregulation in asthma may be a predisposing factor for a following IBD development which is in line with the temporality of some patients in the current study, where GI symptoms preceded the asthma diagnosis in 11.1% of cases.

The study population showed significant exposure to environmental triggers, where the highest incidence (86.0%), strong odors (70.1%), and smoking (45.0%) were implicated as the major asthma trigger factors. These findings are consistent with exposure patterns in the environment documented in Middle Eastern and South Asian asthma cohorts in which dust and particulate matter from arid climates are major modifiable risk factors.[14] A recent comprehensive review that focused on environmental determinants of asthma control reported that exposure to particulate matter with a diameter <2.5 μm (PM2.5) and allergens were significant determinants of asthma exacerbation risk and a decrease in lung function parameters.[15] In the present study, only 18.7% of the participants reported the daily use of asthma medication, while 21.8% reported the noncurrent use of asthma medication despite the confirmed diagnosis of asthma, indicating suboptimal adherence to asthma medication. This poor adherence pattern is in line with global observations on the management of asthma, where medication adherence rates generally vary between 30% and 70% in both adult and pediatric populations.[16] Importantly, the majority of participants (69.2%) only used bronchodilator inhalers for symptom management, with only 26.5% using inhaled corticosteroids, suggesting possible under-treatment of the underlying inflammatory disease process. These adherence and treatment patterns are likely responsible for the high prevalence of uncontrolled asthma (41.7%) and partially controlled asthma (28.0%) found in the cohort.

The results of the study showed that 29.9% of the study populations believed there was a causal relationship between GI problems and asthma exacerbation, and only 14.0% were taking medications to treat GI problems. This mismatch between the perception of the symptoms and therapeutic intervention is a major clinical opportunity. Several clinical studies have shown that treatment of GERD in asthma patients (both pharmacological (proton pump inhibitors, histamine-2 receptor antagonists) and behavioral modification) can result in improvements in asthma control measures.[2] A systematic review and meta-analysis of the literature related to GERD and asthma concluded that asthma patients with coexisting GERD may benefit greatly from reflux management strategies, with improvements in pulmonary function testing and quality of life in patients with asthma as a whole.[10]

The cross-sectional design of this study, although giving valuable descriptive epidemiological information, cannot prove causality of the temporal or causal relationship between GI diseases and asthma outcomes. The use of self-reported diagnoses instead of objective clinical confirmation (e.g., endoscopy for the diagnosis of GERD or colonoscopy for the confirmation of IBD) is a limitation, given the possible influence of patient recall bias and diagnostic uncertainty. In addition, there may have been selection bias due to the distribution of the questionnaire using social media and direct messages, wherein participation in the study may have been skewed to younger individuals with greater digital activity, as shown by the 64.9% of participants aged 18–30 years. The cross-sectional nature also prevented assessment of temporal relationships between the onset of GI disease and the development of asthma, limiting the ability to make inferences about their mechanisms.

CONCLUSION

This study adds valuable prevalence data on the comorbidity of GERD, IBD, and asthma in the Saudi Arabian population, revealing significant associations between these and asthma control status. The results highlight the need for systematic screening of GI comorbidities in asthma, and especially among patients with poorly controlled asthma, as well as the need for integrated management that addresses both the respiratory and GI manifestations of disease to optimize therapeutic outcome. Future prospective and mechanistic studies with the inclusion of objective diagnostic confirmation of GI diseases and spirometric evaluation of the severity of asthma would further clarify the pathophysiological basis of these associations and inform evidence-based integrated treatment strategies.

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ETHICAL APPROVAL

The study was fully explained to all participants, and it was emphasized that participation was voluntary. Written informed consent was obtained from each participant before enrollment. All collected information was securely stored and used exclusively for research purposes.

INFORMED CONSENT

Written informed consent was obtained from all study participants.

DATA AND MATERIALS AVAILABILITY

All data generated or analyzed during this study are included in this published article.

REFERENCES

1. Alrezuk AM, Ismail MH, Alsulaiman RM, Alamri TA, Alhafid IA, Alzahrani IM, *et al*. Prevalence and risk

factors of gastroesophageal reflux disease in patients with dyspeptic and reflux symptoms: An endoscopy-based prospective study from Al Khobar, Saudi Arabia. J Epidemiol Glob Health 2025;15:58.
2. Qureshi F, Asad H, Patel PS, Ramprasad A, Singh SP, Suman S, *et al*. Gastroesophageal reflux disease-associated chronic cough: A population-based analysis of patient presentations in the United States. Cureus 2021;13:e17512.
3. Gong T, Kuja-Halkola R, Harder A, Lundholm C, Smew AI, Lehto K, *et al*. Shared genetic architecture between gastro-esophageal reflux disease, asthma, and allergic diseases. Commun Biol 2024;7:1077.
4. Mahfuz M. Foiling inflammatory bowel disease. Sci Transl Med 2013;5:209ec178.
5. Pemmasani G, Loftus EV, Tremaine WJ. Prevalence of pulmonary diseases in association with inflammatory bowel disease. Dig Dis Sci 2022;67:5187-94.
6. Wang R, Li Z, Liu S, Zhang D. Global, regional and national burden of inflammatory bowel disease in 204 countries and territories from 1990 to 2019: A systematic analysis based on the global burden of disease study 2019. BMJ Open 2023;13:e065186.
7. Kisiel MA, Sedvall M, Malinovschi A, Franklin KA, Gislason T, Shlunssen V, *et al*. Inflammatory bowel disease and asthma. Results from the RHINE study. Respir Med 2023;216:107307.
8. Cheng X, Shi J, Zhang D, Li C, Xu H, He J, *et al*. Assessing the genetic relationship between gastroesophageal reflux disease and chronic respiratory diseases: A Mendelian randomization study. BMC Pulm Med 2023;23:243.
9. Bakdounes D, Dughly R, Almasri IA, Martini N, Hanna M, Albelal D, *et al*. High prevalence of uncontrolled asthma and its association with obesity and GERD-related symptoms in Syria: A multicenter cross-sectional study. Health Sci Rep 2025;8:e70828.
10. Grandes XA, Talanki Manjunatha R, Habib S, Sangaraju SL, Yepez D. Gastroesophageal reflux disease and asthma: A narrative review. Cureus 2022;14:e24917.
11. Mallah N, Turner JM, González-Barcala FJ, Takkouche B. Gastroesophageal reflux disease and asthma exacerbation: A systematic review and meta-analysis. Pediatric Allergy and Immunol 2022;33:e13655.
12. Iqbal N, Amirali A, Lail GU, Khan MA, Sial R, Irfan M. Correlation of gastro-esophageal reflux disease with asthma control and quality of life: A cross-sectional study from a low-middle income country. Ther Adv Respir Dis 2024;10:17534666241297879.
13. Zou X, Lu RL, Liao B, Liu SJ, Dai SX. Causal relationship between asthma and ulcerative colitis and the mediating role of interleukin-18: A bidirectional mendelian study and mediation analysis. Front Immunol 2023;14:1293511.
14. Alzahrani SJ, Alzahrani HA, Alghamdi SM, Alzahrani AN. Health-related quality of life of asthmatic patients in Al-Baha city, Saudi Arabia. Cureus 2024;16:e53601.
15. Mustafina M, Akhmad N, Dyussembayeva A, Baigamyssova D, Orazimbetova A, Tazhiyeva A, *et al.* Factors affecting the quality of life of patients with bronchial asthma (Review). World Acad Sci J 2025;7:67.
16. Eakin MN, Rand CS. Improving patient adherence with asthma self-management practices: What works? Ann Allergy Asthma Immunol 2012;109:90-2. nai.2012.06.009.

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