ORIGINAL RESEARCH

ORAL MANIFESTATIONS AND ORAL HEALTH STATUS IN INFLAMMATORY BOWEL DISEASE PATIENTS IN RELATION TO SEVERITY OF DISEASE

Chnara Jamal Ali[1], Shaheen Ali Ahmed[2], Blind Sirwan Abdullah[3]

[1]B.D.S, Candidate of oral and maxillofacial medicine at KHCMS, Erbil, Iraq

[2]Oral diagnosis department /College of dentistry/ Hawler Medical University Erbil, Iraq

[3]M.B.Ch.B,MRCP, MSc GIT Gastroenterologist, Hepatologist and Interventional Endoscopist, UK, London, Gastroentrology Department, Rizgary Teaching Hospital, Erbil, Iraq

Corresponding Author: Chnara Jamal Ali, B.D.S, Candidate of oral and maxillofacial medicine at KHCMS, Erbil, Iraq
e-mail barzi.shwan92@gmail.com

Background: Inflammatory bowel disease (IBD) are chronic inflammatory disease with primary intestinal involvement, including crohn's disease (CD) and ulcerative colitis (UC) , the patients had at least one extra-intestinal manifestation, oral cavity being the most affected area, has been reported in 25% to 30% of patients suffering from IBD.

The aim of this study were designed to assess the frequency of oral manifestations and oral health status of patients with IBD in relation to severity of disease in a sample of patients at Erbil, Kurdistan, Iraq.

Patient and method: This cross-sectional study was done among 100 patients suffering from IBD mostly (61)were UC remaining (39) CD aged over 15 years fulfilled the mentioned inclusion criteria and were invited to participate in the study,A full clinical examination was conducted by examiner in the Rizgary teaching hospital -gastrointestinal unit; using Harvey-Bradshaw index (HBI) for CD ,Mayo score for UC, gingival index, plaque index, calculus index, DMFT index .

Result: A total of 100 participants (56 males and 44 females) were analyzed, predominantly aged 16-35 years, The majority were in clinical remission, with 49% reporting oral symptoms, primarily ulcers (22%), and dry mouth was notably prevalent, affecting 53% of patients, although no significant correlation between oral manifestation with disease severity was established

Conclusion: The study concludes that most common oral symptoms were dry mouth and oral ulcers, and there is no significant association between oral symptoms and the severity of IBD.

INTRODUCTION

Inflammatory bowel disease (IBD) are chronic inflammatory disease with primary intestinal involvement ,including crohn's disease (CD) and ulcerative colitis (UC) [1,2] IBD is characterized by chronic progression and is believed to result from an aberrant immune response to microbes in the gut in genetically susceptible individuals [3-6]. Other than the expected symptoms of gastrointestinal involvement, IBD patients may exhibit a wide range of non-intestinal signs and symptoms known as extra intestinal manifestations (EIMs),with prevalence rates ranging from 6%- 47% [7]. Join, skin, eyes, and the biliary tract are among the most common organs involved in EIMs , oral involvement with different presentations may also be seen in IBD [8]. Oral manifestations could also occur in these patients due to other causes ,such as drug reactions, infections, and unrelated disease [9]. patients with IBD may present these oral manifestations years before the appearance of intestinal disease [10,12].

The CD is a type of inflammatory bowel disease that can affect any part of the gastrointestinal tract from the

mouth to the anus [13,14]. There is a higher rate of incidence in females ,it commonly affects people in their teens and twenties and people in their 5th to 7th decade of life [15] . It is 3 to 20 times more common in first degree relatives and has a 55% occurrence in twins (if one has the disease) [16]. The CD is not curable and remission can be difficult to achieve , relapse can be prevented by dietary changes, lifestyle modifications, medication, reduction of stress and moderate exercise along with activity [17].Harvey-Bradshaw index (HBI) used to stratify severity of CD.

The UC is an autoimmune disease which causes ulcers and inflammation in the colon either in segments or completely, it has a bimodal distribution of age-specific incidence rates with two peaks : the first is between 15 to 25 years and the second peak is in the 6th decade of life[18]. Mayo score for UC is one of the most commonly used disease activity indices in UC [19,20]. Several oral manifestations are associated with IBD, but the involvement of the oral cavity does not necessarily coincide with gastrointestinal disease. Oral manifestations of CD may appear several months to several years before the bowel symptoms, The frequency of oral ulcers in patients with CD is higher than patients suffering from UC [21, 22].

Most common Oral lesions found in patients with UC may include mucosal ulcers, pyostomatitis vegetans, diffuse pustules and lichen planus . While most common oral lesions in patients with CD my include are diffuse lip swelling with soreness and cracking at the corners of the mouth (called angular stomatitis)[23]. It can also involve mouth ulcers, gum swellings (hyperplasia), Oral manifestations occur among 5%–60% of patients with CD, particularly in pediatric cases and men. The frequency of oral ulcers in UC varies widely, from 2% to 34% [24].

 Previous studies clarified a significant statistical relationship between oral signs (tongue coating and oral ulceration) and oral symptoms such as halitosis, dry mouth (xerostomia), acidic taste, and taste changes in patients suffering from severe ulcerative colitis compared to the control group [25]. These can be helpful in the early diagnosis of IBD, and dentists are the first members in the health-care systems who can diagnose them [26.]

Aim

The aim of this study were designed to assess the frequency of oral manifestations and oral health status of patients with IBD in relation to severity of disease.

PATIENTS AND METHOD

This study adopted a cross-sectional design from March 2024 to March 2025. The research was conducted at Rizgary Teaching Hospital in Erbil, Kurdistan, with cases collected from the gastrointestinal (GIT) outpatient clinics, with sample comprising patients who meet the inclusion criteria. The target sample size is 100 cases, all diagnosed with IBD. The study approved by the ethical committee of the Kurdistan Higher Council of Medical Specialties, with all patients providing verbal and informed consent before inclusion. Patients aged over 15 years with a confirmed diagnosis of IBD included. Patients with systemic diseases that may present with oral manifestations, pregnant or nursing women, and those who do not meet the inclusion criteria were excluded.

Data collected by studying patient's documents, interviews, oral examinations, and completing related information forms. Harvey-Bradshaw index (HBI) used to measure the severity of CD [27],   and Mayo score for UC to asses disease activity [19].

Oral health examination: was assessed visually with a disposable mirror, disposable probe, disposable gloves and light source.This is standardized examination from the WHO included dental findings, evaluation of periodontal health and presence of OML(the oral mucosae will examine for the detection of soft tissue alterations (mucosal ulcers, pyostomatitis vegetans, diffuse pustules, lichen planus, diffuse lip swelling with soreness and cracking at the corners of the mouth (called angular stomatitis), gum swellings (hyperplasia), leukoplakia, candidiasis, geographic tongue, furry tongue, traumatic keratosis, fissured tongue .. etc).), DMFT, and three indicators of periodontal status are used: Plaque index, gingival bleeding index and calculus index[28].

Statistical analysis

The frequency and distribution of various oral manifestations were evaluated using the IBM SPSS Statistics for Windows, version 25.

RESULTS

The table 1- show the sample consisted of 56 males (56%) and 44 females (44%), with most participants aged 26–35 years (32.0%) and 16–25 years (26.0%). Only 20.0% were older than 36 years. The diagnosis distribution was 55 patients (55.0%) with ulcerative colitis and 45 (45.0%) with Crohn's disease. Regarding disease activity, in CD (84.0%) were in clinical remission, while (11.0%) had mild and (5.0%) moderate disease activity according to the Harvey-Bradshaw Index (G.HBI) in UC. The G. Mayo score revealed that 49 patients (49.0%) had no symptoms, while 24 (24.0%) experienced mild symptoms, 26 (26.0%) moderate symptoms, and only 1 (1.0%) had severe symptoms. Oral manifestations were reported in 49 patients (49.0%), with 22 (22.0%) reporting ulcers as the most common symptom, followed by coated tongue in 8 (8.0%), angular stomatitis in 6 (6.0%), and fissured tongue in 4

Chnara Jamal Ali , Shaheen Ali Ahmed , Dr. Blind Sirwan Abdullah. **Oral Manifestations and Oral Health Status in Inflammatory Bowel Disease Patients in Relation to Severity of Disease .**

(4.0%). Severe symptoms, such as gingival swelling and combinations of symptoms (e.g., ulcers with fissured tongue or coated tongue), were rare (1–3%). Interestingly, 51 patients (51.0%) reported no oral symptoms. Dry mouth was a significant complaint, affecting 53 patients (53.0%).

Patients met the criteria of this study.

In this study female to male ratio is (2-1).The mean age $\pm$ SD is 11.4 ± 5.6 years at the time of surgery (Table 1).

Table1. Frequency table of Study Participants

Category	Subcategory	Count (n)	Percentage (%)
Gender	Male	56	56%
	Female	44	44%
Age Group	≤ 15	5	5.0%
	16 - 25	26	26.0%
	26 - 35	32	32.0%
	36 - 45	17	17.0%
	46 - 55	15	15.0%
	56 - 65	3	3.0%
	+66	2	2.0%
Diagnosis	Crohn's Disease	45	45.0%
	Ulcerative Colitis	55	55.0%
G.HBI Score	Clinical Remission	84	84.0%
	Mild Disease	11	11.0%
	Moderate Disease	5	5.0%
G. Mayo Score	Severe	1	1.0%
	Mild	24	24.0%
	Moderate	26	26.0%
	None	49	49.0%
Oral Symptoms	Angular Stomatitis	6	6.0%
	Candidiasis	1	1.0%
	Coated Tongue	8	8.0%
	Fissured Tongue	4	4.0%
	Gingival Swelling	1	1.0%
	Gingival Swelling, Coated Tongue	1	1.0%

	Lichen Planus	1	1.0%
	Ulcer, Fissured Tongue	1	1.0%
	Ulcer	22	22.0%
	Ulcer, Coated Tongue	3	3.0%
	None	51	51.0%
	Ulcer, Lip Swelling	1	1.0%
Dry Mouth	Dry Mouth	53	53.0%

The table 2 highlights the relationship between oral symptoms across disease severity levels in patients with CD measured by G.HBI scores, using Fisher-FreemanHalton Exact Test. Angular stomatitis was reported in 5.0% of patients in remission and 1.0% in moderate disease, but without significant association ($p = 0.093$). Coated tongue and fissured tongue were more common in remission (7.0% and 4.0%, respectively), but absent in moderate disease. Ulcers were observed in 18.0% of patients in remission and decreased in frequency in mild (3.0%) and moderate (1.0%) disease, indicating no significant link to disease severity. Notably, dry mouth showed a statistically significant association with disease severity ($p = 0.014$), affecting 47.0% of patients in remission, while being less common in mild (4.0%) and moderate disease (2.0%). Other symptoms, including gingival swelling, lichen planus, and excessive salivation, were rare and not significantly associated with disease severity. Overall, dry mouth emerges as the primary symptom correlated with disease status.

Table2. Distribution of Oral Symptoms by Disease Severity (G.HBI Scores) of CD

Symptom	Clinical Remission	Mild Disease	Moderate Disease	Fisher-FreemanHalton Exact Test
Oral Symptoms	**n (%)**	**n (%)**	**n (%)**	
Angular stomatitis	5 (5.0%)	0 (0.0%)	1 (1.0%)	**p = 0.093**
Candidiasis	1 (1.0%)	0 (0.0%)	0 (0.0%)	
Coated tongue	7 (7.0%)	1 (1.0%)	0 (0.0%)	
Fissured tongue	4 (4.0%)	0 (0.0%)	0 (0.0%)	
Gingival swelling	1 (1.0%)	0 (0.0%)	0 (0.0%)	
Gingival swelling, coated tongue	0 (0.0%)	1 (1.0%)	0 (0.0%)	
Lichen planus	0 (0.0%)	0 (0.0%)	1 (1.0%)	
None	45 (45.0%)	5 (5.0%)	1 (1.0%)	
Ulcer	18 (18.0%)	3 (3.0%)	1 (1.0%)	
Ulcer, coated tongue	1 (1.0%)	1 (1.0%)	1 (1.0%)	

|				
Ulcer, fissured tongue	1 (1.0%)	0 (0.0%)	0 (0.0%)	
Ulcer, lip swelling	1 (1.0%)	0 (0.0%)	0 (0.0%)	
Dry Mouth	47 (47.0%)	4 (4.0%)	2 (2.0%)	**p = 0.014***

* Significant at Level (p<0.05)

The table 3 examines the distribution of oral symptoms in UC across different G. Mayo Score severity levels (none, mild, moderate, severe). Angular stomatitis occurred consistently at 2.0% in the none, mild, and moderate groups, with no significant association (p = 0.113). Candidiasis and fissured tongue were rare, while coated tongue was observed in 4.0% of patients with none and moderate severity but absent in other groups. Ulcers were most common in patients with none severity (14.0%), decreasing in mild (3.0%) and moderate (5.0%) cases, and absent in severe disease. Dry mouth was the most frequently reported symptom, found in 24.0% of patients with none severity, 11.0% in mild, 17.0% in moderate, and only 1.0% in severe cases, though it showed no significant association with disease severity (p = 0.465). The absence of symptoms decreased progressively from 22.0% in none severity to 14.0% in moderate cases, with no cases in severe disease.

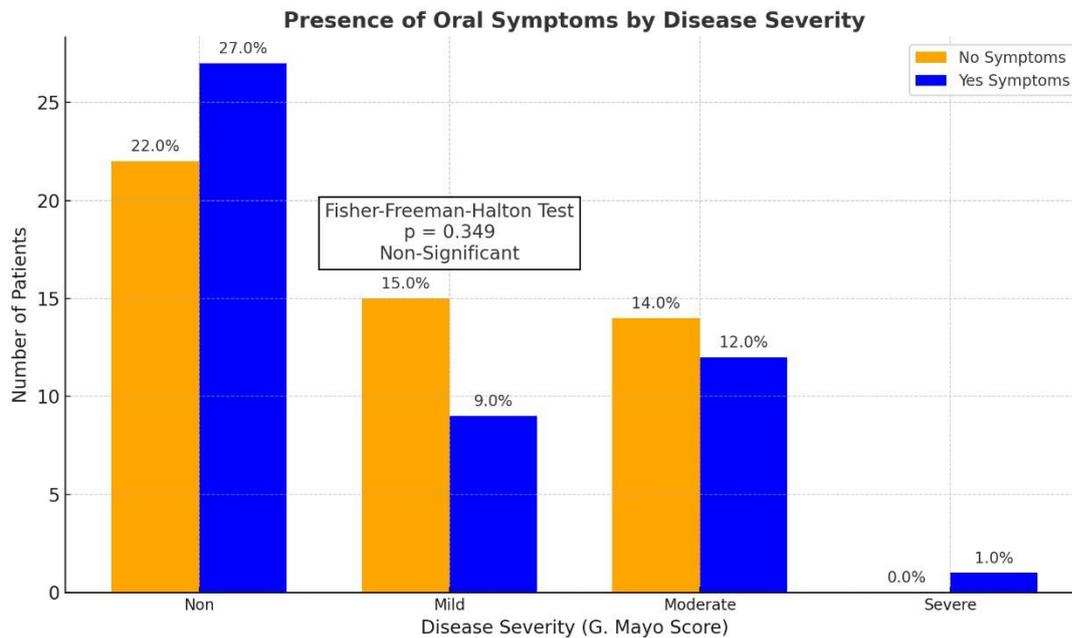**Table 3 Distribution of Oral Symptoms by Disease Severity (G. Mayo Score) of UC**

Oral Symptoms	Clinical Remission (n%)	Mild Disease (n%)	Moderate Disease (n%)	Severe Disease (n%)	Fisher-FreemanHalton Exact Test
Angular stomatitis	2 (2.0%)	2 (2.0%)	2 (2.0%)	0 (0.0%)	
Candidiasis	1 (1.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Coated tongue	4 (4.0%)	0 (0.0%)	4 (4.0%)	1 (0.0%)	
Fissured tongue	0 (0.0%)	2 (2.0%)	1 (1.0%)	2 (1.0%)	
Gingival swelling	1 (0.0%)	1 (1.0%)	0 (0.0%)	0 (0.0%)	
Gingival swelling, coated tongue	2 (1.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Lichen planus	1 (1.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	**p = 0.113**
None (Oral symptoms)	22 (22.0%)	15 (15.0%)	14 (14.0%)	0 (0.0%)	
Ulcer	14 (14.0%)	3 (3.0%)	5 (5.0%)	0 (0.0%)	
Ulcer, coated tongue	3 (3.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Ulcer, fissured tongue	1 (1.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Ulcer, lip swelling	0 (0.0%)	1 (1.0%)	0 (0.0%)	0 (0.0%)	
Dry Mouth	24 (24.0%)	11 (11.0%)	17 (17.0%)	1 (1.0%)	**p = 0.465**

Figure 1 The (bar chart) highlights the distribution of patients experiencing oral symptoms based on their disease severity as measured by the G.HBI scores (clinical remission, mild disease, and moderate disease). A significant proportion of patients without oral symptoms (45.0%) were in clinical remission, while this percentage decreased significantly in mild (5.0%) and moderate disease (1.0%) groups. Similarly, among those experiencing oral symptoms, 39.0% were in clinical remission, 6.0% in mild disease, and 4.0% in moderate disease.
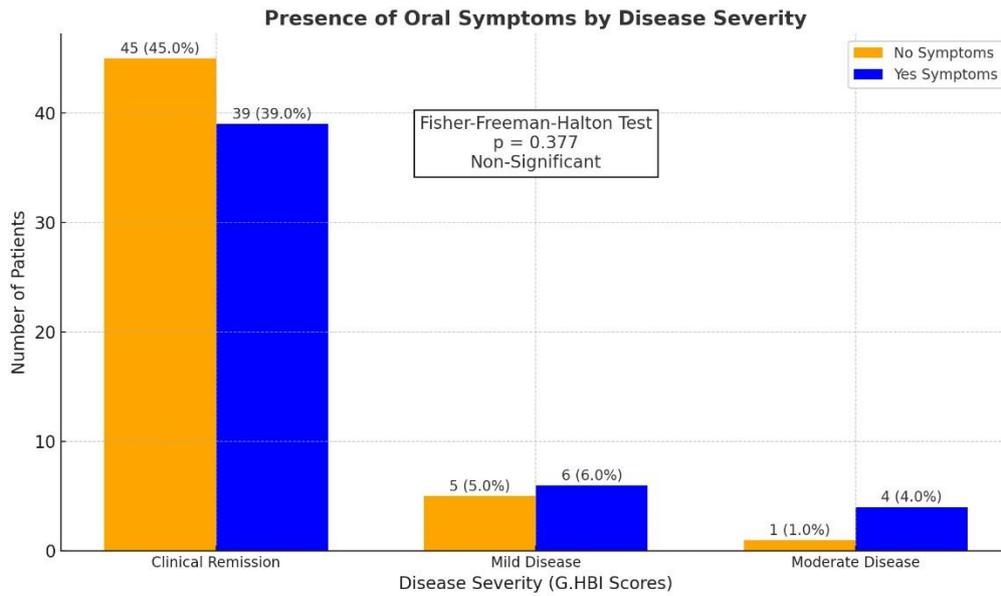
Figure 1. Presence of Oral Symptoms by Disease Severity of CD (G.HBI Scores)

Figure 2 The bar chart illustrates the distribution of patients with and without oral symptoms across different G. Mayo Score severity levels. Among patients in the clinical remission category, 22% had no oral symptoms, while 27% reported symptoms. In the Mild category, 15% had no symptoms compared to 9% with symptoms. For Moderate cases, 14% had no symptoms, whereas 12% reported symptoms. In the Severe category, no patients (0%) were symptom-free, while 1% experienced symptoms. The Fisher-Freeman-Halton Test (p = 0.349) indicates no statistically significant association between the presence of oral symptoms and disease severity.

Figure 2. Bar chart showing distribution of Oral Symptoms by Disease Severity (G. Mayo Score) of UC

Table 4. Comparison of Mean ± SD of Indexes for HBI using Kruskal-Wallis H in CD

Variable	Clinical Remission (Mean ± SD)	Mild (Mean ± SD)	Moderate (Mean ± SD)	Severe (Mean ± SD)	Kruskal-Wallis H	pvalue	Significance
Gingival Index	1.41 ± 0.60	1.44 ± 0.60	1.23 ± 0.49	1.20 ± 0.0	2.739	0.254	N.S
Plaque Index	1.19 ± 0.60	1.08 ± 0.69	0.88 ± 0.60	1.65 ± 0.0	2.652	0.266	N.S
Calculus Index	0.03 ± 1.47	0.13 ± 1.47	0.18 ± 0.51	0.00 ± 0.0	0.263	0.877	N.S
DT	4.20 ± 3.48	2.83 ± 2.65	3.61 ± 2.71	4.00 ± 0.0	1.646	0.439	N.S
MT	2.84 ± 2.93	5.80 ± 5.80	3.31 ± 2.66	6.00 ± 0.0	1.296	0.523	N.S
FT	2.47 ± 3.78	4.20 ± 5.14	2.15 ± 3.31	0.00 ± 0.0	3.715	0.156	N.S

Table 4 showed that Gingival Index, Plaque Index, Calculus Index ,Decayed Teeth, Missing Teeth, Filled Teeth: The mean and standard deviation (SD) for the these indeces were compared between disease severity levels of CD, showing no significant difference.

Table 5. Comparison of Mean ± SD of Indexes for mayo score using Kruskal-Wallis H in UC

Variable	Clinical Remission (Mean ± SD)	Mild Disease (Mean ± SD)	Moderate Disease (Mean ± SD)	Kruskal-Wallis H	p-value	Significance
Gingival Index	1.37 ± 0.56	1.28 ± 0.58	1.53 ± 0.87	1.438	0.487	N.S
Plaque Index	1.04 ± 0.64	1.31 ± 0.49	1.46 ± 0.55	4.052	0.132	N.S
Calculus Index	0.10 ± 0.38	0.02 ± 0.06	0.00 ± 0.00	0.536	0.765	N.S
DT	3.68 ± 3.20	3.91 ± 1.64	5.80 ± 3.70	2.649	0.266	N.S
MT	3.30 ± 3.80	2.99 ± 4.04	8.85 ± 8.46	0.803	0.669	N.S
FT	2.98 ± 3.93	1.55 ± 5.39	5.00 ± 4.85	0.32	0.852	N.S

As in table 5 has been discovered that Gingival Index, Plaque Index, Calculus Index, Decayed Teeth, Missing Teeth, Filled Teeth: The mean and standard deviation (SD) for the these indeces were compared between disease severity levels of UC, showing no significant difference.

DISCUSSION

The paper contributes to understanding the relationship between oral manifestations and oral health status in IBD patients, particularly in relation to disease severity. The present study was carried out on 100 patients with inflammatory bowel disease (IBD). The results indicated that ulcerative colitis (UC) was more prevalent among patients ranged (55 %) in comparison with crohn's disease (CD) which was less prevalent among patients ranged (45%). Similarly, as found by Nimmons et al. [32].

With regard to gender distribution of IBD, the results of this study showed that men were more affected than women (56% vs. 44%), but the difference was not significant, which is in agreement with the previous studies [33,34]. In this study, the overall frequency of oral manifestations was (49.0%), The frequency of oral manifestations was 78% among patients with ulcerative colitis which is not matched with a range of 5%–60% mentioned in previous studies ,this discrepancy suggests that ulcerative colitis may have pronounced impact on oral health than previously understood and the frequency of oral manifestations was 55% among patients with crohn's disease not confirms the various frequencies of 2%–34% in previous studies[37]. The higher frequency of oral manifestations in ulcerative colitis compared with Crohn's disease was in disagreement with previous studies [35,36]. It highlights that a significant number of patients in clinical remission reported no oral symptoms, while dry mouth emerged as a prevalent complaint, affecting over half of the participants, this can be caused by medication used in treatment of IBD , and dehydration caused by diarrhea[37]. The study also provides insights into the types of oral symptoms experienced, such as ulcers and coated tongue, and their distribution across different disease activity levels,these can be caused by nutritional deficiencies including vitamins and minerals (vit B12, iron, folate, and zinc) which are common in IBD patients and medication including immune suppressant and corticosteroids can have side effects that lead to oral ulcers. Additionally, it emphasizes the lack of significant association between oral symptoms and disease severity.

Ulcerative colitis

In this study, the frequency of dry mouth was 52% among patients which was consistent with the results of previous studies[38] and frequency of aphthous ulcers in patients with ulcerative colitis was 22%, which is in agreement with the frequency reported in the previous studies. This finding was followed by coated tongue which was 8% in which range 4% of patient were in clinical remission. But in this study some patient had ulcer with coated tongue ranged about 3% which is in agreement with previous study [39,40]. In the current study, Oral manifestations in IBD, such as stomatitis, glossitis, oral aphthae, and angular cheilitis, can be caused by malnutrition due to the disease or drugs used to treat the disease. The frequency of oral manifestations in smokers (22%) was less than nonsmokers (78%), which is in contrast with the previous studies stated that oral manifestations are more common among smokers [35].

Unusually, cigarette smoking is associated with decreased rates of incidence of UC and has been associated with protective features to prevent further flare-ups of the condition such as relapses, hospitalizations and colectomies[41], some theories suggest that nicotine might increase mucus production in colon, forming protective barrier and suppress immune system, there by reducing immunity[42-44].

Also complications of the condition are reduced in those who do smoke. This raises the concept of encouraging smoking to prevent adverse events occurring.[13]However, there is a plethora of evidence that suggests that smoking has adverse effects on overall morbidity outcomes.[38] In particular, it can increase failure in dental implants, increase the risk of oral cancers and increase the incidence of dental infections. Guidelines advocate smoking cessation in UC patients.

Crohn's disease

In this study, the frequency of dry mouth was 53% among patients, which was consistent with the results of previous. The frequency of aphthous ulcers in Crohn's disease was 22% in the current study, This finding was followed by coated tongue which was 8% in which range 7% of patient were in clinical remission. which is in agreement with previous study [40].

DMFT

IBD patients also have increased rates of lactobacilli and streptococcus mutanes found in their oral cavity contributing to caries [45]. The reasoning behind why these increased rates of caries and infections are not clear, however, proposed arguments include salivary components (increased bacterial concentrations), oral hygiene and diet. another factor is, a risk factor for patients developing IBD is the increased sugar intake that can be associated with further infection [46].

DMFT for UC

Decayed Teeth (DT),Missing Teeth (MT), Filled Teeth (FT) indeces: The analysis showed no significant differences.

DMFT for CD

Decayed Teeth (DT),Missing Teeth (MT), Filled Teeth (FT) indeces: The analysis showed no significant differences.

Periodontal status

The association between IBD and periodontal disease is starting to emerge in recent literature.Due to the

inflammatory nature of both disorders, it is hypothesised that underlying IBD can trigger a raised basal cytokine response that can induce periodontal disease. Several case control studies have been conducted to explore this relationship further.[47] A German study identified that twice as many patients with IBD, compared to those without IBD, had clinic attachment loss >5 mm, however, mean loss was not statistically significant. However, since then further prospective trials have identified that IBD patients have higher provenances of periodontal disease, deeper pocket depth and more clinical attachment loss [48].

Recent studies have indicated that poor oral health, for example, judged by the number of remaining teeth. or presence of periodontitis, has an impact on general medical care costs in older people [49].

Periodontal status for UC:. Gingival Index, Plaque Index, Calculus Index: showed no significant differences among different levels of disease severity.

Periodontal status for CD: Gingival Index, Plaque Index, Calculus Index: showed no significant differences among different levels of disease severity.

Prevalence of Oral Symptoms: The study indicates that a significant proportion of patients with IBD experience oral symptoms, such as ulcers and angular stomatitis, with 22% reporting ulcers and 6% reporting angular stomatitis. However, 51% of participants reported no oral symptoms, suggesting variability in symptom presentation among IBD patients.

Association with Disease Severity: which show no significant association between oral symptoms and disease severity .

Comparison with Other Studies: Other research has similarly found that oral manifestations in IBD patients do not consistently correlate with disease activity. For instance, studies have reported that while some patients experience oral symptoms during active disease phases, others do not, indicating a complex relationship between oral health and IBD activity.

Salivation and Oral Health: Dry mouth was a common issue among participants, affecting 53%, which could contribute to oral health problems. This aligns with other studies that have identified xerostomia as a prevalent issue in IBD patients, potentially exacerbating oral symptoms .

Educational and Demographic Factors: The study's demographic data, with a significant portion of participants having no formal education, may influence health literacy and management of oral symptoms. This aspect is crucial as other studies have highlighted the role of education in managing chronic conditions like IBD.

CONCLUSION AND IMPACT

The study reveal that IBD more common among men than female, UC were more common than CD , oral symptoms more common among patients with UC , and most common oral symptoms were xerostomia and oral ulceration, with no relation of oral symptoms and periodontal status with disease severity.

REFERENCES

1. Lourenço S, Hussein T, Bologna S, Sipahi A, Nico M. Oral manifestations of inflammatory bowel disease: a review based on the observation of six cases. Journal of the European Academy of Dermatology and Venereology. 2010;24(2):204-7.

2. Baumgart DC, Sandborn WJ. Crohn's disease. The Lancet. 2012;380(9853):1590-605.

3. Bharti S, Bharti M. The Business of T Cell Subsets and Cytokines in the Immunopathogenesis of Inflammatory Bowel Disease. Cureus. 2022;14(7).

4. Zhang Y-Z, Li Y-Y. Inflammatory bowel disease: pathogenesis. World journal of gastroenterology: WJG. 2014;20(1):91.

5. Abdullah M, Syam AF, Simadibrata M, Gunawan J, Makmun D, Rani AA. New insights on the pathomechanisms of inflammatory bowel disease. Journal of digestive diseases. 2013;14(9):455-62.

6. Frolkis A, Dieleman LA, Barkema HW, Panaccione R, Ghosh S, Fedorak RN, et al. Environment and the inflammatory bowel diseases. Canadian Journal of Gastroenterology and Hepatology. 2013;27:e18e24.

7. Williams H, Walker D, Orchard TR. Extraintestinal manifestations of inflammatory bowel disease. Current gastroenterology reports. 2008;10:597-605.

8. Ardizzone S, Puttini PS, Cassinotti A, Porro GB. Extraintestinal manifestations of inflammatory bowel disease. Digestive and liver disease. 2008;40:S253-S9.

9. Rowland M, Fleming P, Bourke B. Looking in the mouth for Crohn's disease. Inflammatory bowel diseases. 2010;16(2):332-7.

10. Kaneko F, Togashi A, Saito S, Sakuma H, Oyama N, Nakamura K, et al. Behçet's disease (Adamantiades-Behçet's disease). Journal of Immunology Research. 2011;2011.

11. Hamasur KS. Prevalence of Oral Manifestations of Inflammatory Bowel Disease in Patients Admitted to Sulaymaniyah teaching hospital–Iraq. AL-Kindy College Medical Journal. 2020;16(1):47-53.

12. Nimmons D, Limdi JK. Elderly patients and inflammatory bowel disease. World journal of gastrointestinal pharmacology and therapeutics. 2016;7(1):51.

13. Ng SC, Shi HY, Hamidi N, Underwood FE, Tang W, Benchimol EI, et al. Worldwide incidence and prevalence of inflammatory bowel disease in the 21st century: a systematic review of population-based studies. The Lancet. 2017;390(10114):2769-78.

14. Dai C, Jiang M, Sun M-j. Disease Duration and the Risk of Treatment Failure in Biologic-Treated Patients with Ulcerative Colitis. Inflammatory Bowel Diseases. 2020;26(3):e16-e.

15. Xu Y, Liu X, Ding K, Xin B. IBD: An Interpretable Backdoor-Detection Method via Multivariate Interactions. Sensors. 2022;22(22):8697.

16. Pecci-Lloret MP, Ramirez-Santisteban E, Hergueta-Castillo A, Guerrero-Gironés J, Oñate-Sánchez RE. Oral Manifestations of Crohn's Disease: A Systematic Review. Journal of Clinical Medicine. 2023;12(20):6450.

17. Aydın Ö, Çetin AK, Samur G. Pediatrik İnflamatuvar Bağırsak Hastalıklarında Güncel Beslenme Tedavisi Yaklaşımları. Journal of Current Pediatrics/Guncel Pediatri. 2022;20(1).

18. Little JW, Falace D, Miller C, Rhodus NL. Dental Management of the Medically Compromised Patient-E-Book: Elsevier Health Sciences; 2012.

19. Sandborn WJ, Sands BE, Vermeire S, Leung Y, Guo X, Modesto I, et al. Modified Mayo score versus Mayo score for evaluation of treatment efficacy in patients with ulcerative colitis: data from the tofacitinib OCTAVE program. Therapeutic Advances in Gastroenterology. 2022;15:17562848221136331.

20. Furfaro F, Ragaini E, Peyrin-Biroulet L, Danese S. Novel Therapies and Approaches to Inflammatory Bowel Disease (IBD). MDPI; 2022. p. 4374.

21. Patil SA, Cross RK. Update in the management of extraintestinal manifestations of inflammatory bowel disease. Current gastroenterology reports. 2013;15:1-5.

22. K Ko J, K Auyeung K. Inflammatory bowel disease: etiology, pathogenesis and current therapy. Current pharmaceutical design. 2014;20(7):1082-96.

23. Valentini G, D'Agostino S, Ferrara E, Dolci M. Patients-Reported Oral Manifestations in Coeliac Disease and Inflammatory Bowel Diseases: An Italian Survey. Oral. 2023;3(3):316-24.

24. Lam GA, Albarrak H, McColl CJ, Pizarro A, Sanaka H, Gomez-Nguyen A, et al. The oral-gut axis: periodontal diseases and gastrointestinal disorders. Inflammatory bowel diseases. 2023;29(7):1153-64.

25. Glick M. Burket's oral medicine: PMPH USA; 2015.

26. Büsch K, Ludvigsson JF, Ekström-Smedby K, Ekbom A, Askling J, Neovius M. Nationwide prevalence of inflammatory bowel disease in Sweden: a population-based register study. Alimentary pharmacology & therapeutics. 2014;39(1):57-68.

27. Echarri A, Vera I, Ollero V, Arajol C, Riestra S, Robledo P, et al. The Harvey–Bradshaw Index adapted to a mobile application compared with In-clinic assessment: the MediCrohn Study. Telemedicine and e-Health. 2020;26(1):78-86.

28. Tankova H, Lazarova Z. A Comparative Study of Full Mouth Bleeding Score (FMBS) and Gingival Index Loe and Silness (GILS) in Assessing Gingival Status of Children Aged 10-14 years. Journal of IMAB– Annual Proceeding Scientific Papers. 2024;30(1):5387-91.

29. Hewlett SA, Blankson P-K, Aheto JM, Anto F, Appiah TD, Sackeyfio J, et al. Oral Health Status Assessment of an African Population: Rationale, Methods and Population Characteristics. 2021.

30. Khozeimeh F, Shakerin H, Daghaghzadeh H, Najarzadegan F, Golestannejad Z, Adibi P. Oral manifestations in inflammatory bowel disease: A cross-sectional study in isfahan. Dental Research Journal. 2021;18(1):4.

31. Katsanos KH, Roda G, Brygo A, Delaporte E, Colombel J-F. Oral cancer and oral precancerous lesions in inflammatory bowel diseases: a systematic review. Journal of Crohn's and Colitis. 2015;9(11):1043-52.

32. Georgescu SR, Ene CD, Nicolae I, Mitran M, Musetescu A, Matei C, et al. Reflectometric analysis for identification of various pathological conditions associated with lichen planus. Revista de Chimie. 2017;68(5):1103-8.

33. Ghapanchi J, Rezazadeh F, Fakhraee E, Zamani A. Prevalence of xerostomia in patients referred to Shiraz Dental School, Shiraz, Iran during 2006–2013. Iranian journal of public health. 2016;45(12):1665.

34. Barreiro-de Acosta M, Rio P, Ferreiro R, Bouza M, Pombo M, Lorenzo A, et al., editors. Oral manifestations in inflammatory bowel disease patients under anti-tumour necrosis factor treatment. journal of crohns & colitis; 2016: oxford univ press great clarendon st, oxford ox2 6dp, england.

35. Tan C, Brand H, De Boer N, Forouzanfar T. Gastrointestinal diseases and their oro-dental manifestations: Part 2: Ulcerative colitis. British dental journal. 2017;222(1):53-7.

36. Huang BL, Chandra S, Shih DQ. Skin manifestations of inflammatory bowel disease. Frontiers in physiology. 2012;3:17855.

37. Babu A, Malathi L, Kasthuri M, Jimson S. Ulcerative lesions of the oral cavity–an overview. Biomedical and Pharmacology Journal. 2017;10(1):401-5.

38. Qian X, Wang T, Shen J, Ran Z. Low dose of azathioprine is effective to induce and maintain remission in active Crohn disease: a prospective observational study. Medicine. 2018;97(34):e11814.

39. Lauritano D, Boccalari E, Di Stasio D, Della Vella F, Carinci F, Lucchese A, et al. Prevalence of oral lesions and correlation with intestinal symptoms of inflammatory bowel disease: a systematic review. Diagnostics. 2019;9(3):77.

40. Sbeit W, Kadah A, Mahamid M, Karayanni H, Mari A, Tali S, et al. Oral manifestations of inflammatory bowel disease: the neglected piece of the puzzle. European Journal of Gastroenterology & Hepatology. 2020;32(11):1422-31.

41. Mantzouranis G, Fafliora E, Saridi M, Tatsioni A, Glanztounis G, Albani E, et al. Alcohol and narcotics use in inflammatory bowel disease. Annals of gastroenterology. 2018;31(6):649.

42. Bertl K, Burisch J, Pandis N, Bruckmann C, Klinge B, Stavropoulos A. Periodontitis prevalence in patients with ulcerative colitis and Crohn's disease-PPCC: A case–control study. Journal of clinical periodontology. 2022;49(12):1262-74.

43. Madsen GR, Bertl K, Pandis N, Stavropoulos A, Burisch J. The impact of periodontitis on inflammatory bowel disease activity. Inflammatory bowel diseases. 2023;29(3):396-404.

44. Berkowitz L, Schultz BM, Salazar GA, Pardo-Roa C, Sebastián VP, Álvarez-Lobos MM, et al. Impact of cigarette smoking on the gastrointestinal tract inflammation: opposing effects in Crohn's disease and ulcerative colitis. Frontiers in immunology. 2018;9:74.

45. Saito M, Shimazaki Y, Nonoyama T, Tadokoro Y. Associations of number of teeth with medical costs and hospitalization duration in an older Japanese population. Geriatrics & gerontology international. 2019;19(4):335-41.

46. Sheiham A, James WPT. A reappraisal of the quantitative relationship between sugar intake and dental caries: the need for new criteria for developing goals for sugar intake. BMC public health. 2014;14:1-8.

47. Papageorgiou SN, Hagner M, Nogueira AVB, Franke A, Jäger A, Deschner J. Inflammatory bowel disease and oral health: systematic review and a meta-analysis. Journal of Clinical Periodontology. 2017;44(4):382-93.

48. Lipsky MS, Su S, Crespo CJ, Hung M. Men and oral health: a review of sex and gender differences. American journal of men's health. 2021;15(3):15579883211016361.

49. Manski R, Moeller J, Chen H, Widström E, Lee J, Listl S. Disparity in dental coverage among older adult populations: a comparative analysis across selected European countries and the USA. International dental journal. 2015;65(2):77-88.