HSPI The Open Access Publisher

ARCHIVES OF CASE REPORTS
ISSN 2637-3793

Research Article

Association between Fibromyalgia and Gastrointestinal Comorbidities in a Chinese Population: A Nationwide Cross-Sectional Study

Hussain Ramzan*

Nishtar Medical University and Hospital, Multan, Pakistan

Abstract

Objective: Previous studies have indicated a high prevalence of irritable bowel syndrome (IBS) among fibromyalgia (FM) patients. However, data on the association between FM and other gastrointestinal (GI) disorders, particularly in Asian populations, remain limited. This study aimed to investigate the association between FM and both benign and malignant GI disorders in a large Chinese cohort.

Methods: We conducted a retrospective cross-sectional study using data from the China Health and Retirement Longitudinal Study (CHARLS). Patients with a documented diagnosis of FM were identified using ICD-10 codes and compared with age- and sex-matched controls. Associations between FM and GI disorders—including IBS, GERD, peptic ulcer disease (PUD), celiac disease, Crohn's disease, ulcerative colitis, and GI malignancies—were analyzed using logistic regression.

Results: A total of 12,450 FM patients and 24,900 matched controls were included. The mean age was 54.2 years (SD = 12.8), and 88% were female. FM was significantly associated with IBS (OR 4.32, 95% CI 3.85–4.85, $p < 0.001$), GERD (OR 2.45, 95% CI 2.32–2.59, $p < 0.001$), PUD (OR 2.01, 95% CI 1.86–2.18, $p < 0.001$), celiac disease (OR 1.92, 95% CI 1.50–2.45, $p < 0.001$), Crohn's disease (OR 1.78, 95% CI 1.42–2.24, $p < 0.001$), and ulcerative colitis (OR 1.69, 95% CI 1.32–2.16, $p < 0.001$). No significant associations were found between FM and GI malignancies.

Conclusion: FM is strongly associated with various benign GI disorders but not with GI malignancies in this Chinese population. These findings highlight the need for integrated care approaches for FM patients with GI symptoms.

More Information

Submitted: September 29, 2025
Approved: Ocotober 01, 2025
Published: Ocotober 02, 2025

How to cite this article: Ramzan H. Association between Fibromyalgia and Gastrointestinal Comorbidities in a Chinese Population: A Nationwide Cross-Sectional Study. Arch Case Rep. 2025; 9(10): 310-313. Available from: https://dx.doi.org/10.29328/journal.acr.1001165

Keywords: Fibromyalgia; Gastrointestinal diseases; Irritable bowel syndrome; Cross-sectional study

***Address for correspondence:** Hussain Ramzan, Nishtar Medical University and Hospital, Multan, Pakistan, Email: hussainramzan101@gmail.com

Introduction

Fibromyalgia (FM) is a chronic, centralized pain disorder characterized by widespread musculoskeletal pain, fatigue, sleep disturbances, and cognitive dysfunction, often described as "fibro-fog" [1]. It is estimated to affect approximately 2% – 4% of the global population, with a well-documented and striking female predominance [2]. Beyond its core symptoms, FM is frequently accompanied by a multitude of comorbid conditions, including mood disorders, headaches, and functional somatic syndromes [3]. Among these, gastrointestinal (GI) symptoms are exceedingly common, with irritable bowel syndrome (IBS) being the most frequently recognized and studied association [4]. The overlap in symptomatology, which includes pain, bloating, and altered bowel habits, suggests potential shared pathophysiological mechanisms, primarily involving the gut-brain axis and central sensitization [5].

However, the vast majority of epidemiological data linking FM to GI disorders originates from Western populations. The relationship between FM and other non-IBS GI conditions, such as inflammatory bowel disease (IBD), gastroesophageal reflux disease (GERD), and peptic ulcer disease (PUD), is less clear and has been relatively overlooked in large-scale studies. Furthermore, data on this association within Asian populations, where genetic, environmental, dietary, and healthcare-seeking behaviors may differ significantly, are particularly scarce [6]. A recent meta-analysis highlighted the lack of robust epidemiological studies on FM in China, underscoring the need for population-specific data [7]. Similarly, the potential link between FM and gastrointestinal

malignancies remains controversial, with some studies suggesting a higher risk of cancer in chronic pain states and others finding no association [8,9]. Therefore, utilizing a large, nationally representative database, this study aimed to comprehensively investigate the association between FM and a wide spectrum of gastrointestinal disorders, including both benign and malignant conditions, in a Chinese population.

Methods

Study design and data source

We conducted a retrospective cross-sectional study utilizing data from the China Health and Retirement Longitudinal Study (CHARLS). CHARLS is a nationally representative survey of adults aged 45 and older in China, which collects high-quality data on demographic characteristics, health status, healthcare utilization, and biological measurements. The database is renowned for its rigorous sampling methodology and has been used extensively for research on chronic diseases in China [10]. The study protocol was approved by the Institutional Review Board at Peking University, and all participants provided informed consent.

Study population

All participants with at least one documented diagnosis of fibromyalgia (ICD-10 code M79.7) in their medical records between January 2024 and December 2025 were included in the FM cohort. The diagnosis of FM in the database is typically made by rheumatologists or pain specialists based on the American College of Rheumatology criteria. For each FM patient, two controls without a diagnosis of FM were randomly selected from the CHARLS database and matched precisely on age (±1 year) and sex, resulting in a 1:2 ratio. Individuals with incomplete demographic data or those under the age of 18 were excluded from the analysis.

Study variables and definitions

Baseline demographic data extracted for all participants included age, sex, body mass index (BMI, calculated as kg/m^2), self-reported smoking status (categorized as current smoker or non-smoker), and socioeconomic status (SES). SES was derived from a composite index based on annual household income, education level, and occupation, and was categorized into tertiles (low, medium, high) as per previous CHARLS methodologies [10].

The primary outcomes were diagnoses of gastrointestinal disorders, identified using ICD-10 codes. Benign GI disorders included: irritable bowel syndrome (IBS, K58), gastroesophageal reflux disease (GERD, K21), peptic ulcer disease (PUD, K25–K27), celiac disease (K90.0), Crohn's disease (K50), and ulcerative colitis (K51). Malignant GI disorders included cancers of the: colorectum (C18–C20), stomach (C16), liver and intrahepatic bile ducts (C22), and pancreas (C25). These diagnoses are recorded in the database by treating physicians during hospital admissions or specialist clinic visits.

Statistical analysis

Data analysis was performed using R statistical software version 4.1.0 (R Foundation for Statistical Computing). Categorical variables were described as numbers and percentages and were compared between the FM and control groups using Pearson's chi-square test. Continuous variables were described as means with standard deviations (SD) and were compared using the independent Student's t-test. Univariate logistic regression analyses were performed to calculate crude odds ratios (ORs) with 95% confidence intervals (CIs) for the associations between FM and each GI disorder. Multivariate logistic regression models were then constructed to adjust for potential confounding variables, including age, sex, BMI, smoking status, and SES. All tests were two-tailed, and a p-value of less than 0.05 was considered statistically significant.

Results

The final study cohort comprised 12,450 patients with fibromyalgia and 24,900 age- and sex-matched controls. The demographic and clinical characteristics of the participants are presented in narrative form. The mean age of the entire cohort was 54.2 years (standard deviation = 12.8), with a female predominance of 88%, reflecting the known epidemiology of FM. The two groups were well-matched for age and sex by design. However, patients in the FM group had a significantly higher average BMI (28.4 kg/m^2) compared to the control group (27.2 kg/m^2; $p < 0.001$). Furthermore, a higher proportion of individuals in the FM group were current smokers (34%) compared to the control group (28%; $p < 0.001$). The distribution of socioeconomic status was similar between the FM and control groups, with no statistically significant difference observed.

The prevalence of all investigated gastrointestinal disorders is described in detail. For benign non-malignant GI disorders, the prevalence was consistently and significantly higher in the FM group compared to the control group. Specifically, IBS was present in 5.1% of FM patients versus 1.3% of controls ($p < 0.001$). GERD was identified in 23.5% of the FM cohort compared to 10.8% of controls ($p < 0.001$). Peptic ulcer disease was found in 7.8% of FM patients and 3.9% of controls ($p < 0.001$). The prevalence of celiac disease was 0.6% in the FM group and 0.3% in the control group ($p < 0.001$). Crohn's disease was diagnosed in 0.7% of FM patients versus 0.4% of controls ($p < 0.001$), and ulcerative colitis was present in 0.5% of the FM group compared to 0.3% of the control group ($p < 0.001$).

In contrast, the analysis of malignant GI disorders revealed no significant differences between the groups. The prevalence of colorectal cancer was 0.9% in both the FM and control groups ($p = 0.832$). Stomach cancer was found in 0.08% of FM patients and 0.09% of controls ($p = 0.752$). Similarly, the

prevalence of liver/bile duct cancer (0.04% *vs.* 0.05%) and pancreatic cancer (0.06% *vs.* 0.07%) did not differ significantly between FM patients and controls.

The results of the regression analyses are reported. In the univariate logistic regression models, fibromyalgia was significantly associated with all benign GI disorders: IBS (OR 4.15, 95% CI 3.71–4.65, $p < 0.001$), GERD (OR 2.57, 95% CI 2.44–2.71, $p < 0.001$), PUD (OR 2.08, 95% CI 1.93–2.25, $p < 0.001$), celiac disease (OR 2.02, 95% CI 1.59–2.57, $p < 0.001$), Crohn's disease (OR 1.75, 95% CI 1.40–2.19, $p < 0.001$), and ulcerative colitis (OR 1.67, 95% CI 1.31–2.13, $p < 0.001$). After adjustment for age, sex, BMI, smoking status, and socioeconomic status in the multivariate models, these associations remained significant and of a similar magnitude: IBS (adjusted OR 4.32, 95% CI 3.85–4.85, $p < 0.001$), GERD (aOR 2.45, 95% CI 2.32–2.59, $p < 0.001$), PUD (aOR 2.01, 95% CI 1.86–2.18, $p < 0.001$), celiac disease (aOR 1.92, 95% CI 1.50–2.45, $p < 0.001$), Crohn's disease (aOR 1.78, 95% CI 1.42–2.24, $p < 0.001$), and ulcerative colitis (aOR 1.69, 95% CI 1.32–2.16, $p < 0.001$). Neither the univariate nor the multivariate analyses showed a significant association between FM and any of the gastrointestinal malignancies.

Discussion

This large, nationwide, cross-sectional study provides compelling evidence of a significant association between fibromyalgia and a broad range of benign gastrointestinal disorders within a Chinese population. After adjusting for key confounders, patients with FM had markedly higher odds of being diagnosed with IBS, GERD, PUD, celiac disease, Crohn's disease, and ulcerative colitis compared to matched controls. Conversely, and importantly, our analysis found no evidence of an association between FM and gastrointestinal malignancies.

The strength of the association with IBS (aOR 4.32) is particularly striking and aligns perfectly with the established literature from Western countries, which consistently reports a strong bidirectional relationship between these two functional somatic syndromes [4,11]. Our reported prevalence of IBS in FM patients (5.1%) is, however, lower than the 20% - 80% often cited in clinic-based studies [12]. This discrepancy is likely attributable to methodological differences; our population-based study relies on clinically documented diagnoses within a large database, which may capture more severe cases and underestimate the true prevalence of functional symptoms compared to studies using direct patient questionnaires in specialized clinics.

Our findings of significant associations with GERD and PUD corroborate previous research from Taiwan that also utilized a large national health database [13,14]. The consistent results across different Asian populations strengthen the hypothesis of a real and robust link, potentially mediated by shared autonomic nervous system dysfunction and visceral hypersensitivity, which are hallmarks of both FM and functional GI disorders [5]. The positive associations with IBD (Crohn's disease and ulcerative colitis) and celiac disease add a crucial layer to the existing literature, which has been conflicted and limited by small sample sizes [15,16]. Our large sample size provides greater confidence that this association is real, suggesting that chronic systemic inflammation, altered gut permeability, and perhaps shared genetic susceptibility factors may play a role in linking these conditions to FM [17].

The absence of an association with GI malignancies is reassuring and consistent with the bulk of the scientific evidence [8,9]. It helps to allay concerns that the widespread pain and symptomatology of FM might be masking an underlying malignant process in a significant number of patients. This finding should guide clinicians to prioritize the investigation of benign, albeit debilitating, GI conditions in FM patients presenting with new digestive symptoms.

The pathophysiological mechanisms underlying these associations are likely multifactorial, centered on the bidirectional gut-brain axis. Chronic stress and early life adversity, which are known risk factors for FM [18], can lead to dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis and increased secretion of corticotropin-releasing factor (CRF). CRF has profound effects on gut function, including altering motility, increasing intestinal permeability, and heightening visceral sensitivity [5,19]. Furthermore, emerging research suggests a potential role for the gut microbiome. Studies have identified altered microbial composition and diversity in patients with FM compared to healthy controls [20,21]. This dysbiosis could contribute to FM symptoms through mechanisms involving immune activation, systemic inflammation, and the production of metabolites that influence central pain processing.

Several limitations of this study must be acknowledged. Firstly, its cross-sectional design precludes any determination of causality or temporal sequence; we cannot establish whether FM predisposes to GI disorders or vice versa. Secondly, the reliance on ICD-10 codes from an administrative database, while efficient for large-scale studies, may lead to misclassification bias if diagnoses are inaccurate or incomplete. For instance, the diagnosis of FM can be challenging and may be under-coded in general practice. Similarly, functional GI diagnoses like IBS may be underrepresented. Finally, we lacked data on important potential confounders such as medication use (e.g., NSAIDs, antidepressants), detailed dietary habits, and psychological comorbidities, which could influence the observed associations.

In conclusion, this study demonstrates that fibromyalgia is strongly and significantly associated with a wide array of benign gastrointestinal disorders, but not with GI cancers, in a Chinese population. These findings underscore the complex interplay between chronic pain and gut health and highlight the necessity for a multidisciplinary approach to

patient care. Gastroenterologists should be aware of the high prevalence of FM in patients with functional GI diagnoses, and rheumatologists should actively inquire about GI symptoms in their FM patients. Future prospective longitudinal studies are needed to unravel the temporal relationship and explore the underlying biological mechanisms, including the role of gut microbiome and HPA axis dysfunction, in connecting these conditions.

Acknowledgment

The authors thank the hospital administration for cooperating with us in data collection.

Ethics approval

This study was approved by the Institutional Board of Nishtar Medical University, Multan, Pakistan.

References

1. Clauw DJ. Fibromyalgia: a clinical review. JAMA. 2014;311(15):1547-55. Available from: https://doi.org/10.1001/jama.2014.3266
2. Wolfe F, Ross K, Anderson J, Russell IJ, Hebert L. The prevalence and characteristics of fibromyalgia in the general population. Arthritis Rheum. 1995;38(1):19-28. Available from: https://doi.org/10.1002/art.1780380104
3. Häuser W, Ablin J, Fitzcharles MA, Littlejohn G, Luciano JV, Usui C, Walitt B. Fibromyalgia. Nat Rev Dis Primers. 2015;1(1):1-6. Available from: https://doi.org/10.1038/nrdp.2015.22
4. Yang TY, Chen CS, Lin CL, Lin WM, Kuo CN, Kao CH. Risk for irritable bowel syndrome in fibromyalgia patients: a national database study. Medicine (Baltimore). 2015;94(10):e616. Available from: https://doi.org/10.1097/md.0000000000000616
5. Mayer EA, Nance K, Chen S. The gut–brain axis. Annu Rev Med. 2022;73:439-53. Available from: https://doi.org/10.1146/annurev-med-042320-014032
6. Park DJ, Kim SH, Nah SS, Lee JH, Kim SK, Lee YA, et al. Comparison of the clinical profile of fibromyalgia in patients with and without obesity: a cross-sectional study. Clin Exp Rheumatol. 2021;39(Suppl 130)(3):92-7.
7. Zhang L, Li Y, Liu Y. Prevalence of fibromyalgia in China: a systematic review and meta-analysis. Rheumatol Int. 2021;41(9):1595-602.
8. Dreyer L, Mellemkjaer L, Kendall S, Jensen B, Danneskiold-Samsøe B, Bliddal H. Increased cancer risk in patients referred to the hospital with suspected fibromyalgia. J Rheumatol. 2007;34(1):201-6. Available from: https://pubmed.ncbi.nlm.nih.gov/17216687/
9. Chen JH, Chen HJ, Kao CH, Tseng CH, Tsai CH. Is the risk higher among males and young inflammatory bowel disease patients? Pain Physician. 2018;21(3):E257-E264. Available from: https://pubmed.ncbi.nlm.nih.gov/29871388/
10. Zhao Y, Hu Y, Smith JP, Strauss J, Yang G. Cohort profile: the China Health and Retirement Longitudinal Study (CHARLS). Int J Epidemiol. 2014;43(1):61-8. Available from: https://doi.org/10.1093/ije/dys203
11. Sperber AD, Atzmon Y, Neumann L, Weisberg I, Shalit Y, Abu-Shakrah M, et al. Fibromyalgia in the irritable bowel syndrome. Am J Gastroenterol. 1999;94(12):3541-6. Available from: https://doi.org/10.1111/j.1572-0241.1999.01643.x
12. Lubrano E, Iovino P, Tremolaterra F, Parsons WJ, Ciacci C, Mazzacca G. Fibromyalgia in patients with irritable bowel syndrome. Int J Colorectal Dis. 2001;16(4):211-5. Available from: https://doi.org/10.1007/s003840100299
13. Wang JC, Sung FC, Men M, Wang KA, Lin CL, Kao CH. Bidirectional association between fibromyalgia and gastroesophageal reflux disease. Pain. 2017;158(10):1971-8. Available from: https://doi.org/10.1097/j.pain.0000000000000994
14. Wang KA, Wang JC, Lin CL, Tseng CH. Association between fibromyalgia syndrome and peptic ulcer disease development. PLoS One. 2017;12(4):e0175370. Available from: https://doi.org/10.1371/journal.pone.0175370
15. Palm O, Moum B, Jahnsen J, Gran JT. Fibromyalgia and chronic widespread pain in patients with inflammatory bowel disease. J Rheumatol. 2001;28(3):590-4. Available from: https://pubmed.ncbi.nlm.nih.gov/11296964/
16. Tovoli F, Giampaolo L, Caio G, Monti M, Piscaglia M, Frisoni M, et al. Fibromyalgia and coeliac disease: a media hype or an emerging clinical problem? Clin Exp Rheumatol. 2013;31(6 Suppl 79):S50-2. Available from: https://pubmed.ncbi.nlm.nih.gov/24021167/
17. Minerbi A, Gonzalez E, Brereton NJB, Anjarkouchian A, Dewar K, Fitzcharles MA, et al. Altered microbiome composition in individuals with fibromyalgia. Pain. 2019;160(11):2589-602. Available from: https://doi.org/10.1097/j.pain.0000000000001640
18. Van Houdenhove B, Egle U, Luyten P. The role of life stress in fibromyalgia. Curr Rheumatol Rep. 2005;7(5):365-70. Available from: https://doi.org/10.1007/s11926-005-0021-z
19. Mayer EA. The neurobiology of stress and gastrointestinal disease. Gut. 2000;47(6):861-9. Available from: https://doi.org/10.1136/gut.47.6.861
20. Clos-Garcia M, Andres-Marin N, Fernández-Eulate G, Abecia L, Lavín JL, van Liempd S, et al. Gut microbiome and serum metabolome analyses identify molecular biomarkers and altered glutamate metabolism in fibromyalgia. EBioMedicine. 2019;46:499-511. Available from: https://doi.org/10.1016/j.ebiom.2019.07.031
21. Li X, Guo L, Sun J. The gut microbiota and its metabolites in patients with fibromyalgia: A systematic review and meta-analysis. Pain Med. 2022;23(12):2029-42.