BMC Gastroenterology

RESEARCH Open Access

Epidemiological and histopathological spectrum of gastrointestinal tract disorders: a decade of records from the UAE

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Abstract

Background Gastrointestinal (GI) disorders represent a major public health concern, yet data from the UAE remain limited, particularly regarding histopathological trends. This study aimed to characterize the epidemiological spectrum and distribution of GI disorders reported to a tertiary care pathology center over a ten-year period. Histopathology-based surveillance offers unique insight into tissue-level patterns often missed by clinical registries.

Methods A retrospective, record-based analysis of 12,688 GI-related histopathology reports was conducted from Thumbay Laboratories, UAE (2013–2023). Data was extracted using a structured checklist and analyzed in SPSS v29. Descriptive statistics and inferential tests were applied ($p < 0.05$).

Results Of the 12,688 cases, 67.5% were male and 32.5% female ($p < 0.001$). Most patients were aged 21–40 years (60.3%). The stomach (29.6%), large intestine (21.2%), and appendix (20.4%) were the most affected organs. Gastritis (27.3%), intestinal conditions (20.6%), and appendicitis (20.0%) predominated. Males showed higher rates of gastritis and appendicitis, while cholecystitis was more common in females (21.4%). Appendicitis was dominant in those < 20 years (60.1%), while neoplasms and gastritis were more prevalent in older adults (≥ 61 years; $p < 0.001$).

Conclusion This study provides a decade-long overview of GI pathology trends in the UAE. The findings highlight age- and sex-specific patterns and support future research integrating clinical and demographic data to inform targeted public health strategies.

Keywords Gastrointestinal disorders, Retrospective study, Epidemiology, Cross-sectional study, UAE

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Introduction

Gastrointestinal (GI) disorders constitute a major global health concern, affecting millions worldwide and encompassing a diverse range of conditions from the mouth to the anus [1]. These include functional disorders, where anatomical structures appear normal, but function is impaired, such as irritable bowel syndrome, functional dyspepsia, and chronic constipation, as well as structural disorders, including hemorrhoids, colorectal polyps, and malignancies like colorectal cancer [2]. Common symptoms include recurrent abdominal pain, diarrhea, heartburn, bloating, nausea, and vomiting [2, 3].

GI disorders have been shown to significantly impact patients' quality of life, contribute to high healthcare utilization, and impose a substantial economic burden [4–6]. Globally, over 40% of individuals experience functional GI disorders at some point in life [7]. Colorectal cancer alone accounts for 10% of global cancer incidence, making it the third most commonly diagnosed malignancy worldwide [8]. Digestive diseases ranked as the 13th leading cause of disability-adjusted life years (DALYs) in 2019, contributing to 3.5% of total DALYs globally [9]. In the Middle East and North Africa (MENA) region, the burden remains particularly high. Countries like Kuwait, the UAE, and Qatar have shown persistently elevated GI-related DALY rates, especially in middle-SDI nations, despite global improvements [10, 11].

Despite increasing global attention to GI health, the UAE continues to lack comprehensive epidemiological insight into the full spectrum of GI disorders. Most existing studies have narrowly focused on specific conditions, leaving broader patterns underexplored. Additionally, prior investigations often rely on symptomatic or clinical diagnoses, which may overlook tissue-level changes critical to disease classification and prognosis. Histopathology-based surveillance, in contrast, enables more precise identification of underlying pathology, especially for conditions like neoplasia or chronic inflammation that may not be apparent through imaging or symptomatology alone.

This study aims to characterize the histopathological spectrum of GI disorders reported to a tertiary care pathology laboratory in the UAE over ten years. Specifically, it explores demographic patterns, organ-specific involvement, and disease trends to address current data gaps and support future clinical decision-making, public health strategies, and research in the field of gastroenterology and GI pathology.

Methodology

Study design, settings and sampling

This retrospective cross-sectional study was conducted at the Histopathology Laboratory of Thumbay Laboratories, which operates in a private academic hospital affiliated with Gulf Medical University (GMU) in the Emirate of Ajman in the UAE. The study included archived GI-related histopathology reports of patients whose biopsy samples were processed between December 2013 and December 2023.

Records lacking essential demographic or diagnostic data (e.g., organ involvement or pathological findings) were excluded to ensure methodological consistency.

A total of 12,688 patient records were included in the study. As this was a retrospective study, the sample size reflected the complete census of eligible cases reported during the specified 10-year period.

Eligibility was restricted to GI tract-related cases. Records not about the GI tract system were excluded during the first screening stage. In the second stage, records with duplications, missing critical variables, or unconfirmed diagnoses requiring further testing were excluded. The stepwise selection process and number of cases excluded at each stage are detailed in the study flow diagram (Fig. 1).

Data collection and validation

The study received approval from the Institutional Review Board of GMU (IRB-COM-FAC-59-NOV-2023), with a waiver of informed consent due to its retrospective nature and exclusive use of de-identified secondary data. The research was conducted in accordance with the ethical standards of the institutional research committee and with the Declaration of Helsinki and its later amendments or comparable ethical standards. Strict confidentiality, anonymity, and privacy of patient data were maintained, with all records being anonymized prior to analysis in compliance with applicable data protection regulations and institutional privacy policies.

Data was retrieved from the Laboratory Data Management (LDM) system using Current Procedural Terminology (CPT) codes to accurately filter GI-related procedures. This ensured procedural consistency and accurate filtering of relevant GI histopathological reports. Each record was reviewed to confirm the presence of critical variables (age, gender, organ involved, and histopathological diagnosis). Referral status (internal or external) was also captured. No data on nationality, employment, or socioeconomic status were available.

For analytical consistency, GI organs and diagnosis were grouped into clinically and histopathologically relevant categories. 'Accessory organs' included the liver, gallbladder, pancreas, and omentum, reflecting their supportive role in digestion. The comprehensive list of conditions under each category is provided in Supplementary Table S1.

A structured validation protocol was followed. Data was exported to Microsoft Excel® for cleaning, where duplicates (based on accession numbers) and entries

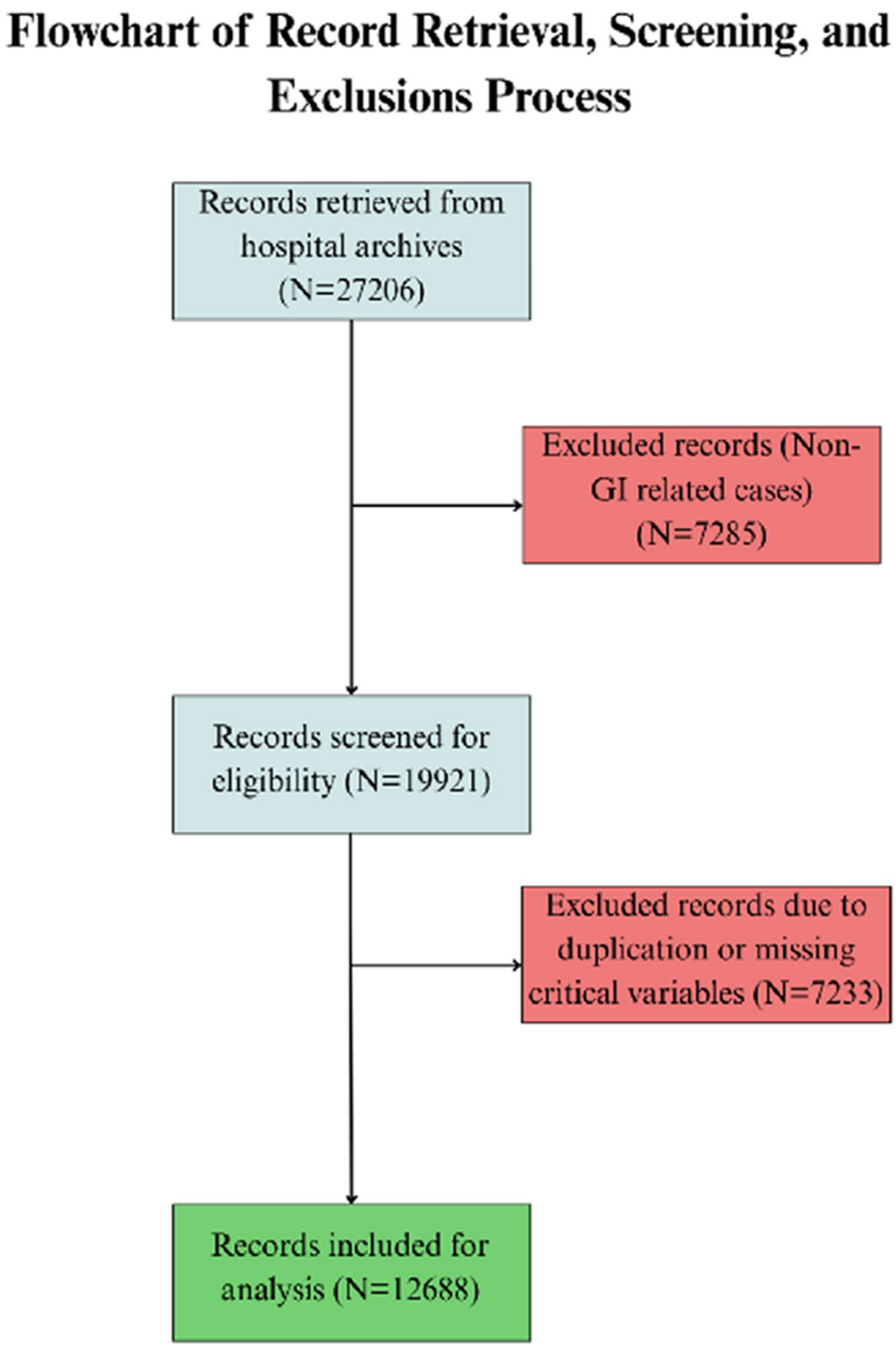

Fig. 1 Flow diagram showing the process of record identification, screening, exclusion, and final inclusion in the study

with missing critical fields were removed. In cases where patients had multiple biopsy samples recorded for the same anatomical region or pathological category, such as in intestinal disorders, the dataset was curated to avoid duplication. When multiple entries were associated with a single diagnostic episode, only the record containing a confirmed diagnosis was retained for analysis, while additional entries from the same patient were excluded. This ensured that each patient was represented only once per condition, maintaining analytical integrity and avoiding inflated frequencies. Manual cross-verification ensured CPT codes aligned with reported diagnoses. The final cleaned dataset was imported into IBM SPSS Statistics v29 for analysis.

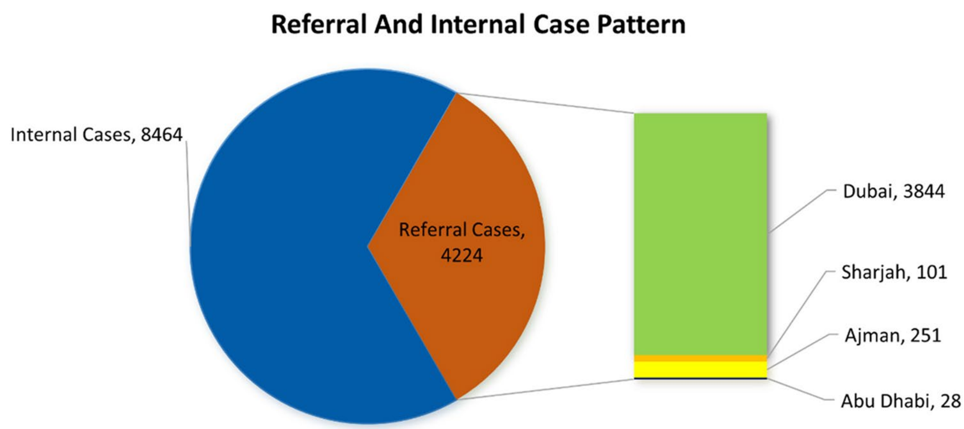

Fig. 2 Distribution of referral and internal cases

Histopathological reporting

All histopathological diagnoses were made by board-certified pathologists at the Department of Pathology, Thumbay Laboratories, with no change in personnel throughout the 10-year study period. Diagnoses adhered to standardized institutional protocols and internationally accepted criteria for GI pathology, specifically following the College of American Pathologists (CAP) guidelines. The laboratory maintained continuous CAP accreditation during this period, ensuring rigorous quality control, including standardized diagnostic criteria and monitoring of diagnostic consistency through routine practices such as standardized reporting and internal discussions of complex cases. There were no changes in diagnostic criteria, classification systems, or institutional reporting protocols relevant to this study between 2013 and 2023.

Statistical analysis

Data analysis was performed in August 2024 using IBM SPSS Statistics v29. Participants were categorized into age groups (0–20, 21–40, 41–60, and ≥61 years) based on biologically and epidemiologically relevant life stages. These intervals reflect distinct life stages with differing GI risk profiles (childhood/adolescence, early to mid-adulthood, late adulthood, and older age). Descriptive statistics (frequencies, percentages) were used to summarize demographics and pathological patterns. Associations between categorical variables (e.g., sex vs. disease type, organ vs. age group) were evaluated using chi-square tests. Crosstab outputs were used to visualize diagnostic trends over time, plotted as line graphs in Microsoft Excel®. A p-value < 0.05 was considered statistically significant.

Table 1 Age distribution of study participants

Variable	Group	Frequency (*n*)	Percentage (%)
Age Group	0–20 Years	764	6.0
	21–40 Years	7654	60.3
	41–60 Years	3600	28.4
	>=61 Years	670	5.3

Results

The analysis included 12,688 medical records of patients with various GI conditions, of which 66.7% ($n = 8464$) were submitted from internal units, while 33.3% ($n = 4224$) were external referrals (Fig. 2). The majority of patients were male (67.5%, $n = 8559$), whereas female patients comprised 32.5% ($n = 4129$). The study population had a median age of 36 years, with an interquartile range (IQR) of 15 years. Most participants were in the age group of 21–40 years, accounting for 60.3% ($n = 7654$), followed by those aged 41–60 years (28.4%, $n = 3600$). The 0–20 and ≥61 years age groups had lower representation, with 6.0% ($n = 764$) and 5.3% ($n = 670$), respectively (Table 1).

GI diseases by organ groups indicated that the largest proportion of cases fell under the stomach, large intestine, and appendix, representing 29.6% ($n = 3751$), 21.2% ($n = 2689$), and 20.4% ($n = 2584$), respectively. The small intestine and accessory organs (consisting of the liver, gallbladder, pancreas, and omentum) accounted for 11.8% ($n = 1496$) and 12.3% ($n = 1566$), respectively. The Mouth and esophagus accounted for the smallest percentage at 4.7% ($n = 602$) of the dataset. (Table 2).

The data analysis reveals the most frequent condition to be gastritis at 27.3% ($n = 3468$), intestinal conditions at 20.7% ($n = 2632$), and appendicitis at 20% ($n = 2541$). Cholecystitis was seen in 11.5% ($n = 1453$) of patients. The less frequent conditions included neoplastic conditions (4.2%, $n = 539$), anal conditions (4.8%, $n = 607$), and esophageal conditions (3.9%, $n = 491$). Finally, 7.5% ($n = 957$) of cases

Table 2 Distribution of affected organs and GI disorders among study participants

Variable	Group	Frequency (n)	Percentage (%)
GI Organs	Mouth and Esophagus	602	4.7
	Stomach	3751	29.6
	Small Intestine	1496	11.8
	Large Intestine	2689	21.2
	Accessory Organs*	1566	12.3
	Appendix	2584	20.4
GI Disorders	Appendicitis	2541	20
	Cholecystitis	1453	11.5
	Intestinal Conditions	2632	20.7
	Esophageal Conditions	491	3.9
	Gastritis	3468	27.3
	Neoplastic Conditions	539	4.2
	Anal Conditions	607	4.8
	Other	957	7.5

*Accessory Organs consist of liver, gallbladder, pancreas, and omentum

Table 3 Distribution of neoplastic conditions among study participants

Variable	Group	Frequency (n)	Percentage (%)
Neoplastic Conditions	Malignant Tumors	129	1
	Benign Tumors	410	3.2

were classified as 'other' with a mix of different diagnoses (Table 2).

Upper and lower GI tract comparison

The distribution of GI conditions showed a near-equal prevalence between the upper and lower GI tracts. Upper GI tract disorders accounted for 51% ($n = 4353$) of cases, while lower GI tract disorders represented 49% ($n = 4185$).

Neoplastic conditions

Among the total GI cases, neoplastic conditions accounted for 4.2% ($n = 539$). Of these, malignant tumors comprised 129 cases (1.0%), while benign tumors comprised 410 cases (3.2%) (Table 3).

Helicobacter. Pylori severity in gastritis

Among patients diagnosed with gastritis and H. pylori infection, severity was classified histologically based on the Sydney system. The majority had mild infection severity, comprising 72.3% of the cases. Moderate severity was observed in 10.1%, while 17.6% of the patients were classified as having severe H. pylori infection (Fig. 3).

Association of affected GI organs by gender and age group

A statistically significant association was observed between gender and the affected GI organ ($p < 0.001$). Males had a higher prevalence of conditions involving the stomach, 30.4% ($n = 2601$), large intestine, 22.9% ($n = 1957$), and appendix, 23.1% ($n = 1976$) compared to females, 27.9% ($n = 1150$), 17.7% ($n = 732$), and 14.7% ($n = 608$), respectively. In contrast, females showed a significantly higher prevalence of accessory organ conditions, 22.5% ($n = 930$), which again includes those affecting the gallbladder, liver, pancreas, and omentum, compared to males, 7.4% ($n = 636$).

Similarly, a statistically significant association was observed between age group and the affected organs ($p < 0.001$). Appendix-related conditions were most common in the 0-20-year age group, 60.7% ($n = 464$) and

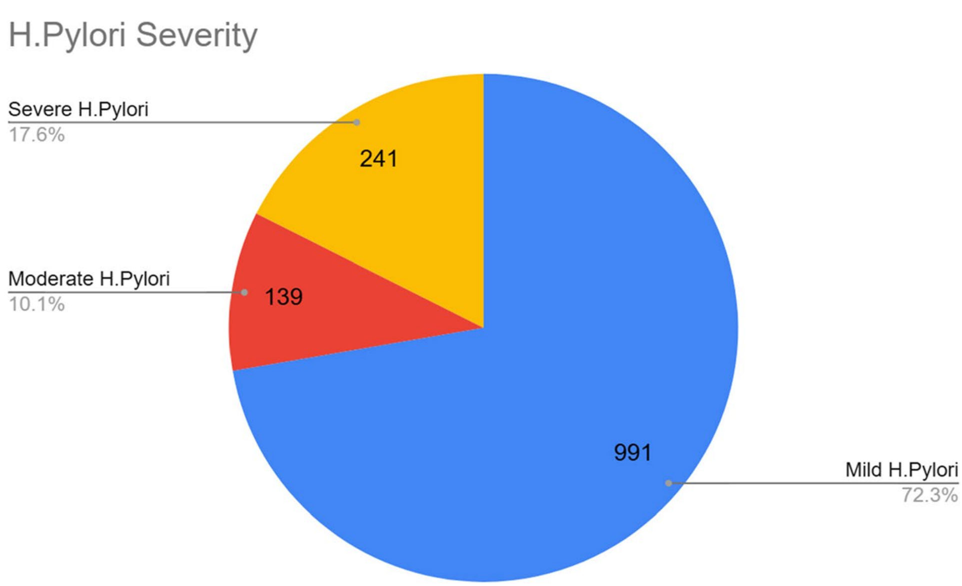

Fig. 3 Distribution of H. Pylori Severity in gastritis

declined with increasing age. Stomach, 33.6% ($n=1211$) and large intestine 26.4% ($n=952$) conditions were most prevalent in the 41–60 age group, with the same trend observed in the >=61 age group, 33.4% ($n=224$) and, 34.0% ($n=228$), respectively. Small intestine disorders were evenly distributed across all age groups, whereas accessory organ conditions were most frequent among the 41–60 group, 13.7% ($n=494$). Detailed distribution is presented in Table 4.

Association of GI disorders by gender and age group

A statistically significant association was observed between gender and the type of GI disorders ($p<0.001$). Appendicitis was more prevalent among males (22.7%, $n=1942$) compared to females (14.5%, $n=599$), whereas cholecystitis was significantly higher in females (21.4%, $n=885$) compared to males (6.6%, $n=568$). Gastritis also showed a higher occurrence in males (28.2%, $n=2417$) compared to females (25.5%, $n=1051$), as did anal conditions (5.5%, $n=468$ in males vs. 3.4%, $n=297$ in females). In contrast, other GI diseases, including esophageal and neoplastic conditions, did not show much gender difference. These findings suggest a potential gender-based predisposition to some GI disease, which may be possibly influenced by hormonal, anatomical, or lifestyle-related factors.

Similarly, the age prevalence of GI disorders also varied significantly ($p<0.001$). Appendicitis was most common among the youngest age group (0–20 years), accounting for 60.1% ($n=459$) of cases in this group. Gastritis (30.6%, $n=10.3$) and cholecystitis (12.8%, $n=459$) were most prevalent among individuals aged 41–60 years. The prevalence of esophageal disorders and neoplastic disorders increased with age, with esophageal conditions (6.0%, $n=47$) and neoplastic conditions (14.8%, $n=99$) being more prevalent among individuals aged >=61 years. Furthermore, the proportion of intestinal conditions was lower in individuals aged 0–20 years and slightly higher and comparable among the 21–40, 41–60, and ≥61-year age groups, while anal conditions and other GI disorders did not display a clear age-related trend. A detailed distribution of GI conditions by gender and age group is presented in Table 5.

Temporal trends in GI diagnoses (2013–2023)

Over the 10-year period from 2013, December to 2023, December, notable variations were observed in the distribution of gastrointestinal conditions reported. Gastritis emerged as the most frequently diagnosed condition, showing a marked rise from just 16 cases in 2013 to a peak of 774 cases in 2023, reflecting a consistent upward trend. Intestinal conditions also showed a steady increase, rising from 6 cases in 2013 to 444 cases in 2023. Appendicitis diagnoses increased steadily from 2 cases in 2013 to a peak of 464 in 2017, after which there was a gradual decline, with a mild rebound noted in 2023 (183 cases). A similar pattern was seen in cholecystitis, which peaked in 2018 at 249 cases before plateauing.

Anal conditions and esophageal disorders remained relatively stable over the years but showed a mild increase after 2018. Neoplastic conditions, although lower in absolute numbers, showed modest increases, particularly after 2015, suggesting potential improvements in detection or referral patterns. The 'Other' category also displayed a steady rise, particularly from 2015 onward. Overall, the temporal pattern indicates an increasing trend in the reporting of non-acute GI conditions such as gastritis and neoplasms over time, possibly reflecting enhanced diagnostic capabilities and evolving referral practices.

A detailed year-wise breakdown is provided in Supplementary Tables, Table S2, and corresponding temporal trends are illustrated in Fig. 4.

Table 4 Association of affected GI organs by gender and age group

Variable	Group		GI Organs						*P*-Value
			Mouth and Esophagus	Stomach	Small Intestine	Large Intestine	Appendix	Accessory Organs	
Gender	Female	No.	188	1150	521	732	608	930	< 0.001
		%	4.6	27.9	12.6	17.7	14.7	22.5	
	Male	No.	414	2601	975	1957	1976	636	
		%	4.8	30.4	11.4	22.9	23.1	7.4	
Age Group	0–20	No.	10	117	69	86	464	18	< 0.001
		%	1.3	15.3	9.0	11.3	60.7	2.4	
	21–40	No.	315	2199	887	1423	1851	979	
		%	4.1	28.7	11.6	18.6	24.2	12.8	
	41–60	No.	218	1211	464	952	261	494	
		%	6.1	33.6	12.9	26.4	7.2	13.7	
	>=61	No.	59	224	76	228	8	75	
		%	8.8	33.4	11.3	34.0	1.2	11.2	

Table 5 Association of GI disorders by gender and age group

Variable	Group		GI Disorders								P-Value
			Appendicitis	Cholecystitis	Intestinal Conditions	Esophageal Conditions	Gastritis	Neoplastic Conditions	Anal Conditions	Other	
Gender	Female	No.	599	885	838	153	1051	167	139	297	< 0.001
		%	14.5	21.4	20.3	3.7	25.5	4	3.4	7.2	
	Male	No.	1942	568	1794	338	2417	372	468	660	
		%	22.7	6.6	21	3.9	28.2	4.3	5.5	7.7	
Age Group	0–20	No.	459	15	117	6	109	1	5	52	< 0.001
		%	60.1	2.0	15.3	0.8	14.3	0.1	0.7	6.8	
	21–40	No.	1826	925	1573	253	2062	178	384	453	
		%	23.90	12.10	20.60	3.30	26.90	2.30	5.00	5.90	
	41–60	No.	250	459	799	185	1103	261	189	354	
		%	6.90	12.80	22.20	5.10	30.60	7.20	5.30	9.80	
	>=61	No.	6	54	143	47	194	99	29	98	
		%	0.90	8.10	21.30	7.00	29.00	14.80	4.30	14.60	

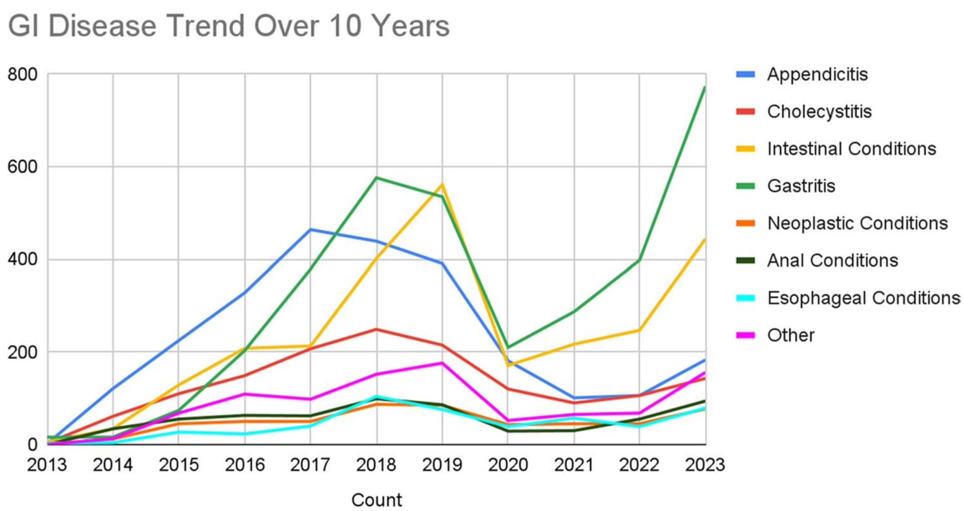

Fig. 4 GI Disease Trend Over 10 Years

Discussion

The analysis of medical records from a tertiary care center in the UAE offers valuable insight into the demographic and clinical characteristics of GI disorders. The substantial male predominance (67.5%) in our study reflects, to a certain extent, the demographic structure of Ajman, where a large proportion of residents are male expatriates [12]. While this distribution is consistent with the broader UAE population where males constitute about 64% and females 36% (a ratio of 176:100 in 2025) [13], other unmeasured factors, such as healthcare-seeking behavior, occupational health screening, and disparities in access to private healthcare, may also contribute. The absence of nationality, employment sector, and socioeconomic status data must be considered when interpreting disease patterns.

In our study, 66.7% of patients were internal cases from Thumbay affiliated hospitals, most commonly reported from Thumbay Hospital Ajman (55.8%), followed by Thumbay Hospital Fujairah (10.7%), and Thumbay Hospitals in Sharjah (0.2%). The remaining 33.3% were external referrals from other healthcare facilities, with majority coming from the emirate of Dubai (30.3%), and smaller proportions from Ajman (2.0%), Sharjah (0.8%), and Abu Dhabi (0.2%). This pattern indicates that our center's catchment area extends beyond Ajman and is shaped largely by institutional referral networks within the Thumbay healthcare system, while also receiving a significant share from neighboring emirates. Although referral dynamics are likely to differ across other healthcare providers in the UAE, comparable published data are lacking. Multi-center studies incorporating both government and private hospitals would allow more robust estimation of GI disease patterns in the national population.

The predominance of patients aged 21–40 years (60.3%) reflects the working-age structure of the UAE population [13, 14]. Acute conditions such as appendicitis were most common in the 0–20 age group (60.1%), aligning with established epidemiological trends linked to lymphoid hyperplasia in youth, which predisposes to lumen obstruction and inflammation [15, 16]. Conversely, chronic and degenerative disorders, including neoplasia and gastritis, were more frequent in older individuals, likely reflecting cumulative lifestyle exposures such as diet and smoking [17, 18]. These findings highlight the potential value of age-specific diagnostic and screening strategies.

Our study identified the stomach, large intestine, and appendix as the most frequently affected sites, together comprising over 70% of cases. This distribution mirrors the predominance of gastritis (27.3%), intestinal disorders (20.7%), and appendicitis (20%) in our cohort, with gastritis often linked to H. pylori infection. Interestingly, most H. pylori-associated gastritis cases were of mild severity (72.3%), which may reflect early detection or low bacterial virulence; however, the absence of clinical data prevents firm conclusions. This observation adds to regional evidence of the high H. pylori burden in the Middle East [19].

Significant gender-based differences were also noted. Males had higher rates of stomach, appendix, and large intestine involvement, whereas females showed greater accessory organ involvement, particularly cholecystitis (21.4%), likely reflecting hormonal predisposition to gallstone formation [20]. These findings underscore the importance of considering gender-specific risk factors in future epidemiological assessments.

Notably, we observed a nearly equal distribution of upper (51%) and lower (49%) GI tract disorders, a pattern not commonly reported in previous regional studies, which tend to analyze these categories separately. For instance, duodenal ulcers dominate upper GI morbidity in Bahrain [21], and colorectal cancer leads lower GI malignancy in Saudi Arabia [22]. International data also point to the growing lower GI morbidity, alongside persistent upper GI conditions [6, 23]. Our balanced distribution highlights the need for integrated surveillance and management strategies that address both segments of the GI tract.

Our findings of male predominance are consistent with previous studies. In India, Bagum et al., 2024 [24] reported a 1.39:1 male-to-female ratio, and J et al., 2020 [25] also described more male prevalence in upper GI neoplasms. Additionally, global analysis by Wang F et al., 2023 [6] report higher number of DALYs due to GI disorders among males. However, while these studies could suggest a potential disease-related reason for the higher number of male cases, the male predominance observed in our study is likely due to the demographic structure of the UAE, highlighting the need for cautious interpretation when making comparisons.

Gender-specific affected organs and conditions also showed variation. Appendicitis and gastritis were more common in males in our cohort. This finding is supported by Alrasheed et al., 2024 in Saudi Arabia [26], Peeters et al., 2023 in western Europe [27], and Parvathidevi et al., 2024 in India [28] who reported a higher male-to-female ratio for appendicitis. However, Parvathidevi et al. [28] reported a higher prevalence of gastritis among females, contrasting our findings, possibly due to demographic differences. The higher prevalence of cholecystitis among females is consistent with Al Shibli et al., 2025 in Saudi Arabia [29] and Bailey et al., 2019 in the United States [30], highlighting the higher numbers of cholecystitis among females compared to males.

Regarding age groups, disorders were most frequent in the 21–40-year age group, followed by the 41–60 age group, particularly in acute GI conditions. This aligns with global reports by Wang F et al., 2023 [6] Krzyzak et al., 2020 [31] reporting a higher incidence of acute appendicitis in younger and middle-aged populations. Chronic conditions, particularly cancers, were concentrated in older adults, aligning with Cheema et al., 2021 [32] projecting a substantial rise in cancer burden among individuals aged 70 and above across GCC countries by 2040, and Dumic et al., 2019 [33], who reported gastric cancer predominance in older populations.

Temporal analysis revealed a general rise in non-acute gastrointestinal conditions, particularly gastritis and intestinal disorders. The marked rise in gastritis prevalence observed aligns with findings across the Middle East [34, 35], where high *H. pylori* prevalence [36, 37], frequent NSAID use [38, 39], and psychological stress [40] are commonly cited contributors. Similarly, the upward trend in intestinal disorders parallels reports from the Middle East [34, 35, 41], often linked to antibiotic exposure and altered gut microbiota [42, 43].

In contrast, appendicitis and cholecystitis showed a mid-decade peak followed by plateau or decline, consistent with international observations [15]. These shifts may reflect increasing adoption of conservative management for appendicitis [44] and improved treatment approaches for cholecystitis [45].

The temporary decline in diagnoses observed between 2019 and 2020 may be attributable to the COVID-19 pandemic and its impact on healthcare utilization. During this period, non-urgent procedures, including GI endoscopy, were widely deferred [46, 47], routine hospital visits declined [48], and resources were redirected toward COVID-19 care [49]. These service disruptions limited diagnostic activity for GI disorders and likely contributed to the trends observed in our study [47, 50].

Anal and esophageal conditions remained relatively stable. Though less frequent, neoplastic conditions gradually increased, which could be attributed to the availability of screening techniques and specific cancer initiatives in the country [51].

Public health implications

The epidemiological patterns observed in our dataset, particularly the high burden of gastritis, appendicitis, and hepatobiliary disorders, highlight potential areas of interest for digestive health surveillance in the UAE and MENA region. Although the study design was descriptive and limited to histopathological records, the findings align with broader global trends suggesting rising incidence of H. pylori–associated gastritis and colorectal neoplasms among younger adults in low- and middle-SDI countries [23].

In the context of regional noncommunicable disease priorities, the increasing recognition of conditions such as nonalcoholic steatohepatitis (NASH) further emphasizes the need for enhanced metabolic risk screening and preventive care, although our dataset does not include such clinical parameters [23]. Notably, observed gender differences in disease frequency, such as in cholecystitis, point to potential topics for further investigation regarding gender-sensitive health education and service delivery strategies [9].

While our study was not designed to evaluate interventions or population-wide prevalence, the findings suggest the value of conducting larger multicenter studies to examine the potential utility of establishing national digestive disease registries and improving surveillance systems. Further research could provide the evidence needed to inform strategies for integrating digestive health within the UAE's National Nutrition Strategy (2022–2030) and broader NCD frameworks [52].

Limitations

Several limitations exist in this study. First, the generalizability of our findings is limited by the absence of data on potential confounders, such as socioeconomic factors, nationality, comorbidities, and duration of residence. As the study was conducted in a private tertiary care center, this subject results in selection bias, potentially reflecting health-seeking patterns of insured or referred patients rather than the broader population, and while referral proportions were available, detailed reasons for referral and insurance information were not captured. Additionally, the focus on a single emirate may limit the applicability of findings to other regions. Second, the study's exclusive reliance on histopathological records limits clinical interpretation. Functional gastrointestinal disorders such as irritable bowel syndrome, functional dyspepsia, and chronic constipation, which typically do not require tissue diagnosis, were inherently excluded. Similarly, no clinical data was available on patient symptoms, treatment responses, or follow-up. While this narrows the clinical spectrum to predominantly structural lesions, it aligns with the study's core objective of describing histopathological and epidemiological patterns based on biopsy-confirmed diagnoses. Thirdly, although inter-observer variability and temporal inconsistencies are minimized through a consistent team of pathologists adhering to CAP protocols, we confirmed that no major changes in diagnostic criteria occurred during 2013–2023. Nonetheless, some degree of inter-observer variability is acknowledged as an inherent methodological limitation in this decade-long retrospective study. Moreover, while temporal trends were analyzed, these patterns should be interpreted with caution, as they may be influenced by changes in referral rates, diagnostic practices, or healthcare access over the study period rather than reflecting true shifts in disease incidence. Finally, this study employed a descriptive analytical approach, focusing on frequencies and associations. Multivariable analyses were not performed due to the absence of a control group and lack of additional confounding variables beyond age, sex, organ, and diagnosis. The structure of our outcome variables, involving multiple subgroups without clear comparators, further limited regression modeling.

Overall, this study provides the first and largest decade-long, institution-based epidemiological analysis of gastrointestinal disorders in the UAE, offering insights not previously documented in the region. By capturing trends within a diverse population structure, our findings add novel evidence to global literature on GI disease patterns. This work establishes a foundational reference for future studies, surveillance systems, and healthcare planning for countries with similar demographic structures.

Conclusion

Our study offers a decade-long epidemiological snapshot of GI disorders in a tertiary care center in the UAE. The findings reveal a predominance of young adult males, with the stomach, large intestine, and appendix being the most commonly affected sites. Gastritis emerged as the leading diagnosis, often linked to early-stage Helicobacter pylori infection. Age and gender disparities were evident, with younger individuals showing a higher prevalence of appendicitis, and older patients more likely to present with chronic or neoplastic conditions.

These insights may inform consideration of targeted public health strategies such as early screening programs for youth, gender-sensitive interventions, and surveillance of chronic GI conditions among older adults. To translate these observations into actionable strategies, we recommend expanding multicenter, multiethnic studies. Such research would provide stronger evidence to inform prevention, resource planning, and tailored interventions.

Our findings provide a foundational reference that may inform the development of demographically tailored GI healthcare policies in the UAE and comparable high-migration settings, while underscoring the need for broader multi-center studies to validate these observations.

Abbreviations

GI	Gastrointestinal
DALYs	Disability-Adjusted Life Years
SDI	Socio-Demographic Index
LDM	Laboratory Data Management
CPT	Current Procedural Terminology
SPSS	Statistical Package for Social Sciences
NSAID	Non-Steroidal Anti-Inflammatory Drug

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12876-025-04302-2.

Supplementary Material 1.

Supplementary Material 2.

Acknowledgements

The authors would like to express their sincere gratitude to the Department of Pathology at Thumbay Laboratory for granting access to the histopathological records used in this study. We also thank the Institutional Review Board of Gulf Medical University for approving this research and ensuring ethical compliance. Special thanks to the faculty and staff of Gulf Medical University, for their support and guidance throughout the research process.

Authors' contributions

All authors contributed equally to the conception, design, data collection, analysis, interpretation, and drafting of the manuscript. All authors read and approved the final version of the manuscript.

Funding

Not applicable.

Data availability

The dataset used and analyzed during the current study has been submitted as supplementary material and is available with this publication.

Declarations

Ethics approval and consent to participate

This retrospective study was approved by the Institutional Review Board (IRB) of Gulf Medical University in Ajman, United Arab Emirates (Ref. no. IRB-COM-FAC-59-NOV-2023). As the study involved secondary analysis of data extracted from hospital medical records, with no direct contact with patients or human tissues during data collection, the requirement for informed consent was waived by the IRB committee. Privacy, confidentiality, and anonymity of the patients' data were maintained throughout the study. Furthermore, the research was conducted in accordance with the ethical standards of the institutional research committee and with the principles outlined in the Helsinki Declaration and its later amendments or comparable ethical standards.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Received: 31 May 2025 / Accepted: 2 September 2025
Published online: 29 September 2025

References

1. National Institute of Diabetes and Digestive and Kidney Diseases. Your digestive system & how it works. Bethesda (MD): NIDDK. 2023 Available from: https://www.niddk.nih.gov/health-information/digestive-diseases/digestive-system-how-it-works.
2. Lee KS, Kim ES. Explainable artificial intelligence in the early diagnosis of Gastrointestinal disease. Diagnostics. 2022;12(11):2740. https://doi.org/10.3390/diagnostics12112740.
3. Jabłońska B, Mrowiec S. Gastrointestinal disease: new diagnostic and therapeutic approaches. Biomedicines. 2023;11(5):1420. https://doi.org/10.3390/biomedicines11051420.
4. Canavan C, West J, Card T. Review article: the economic impact of the irritable bowel syndrome. Aliment Pharmacol Ther. 2014;40(9):1023–34. https://doi.org/10.1111/apt.12938.
5. Peery AF, Crockett SD, Murphy CC, Jensen ET, Kim HP, Egberg MD, et al. Burden and cost of gastrointestinal, liver, and pancreatic diseases in the United States: update 2021. Gastroenterology. 2022;162(2):621–44. https://doi.org/10.1053/j.gastro.2021.10.017.
6. Wang F, Hu D, Sun H, Yan Z, Wang Y, Wang L, et al. Global, regional, and national burden of digestive diseases: findings from the global burden of disease study 2019. Front Public Health. 2023;11:1202980. https://doi.org/10.3389/fpubh.2023.1202980.
7. Sperber AD, Bangdiwala SI, Drossman DA, et al. Worldwide prevalence and burden of functional Gastrointestinal disorders, results of Rome foundation global study. Gastroenterology. 2021;160(1):99–e1143. https://doi.org/10.1053/j.gastro.2020.04.014.
8. Morgan E, Arnold M, Gini A, Lorenzoni V, Cabasag CJ, Laversanne M. Global burden of colorectal cancer in 2020 and 2040: incidence and mortality estimates from GLOBOCAN. Gut. 2023;72(2):338–44. https://doi.org/10.1136/gutjnl-2022-327736.
9. Wang R, Li Z, Liu S, Zhang D. Global, regional, and national burden of 10 digestive diseases in 204 countries and territories from 1990 to 2019. Front Public Health. 2023;11:1061453. https://doi.org/10.3389/fpubh.2023.1061453.
10. Sepanlou SG, Malekzadeh F, Delavari F, Naghavi M, Forouzanfar MH, Moradi-Lakeh M, et al. Burden of Gastrointestinal and liver diseases in middle East and North africa: results of global burden of diseases study from 1990 to 2010. Middle East J Dig Dis. 2015;7(4):201–15.
11. Al Al-Ajlouni TO, Lahoud Y, Almasaid C, Alhalalmeh S, Oweis Y. Socioeconomic and demographic disparities in the impact of digestive diseases in the middle East and North Africa (MENA) region. Int J Equity Health. 2025;24(1):85. https://doi.org/10.1186/s12939-025-02448-9.
12. Ajman Statistics Centre. Ajman Emirate: statistical book – Emirate statistics as of 3 June 2025. Ajman: Ajman Statistics Centre. 2025 Available from: https://scc.ajman.ae/en/node/2431.
13. Global Media Insight. UAE population statistics 2025. https://www.globalmediainsight.com/blog/uae-population-statistics/#UAE_Population_by_Age.
14. United Arab Emirates Population Report. 2022. EDS Outdoor. https://eds.ae/united-arab-emirates-population-report-2022/.
15. Guan L, Liu Z, Pan G, Zhang B, Wu Y, et al. The global, regional, and national burden of appendicitis in 204 countries and territories, 1990–2019: a systematic analysis from the global burden of disease study 2019. BMC Gastroenterol. 2023;23(1):44. https://doi.org/10.1186/s12876-023-02678-7.
16. Lotfollahzadeh S, Lopez RA, Deppen JG. Appendicitis. [Updated 2024 Feb 12]. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK493193/.
17. Azer SA, Awosika AO, Akhondi H. Gastritis. [Updated 2024 Jun 22]. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025 Jan. Available from: https://www.ncbi.nlm.nih.gov/books/NBK544250/.
18. Razzak HA, Harbi A, Ahli S. Tobacco smoking prevalence, health risk, and cessation in the UAE. Oman Med J. 2020;35(4):e165. https://doi.org/10.5001/omj.2020.107.
19. Alsulaimany FAS, Awan ZA, Almohamady AM, Koumu MI, Yaghmoor BE, Elhady SS, et al. Prevalence of *Helicobacter pylori* infection and diagnostic methods in the Middle East and North Africa region. Medicina (Kaunas). 2020;56(4):169. https://doi.org/10.3390/medicina56040169.
20. Saddique MN, Saleem S, Shahid I, et al. The estrogen-gallstone connection: uncovering the pathways. Discov Public Health. 2024;21:113. https://doi.org/10.1186/s12982-024-00232-8.
21. Yousif YF, Dhaif MB, Alaysreen AA, Mallah SI, AlHoda M, Alrahma HA, et al. Clinical epidemiology, etiology, and outcomes of upper gastrointestinal bleeding at a tertiary center in Bahrain: a retrospective study. Cureus. 2025;17(1):e77133. https://doi.org/10.7759/cureus.77133.

22. Alreshidi FS. Epidemiology and patterns of GI tract cancers in Saudi arabia: benefit of prompt lifestyle changes. Int J Clin Exp Pathol. 2025;18(6):222–32. https://doi.org/10.62347/OLDP2841.
23. Wang Y, Huang Y, Chase RC, Li T, Ramai D, Li S, et al. Global burden of digestive diseases: A systematic analysis of the global burden of diseases study, 1990 to 2019. Gastroenterology. 2023;165(3):773–e78315. https://doi.org/10.1053/j.gastro.2023.05.050.
24. Sadia Begum MS, Hussain, Padmaja K, Anusha P. Histopathological spectrum of upper gastrointestinal lesions in endoscopic biopsies at a tertiary care centre. Indian Journal of Pathology and Oncology 2024;2024:21549. Available at: https://www.ijpo.co.in/article-details/21549.
25. Tarun M, Niranjan J, Prathima S. Histopathological spectrum of upper gastrointestinal endoscopic biopsies of neoplastic lesions: A retrospective study. IP Journal of Diagnostic Pathology and Oncology 2020;2020:12833. Available at: https://www.jdpo.org/article-details/12833.
26. Alrasheed F, Alasfoor SG, Ali ZA, Alrasheed A, Takruni AO. Prevalence of appendicitis among patients admitted to Dammam Medical Center through ER to surgical ward between October 2020 and October 2023: a cohort study. Surgery, Gastroenterology and Oncology. 2024. https://doi.org/10.21614/sgo-693.
27. Peeters T, Houben B, Cools P, Thys Y, D'Onofrio V, Martens S, et al. An observational study on lifestyle and environmental risk factors in patients with acute appendicitis. Heliyon. 2023;9(4):e15131. https://doi.org/10.1016/j.heliyon.2023.e15131.
28. Parvathidevi GK, Chaithra H, Sriharsha HV. Histopathological spectrum of gastrointestinal lesions – in a tertiary care centre. IP Arch Cytol Histopathol Res. 2024;9(1):17–22. https://doi.org/10.18231/j.achr.2024.004.
29. Al Shibli N, Alkhalidi MF, Aldhuwayhi TZ, Alruwaili EK, Alibrahim NO, ALruwaili GQ, et al. Investigating the prevalence and risk factors of gallstone disease in al Jouf region, the Kingdom of Saudi Arabia. Bahrain Med Bull. 2025;47(2). https://doi.org/10.13140/RG.2.2.11732.10885.
30. Bailey KS, Marsh W, Daughtery L, Hobbs G, Borgstrom D. Sex disparities in the presentation of gallbladder disease. Am Surg. 2021;87(5):686–92. https://doi.org/10.1177/0003134821989044.
31. Krzyzak M, Mulrooney SM. Acute appendicitis review: background, epidemiology, diagnosis, and treatment. Cureus. 2020;12(6):e8562. https://doi.org/10.7759/cureus.8562.
32. 2040 cancer burden in the older population of the Gulf Cooperation Council (GCC) countries: public health implications. Cancer Control. 2021;28:10732748211027158. https://doi.org/10.1177/10732748211027158.
33. Dumic I, Nordin T, Jecmenica M, Stojkovic Lalosevic M, Milosavljevic T, Milovanovic T. Gastrointestinal tract disorders in older age. Can J Gastroenterol Hepatol. 2019;2019:6757524. https://doi.org/10.1155/2019/6757524.
34. Wang L, Jiang W, Li H. Global, regional, and national burden of gastritis and duodenitis from 1990 to 2021 with projections to 2050: a systematic analysis of the global burden of disease study 2021. Int J Med Sci. 2025;22(11):2570–82. https://doi.org/10.7150/ijms.109762.
35. Liu Y, Zhang J, Guo Y, Tian S, Wu Y, Liu C, et al. Global burden and risk factors of gastritis and duodenitis: an observational trend study from 1990 to 2019. Sci Rep. 2024;14(1):2697. https://doi.org/10.1038/s41598-024-52936-1.
36. Khedmat H, Karbasi-Afshar R, Agah S, Taheri S. Helicobacter pylori infection in the general population: a Middle Eastern perspective. Caspian J Intern Med. 2013 Fall;4(4):745–53. PMID: 24294467; PMCID: PMC3841773.
37. Khan ZAW, Ib Swehli HA, Al-battah AH, Mahmoud M, John A, Al-Ejji K, et al. Population based treatment strategy of *H. pylori* in qatar: through clinical and demographic insights. Arab J Gastroenterol. 2024;25(4):399–404. https://doi.org/10.1016/j.ajg.2024.07.007.
38. Saeed ZM, Sridhar SB, Shareef J, Rashed Alsereidi AM. From prescription patterns to drug safety: a closer look at non-steroidal anti-inflammatory drugs and analgesics in outpatient pharmacy. Front Pharmacol. 2025;16:1558830. https://doi.org/10.3389/fphar.2025.1558830.
39. Sohail R, Mathew M, Patel KK, Reddy SA, Haider Z, Naria M, et al. Effects of non-steroidal anti-inflammatory drugs (NSAIDs) and gastroprotective NSAIDs on the gastrointestinal tract: a narrative review. Cureus. 2023;15(4):e37080. https://doi.org/10.7759/cureus.37080.
40. Albadrani AA, Al Abdulqader AK. Prevalence of gastrointestinal disorders and their association with stress and sedentary lifestyle in working professionals. J Neonatal Surg. 2025;14(32S):8604. Available from: https://www.jneonatalsurg.com/index.php/jns/article/view/8604.
41. Alsakarneh S, Ahmed M, Jaber F, Abuassi M, Mourad FH, Francis FF et al. Inflammatory bowel disease burden in the Middle East and North Africa Region: a comprehensive analysis of incidence, prevalence, and mortality from 1990–2019. Ann Gastroenterol. 2024;37(5):527 – 35. https://doi.org/10.20524/aog.2024.0909.
42. Kesavelu D, Jog P. Current understanding of antibiotic-associated dysbiosis and approaches for its management. Ther Adv Infect Dis. 2023;10:20499361231154443. https://doi.org/10.1177/20499361231154443.
43. Hou K, Wu ZX, Chen XY, Wang JQ, Zhang D, Xiao C, et al. Microbiota in health and diseases. Signal Transduct Target Ther. 2022;7:135. https://doi.org/10.1038/s41392-022-00974-4.
44. Collard M, Lakkis Z, Loriau J, Mege D, Sabbagh C, Lefevre JH, et al. Antibiotics alone as an alternative to appendectomy for uncomplicated acute appendicitis in adults: changes in treatment modalities related to the COVID-19 health crisis. J Visc Surg. 2020;157(3S1):S33–42. https://doi.org/10.1016/j.jviscsurg.2020.04.014.
45. Mou D, Tesfasilassie T, Hirji S, Ashley SW. Advances in the management of acute cholecystitis. Ann Gastroenterol Surg. 2019;3(3):247–53. https://doi.org/10.1002/ags3.12240.
46. Calderwood AH, Calderwood MS, Williams JL, Dominitz JA. Impact of the COVID-19 pandemic on utilization of EGD and colonoscopy in the United States: an analysis of the GIQuIC registry. Techniques and Innovations in Gastrointestinal Endoscopy. 2021;23(4):313–21. https://doi.org/10.1016/j.tige.2021.07.003.
47. Sohail SH, Gupta K, Dang E, Hans B, Desilets DJ. Delay of care for Gastrointestinal emergencies during the COVID pandemic: a retrospective cohort study. Gastrointest Endosc. 2022;95(6):AB129–30. https://doi.org/10.1016/j.gie.2022.04.355.
48. Birkmeyer JD, Barnato A, Birkmeyer N, Bessler R, Skinner J. The impact of the COVID-19 pandemic on hospital admissions in the United States. Health Aff (Millwood). 2020;39(11):2010–7. https://doi.org/10.1377/hlthaff.2020.00980.
49. Soni MM, Mamdouh HM, Suliman EA. Impact of COVID-19 pandemic on utilization of healthcare services and spending patterns in Dubai, United Arab Emirates: a cross-sectional study. Healthcare. 2024;12(4):473. https://doi.org/10.3390/healthcare12040473.
50. Grinspan LT, Rustgi SD, Itzkowitz SH, Polydorides AD, Lucas AL. Impact of COVID-19 pandemic on gastrointestinal cancer diagnosis and resection: an observational study. Clin Res Hepatol Gastroenterol. 2022;46(3):101839. https://doi.org/10.1016/j.clinre.2021.101839.
51. Rafii S, Al-Shamsi HO. Cancer prevention, screening, and early detection in the UAE. In: Al-Shamsi HO, editor. Cancer Care in the United Arab Emirates. Singapore: Springer; 2024 Sep 18. pp. 79–90. https://doi.org/10.1007/978-981-99-6794-0_4.
52. MoHAP, WHO organize workshop to develop National Nutrition. Strategy 2022–2030. Ministry of Health and Prevention - UAE. 2022. Available from: https://mohap.gov.ae/en/w/mohap-who-organize-workshop-to-develop-national-nutrition-strategy-2022-2030. Cited 2025 Aug 3.

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