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Demographic and dietary profile of patients with ulcerative colitis at Al-Rajhi University Hospital, Assiut, Egypt

Sanaa Mohammed Sayed[1], Shimaa Hosny Hassan[2*], Ashraf Mahmoud Osman[1], Mohammed Abd EL Sabour Mohammed[1], Mohammed Ahmed Medhat[1]

[1] Tropical Medicine and Gastroenterology department, Faculty of Medicine, Assiut University Assuit, Egypt.

[2] Public Health and Community Medicine department, Faculty of medicine, Assuit university, Assuit, Egypt.

[*]Corresponding Author: e-mail: shimaahosny@aun.edu.eg

ABSTRACT

Ulcerative colitis (UC) is a form of inflammatory bowel disease. Multiple disease relapses can impair the quality of life in UC patients and increase the risk of colitis-associated complications. Diet is known to play an important role in the complex pathogenesis of UC and many patients attribute their disease relapses to diet.

This is an interesting work aimed to study the demographic and dietary profile of UC patients, assess their beliefs regarding the effect of nutrition on disease conditions, and study the effect of diet on disease severity. A cross-sectional study was conducted at Al-Rajhi University Hospital, Assiut and included 70 patients diagnosed with UC. The mean age of studied patients was 35.63 ± 9.92 years and more than half of them were females. As regards socioeconomic level, 55.7% of patients were from the middle level, and 42.9% of patients were from the low socioeconomic level. The most frequently consumed food items were beans and cereals while meat, sea food and eggs were the least frequent. The majority of patients believed that nutrition was an important cause of the disease. There was a significant association between the fiber content of diet and disease severity. In conclusion, different dietary contents have a great effect on patients with UC. Patients consuming high fiber diets were found to have better disease outcomes with low disease severity. More than half of patients with high- fiber diet had mild disease and received conventional therapy.

Keywords: dietary profile, demographic, ulcerative colitis, Al-Rajhi Hospital patients.

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INTRODUCTION

Ulcerative colitis (UC) is an inflammatory bowel disease (IBD) characterized by diffuse inflammation of the colonic mucosa. Using Montreal World Congress of Gastroenterology classification, UC is classified according to the extension of colonic mucosa inflammation into E_1, E_2, E_3**.** E_1 means that inflammation is limited to the rectum, E_2 means that the inflammation extends up to the left colon (distal to splenic flexure) and when inflammation reach proximal to splenic angle its E_3 **(Ordás et al 2012).**

Worldwide, IBD are reported as a public health problem because of its long-term incurable complications, which cause significant damage to health-related quality of life and health expenditure. Over the last 20 years, epidemiological studies in developing countries from Africa, Asia and South America, revealed an increasing incidence which has been explained by the change in environmental factors as increased industrialization, more access to healthcare, and cases registry (**Gomes, et al., 2021).**

Although there is a lack of epidemiologic data in the developing countries, it seems that there is a universal emergence of UC. The annual incidence has been reported to increase during the recent two decades. In Asia and the Eastern Mediterranean region, the incidence was reported as 6.3 per 100,000 person-years (**Gheibipour et al., 2020)**

Dietary behaviour is thought to have an important role in the complex pathogenesis of UC. However, UC patients usually adopt unguided dietary habits and behaviors without any advice from a dietician or specialized physician **(De Jong et al., 2017).** Higher intake of vegetables and fruits were significantly associated with a reduced risk of UC as reported by a meta-analysis in 2015 (**Li, F et al., 2015)**

Dietary protein consumption and amino acid supplementation may affect the IBD course according to the disease phase. For example, although dietary protein is needed for mucosal healing after an inflammatory episode, an excessive amount of it may result in an increase in metabolites of potentially harmful bacteria. This can impair cell proliferation and barrier function and in turn affect epithelial repair **(Vidal-Lletjós et al., 2017).**

Multiple disease relapses result in impaired quality of life in patients with IBD. The risk of colitis-associated colorectal cancer increase in patients with longstanding UC. In addition, there are several observational and retrospective studies of dietary factors that have been associated with the increased risk of UC relapse and many UC patients attribute their disease relapses to diet (**Keshteli et al., 2022)**

According to published data, the determination of nutritional gaps is needed to facilitate the development of evidence-based dietary guidelines and subsequently give suitable dietary advice to UC patients **(Haskey and Gibson, 2017).**

Unfortunately, little is known about the effect of demographic characteristics of Egyptian patients with UC on disease progression and severity. Therefore, the objectives of this research were to examine the demographic pattern and dietary habits of UC patients, to gauge patients' perceptions of the role of nutrition in their illness, and to determine how food impacts the severity of their condition.

MATERIALS AND METHODS

This cross-sectional hospital-based study was conducted at Al-Rajhi University Liver Hospital, Assiut University Hospitals, in the period between December 2020 to December 2021.

During this period of time, seventy patients attended the IBD clinic and were diagnosed to have UC based on clinical, endoscopic, and histological findings.

Clinical data included rectal bleeding, frequent stool, mucus discharge from the rectum and/or tenesmus (**Boyle et al., 2017)**. **Endoscopic assessment** by which UC was classified into mild (edema, erythema and fine granular appearance), moderate (coarse mucosa with mucus, pus and/or blood) and severe (deep widespread ulcer with marked bleeding from granulation tissue of the ulcer base) (**Oka et al., 2019). Histological findings** which included either macroscopic features such as diffuse inflammation restricted to the colonic mucosa or mucosal polyps, or microscopic features such as architecture distortion of lining mucosa in the form of shortening of the crypts with variation in the size and shape of the crypts (**Kawachi, 2019)**.

Patients who had any comorbidity (hypertension, diabetes mellitus, primary sclerosing cholangitis) were excluded as those patients need some restrictions of diet which may affect the prognosis of the disease. Also, we excluded patients who were diagnosed with other IBD such as Crohn's disease or intermediate colitis. Then a structured questionnaire was administered to all participants which was consisted of three parts:

Part-I

A-Family Socio-economic Scale, revised version 2019: This scale was designed by **Abdel-Tawab, 2019:** It assesses socioeconomic status of the patient and consists of 4 dimensions: patient's level of education (8 items), patient's occupation (2 items), total monthly income (6 items), lifestyle of the patient (12 items): apartment level (3), cultural level (3) and family private property (6).

The total score of each dimension were summed and then multiplied to the proportional weight as follows: **D1** = Sum of the educational level × 7.33. **D2** = Sum of the professional level × 6.91. **D3** = The degree of the family income level × 4.86. D4 = Sum of the lifestyle level × 3.12.

The following equation was used to get the socio-economic status (D) of the family: D = D1 + D2+ D3 + D4.

The mean and the standard deviation (SD) were calculated for the resulting socio-economic status (D) of the family. Then the socio-economic status was classified as follows: **Low** socioeconomic level: < mean -1SD, **Middle** socioeconomic level: mean ±1 SD and **High** socioeconomic level: > mean + 1SD.

B- Characteristics of the disease and its severity: Clinical data (duration of disease, symptoms of disease as diarrhea and its frequency, if associated with blood or not, amount and frequency of blood, abdominal pain, weight loss). Laboratory data (Hemoglobin, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), fecal calprotectin (FC). Current medications (conventional therapy "Amino salicylates, corticosteroid, immunomodulators" or biological therapy), Endoscopic assessment of disease activity using Mayo endoscopic sub score and finally histopathological finding.

According to clinical, laboratory and endoscopic assessment, we categorized the patients into three groups " mild, moderate and severe."

Part-II: Dietary profile: Dietary habits for the previous year were self-reported through completion of a short form of a validated food frequency questionnaire. In the questionnaire we asked patients about the frequency of each type of food and if it was taken daily, weekly, monthly or yearly and then we divided patients into two groups: **More frequent** (where diet was eaten daily or weekly) **Less frequent** (where diet was eaten monthly or yearly); (**Ruiz-Cabello et al., 2017)**

Also, patients were stratified according to the data into either**" low fiber diet or high fiber group". Low- fiber diets** included gluten-containing products made from white flour, such as bread, noodles and gluten-free, starchy foods, such as white rice, cakes, and crackers. **High-fiber diets** include fruits, vegetables, beans and legumes.

Part-III: Knowledge of patients about role and effect of the dietary profile on their disease severity (12 questions with yes or no answers).

Ethical consideration

Before starting, the study protocol was approved by the "**institutional Review board**" of the Faculty of Medicine, Assiut University, Assiut, Egypt. **(IRB no: 17101144).** Official permission was obtained from the director of Al-Rajhi University Hospital, Assiut University Hospitals for data collection. The aim of the study was explained to all participants before starting data collection. Full informed consent was obtained from the participants before the study. The voluntary participation of each patient who agreed to participate in this study was assured. The privacy and confidentiality of all data were assured.

Statistical analysis:

Data entry, cleaning, analysis and recording (if needed) were done using the Statistical Package for Social Science (SPSS Inc., Chicago, IL, USA) version 20 **(SPSS, 2020).** Descriptive statistics were calculated as the mean and SD for continuous variables and as frequency and percentages for categorical variables. Chi-square ($\chi 2$) and Fisher's exact tests were used as the test of significance for categorical variables. The Student T.test was used to compare the mean of the continuous variables between cases. The statistical significance level was considered when the P-value was 0.05 for all statistical tests.

RESULTS

Our results **(Table 1)** demonstrated that the mean age of studied UC patients was 35.63 ± 9.92 years and more than half of them were females (58.6%). Most of the studied patients had either pre-university (41.5%) or university and above (44.3%) education. More than half of the patients (64.3%) were from rural areas and 35.7% from urban areas. Regarding work, 60% of the patients were working and 40% were not working. As regards socioeconomic level 55.7% were in the middle level, 42.9% were in the low socioeconomic level and only one patient was in the high socioeconomic level.

Moreover, the results **(Table 2)** showed that the disease duration exceeded two years in the majority (71.4%) of patients. Diarrhea was less than 4 times/day in 45.7% of patients and exceeded 10 times/day in 40 % of patients. Only ten patients had diarrhea 4 to 10 times/day. Regarding disease severity, 58.5% of patients had mild, 14.4% had moderate and 27.1% of patients had severe disease. More than two thirds of the studied patients (72.9%) were receiving conventional treatment and only 27.1% were receiving biological treatment.

Table (1): Sociodemographic characteristics of the studied patients

Characteristic	**N= 70 (%)**
Age (years) Mean ± SD	35.63 ± 9.92
Sex	
Male	29 (41.4%)
Female	41 (58.6%)
Education level	
Illiterate	10 (14.2%)
Pre-university	29 (41.5%)
University and above	31 (44.3%)
Job	
Working	42 (60%)
No working	28 (40%)
Residence	
Rural	45 (64.3%)
Urban	25 (35.7%)
Socioeconomic level	
Low	30 (42.9%)
Middle	39 (55.7%)
High	1 (1.4%)

Table (2): Clinical, laboratory and endoscopic characteristics among the studied patients

Characteristic	**N= 70**
Laboratory (Mean ± SD)	
Hemoglobin (g/dl)	11.98 ± 2.08
ESR (ml/hour)	34.84 ± 29.13
CRP (mg/dl)	25.60 ± 18.14
FC (pg/g)	177.01 ± 52.70
Clinical	
Duration of illness	
Less than 6 months	5 (7.1%)
6-24 months	15 (21.4%)
More than 24 months	50 (71.4%)
Frequency of diarrhea/day	
Less than 4 times	32 (45.7%)
4 to 10 times	10(14.3%)
More than 10 times	28 (40%)
Presence of blood on stool	
None	1 (1.4%)
Intermittent	32 (45.7%)
Frequent	29 (41.4%)
Continuous	8 (11.4%)
Endoscopic assessment	
Disease severity	
Mild	41 (58.5%)
Moderate	10(14.4%)
Severe	19 (27.1%)
Treatment	
Current therapy	
Conventional therapy	51 (72.9%)
Biological therapy	19 (27.1%)

The dietary profile among the studied patients was demonstrated in **Table 3** revealed that the less frequent consumed foods were meat (62.8%), sea food (71.4%), eggs (65.7%) and diary products (58.6%) while the more frequent consumed foods were beans (85.7%), cereals (88.5%), fat-based food (68.6%) and sweets (61.5%).

Table (3): Dietary profile among the studied patients (n=70)

Food item	N= 70 (%)
Meat	
More frequent	26 (37.2%)
Less frequent	44 (62.8%)
Sea food	
More frequent	20 (28.6%)
Less frequent	50 (71.4%)
Eggs	
More frequent	24 (34.3%)
Less frequent	46 (65.7%)
Beans	
More frequent	60 (85.7%)
Less frequent	10 (14.3%)
Cereals	
More frequent	62 (88.5%)
Less frequent	8 (11.5%)
Dairy products	
More frequent	29 (41.4%)
Less frequent	41 (58.6%)
Fat based food	
More frequent	48 (68.6%)
Less frequent	32 (31.4%)
Vegetables	
More frequent	38 (54.3%)
Less frequent	32 (45.7%)
Fruits	
More frequent	35 (50%)
Less frequent	35 (50%)
Sweet	
More frequent	43 (61.5%)
Less frequent	27 (38.5%)
Junk food	
More frequent	42 (60%)
Less frequent	28 (40%)

Patients' beliefs and attitudes toward diet are shown in **Table 4.** The majority of patients in the current study believe that nutrition is an important cause of the disease. The majority of the studied patients (88.6%) believed that nutrition is the most important cause of UC, expect to gain more control of the disease by nutrition and use food supplements. All patients (70) believed that

their disease decreased their appetite. More than half of them (60%) know that nutrition may cause disease relapse and 74.3% believed that nutrition is important when compared to medication.

Table (4): Patients believes and attitude towards diet in the studied patient:

Believes and attitudes	**N= 70**	
	Yes	**No**
Do you believe that nutrition is the most important cause of UC?	62 (88.6)	8 (11.4)
Do you believe that nutrition plays an important role in causing relapse?	42 (60%)	28 (40%)
Do you believe that nutrition can end a relapse faster with adapted nutrition?	46 (65.7%)	24 (34.3%)
Do you expect to gain more control over your disease through nutrition on future?	62 (88.6%)	8 (11.4%)
Are you successful in controlling your disease symptoms by adapting your nutrition?	26 (37.1%)	44 (26.9%)
Does nutrition is important if compared to your medicine?	52 (74.3%)	18 (25.7%)
Do you believe that your disease decreases your appetite?	70 (100%)	0
Does your appetite increase during remission?	35 (50%)	35 (50%)
Have you followed diet for your disease?	33 (47.1%)	37 (52.9)
Do you omit foods in order to reduce disease symptoms?	46 (65.7%)	24 (34.3%)
Do you eat more of certain foods that have a beneficial effect on disease symptoms?	49 (70%)	21 (30%)
Do you use food supplements?	62 (88.6%)	8 (11.4)

The results **(Table 5)** showed that patients with high- fiber diet had significantly higher hemoglobin levels with significantly lower CRP, ESR and FC compared to those on low fiber diet. Also, there was a significant association between fiber content and diarrhea frequency. More than half of the patients with high fiber diets had less frequent diarrhea and intermittent blood in stools. As regards disease severity based on endoscopic assessment; there was a significant association between fiber content of diet and disease severity. More than half of patients with high- fiber diets had mild disease severity and received conventional therapy.

Table (5): Characteristic of studied patients based on fibers content of the diet:

	High fiber diet (n= 40)	**Low fiber diet (n= 30)**	**P-value**
Age (years)	34.43 ± 10.98	35.90 ± 8.90	0.09
Sex			
Male	17 (42.5%)	12 (40%)	0.65
Female	23 (57.5%)	18 (60%)	
Duration of the disease	16.15 ± 2.56	15 ± 6.98	0.188
Frequency of diarrhea/day			
Less than 4 times	25 (62.5%)	5 (16.6%)	**< 0.001**
4 to 10 times	10 (25%)	2 (6.7%)	
More than 10 times	5 (12.5%)	23 (76.7%)	
Presence of blood on stool			
None	1 (2.5%)	0	**0.01**
Intermittent	25 (62.5%)	7 (23.3%)	
Frequent	14 (35%	15 (50%)	
Continuous	0	8 (26.7%)	
Hemoglobin (g/dl)	12.01 ± 2.11	10.11 ± 3.33	**0.03**
ESR (ml/hour)	22.11 ± 10.10	45.45 ± 13.45	**< 0.001**
CRP (mg/dl)	15.29 ± 2.22	49.49 ± 3.10	**< 0.001**
FC (pg/g)	123.45 ± 43.30	342.34 ± 55.67	**< 0.001**
Endoscopic assessment			
Mild	25 (62.5%)	12 (40%)	**< 0.001**
Moderate	10 (25%)	4 (13.3%)	
Severe	5 (12.5%)	14 (46.7%)	
Current therapy			
Conventional therapy	35 (87.5%)	16 (53.3%)	**< 0.001**
Biological therapy	5 (12.5%)	14 (46.7%)	

Data expressed as frequency (percentage), mean (SD). P value was significant if < 0.05. ESR: erythrocytes sedimentation rate; CRP: C-reactive protein; FC: fecal calprotectin.

DISCUSSION

In our community, there is paucity in literature about dietary profile among the patients with UC. Over one-year duration, a total of 70 patients was diagnosed as UC came for follow up in our IBD outpatient clinic.

Patients consuming high fiber diet were found to have better disease outcome with low disease severity. Beans were found to be the most frequent eaten diet among our patients. Traditionally, the main physiological function of dietary fibers is to facilitate the passage of stool by increasing its bulk and absorbing water. More recent scientific evidence indicates that dietary fibers play an important role in intestinal inflammations, especially through the fermentation of fiber into short-chain fatty acids (SCFAs) in colonocytes **(Koh et al., 2016).**

SCFAs contribute to more diverse intestinal microbiome and protect from dysbiosis of microbiota in the colonic microenvironments. Therefore, intestinal inflammation is under control with less production of pro-inflammatory substrates and with immunomodulation properties of SCFAs, which are fermented out of dietary fibers. It's hypothesized that both in animals and humans, low fiber diet promote intestinal inflammation and high fiber diet protect against the inflammatory process **(Vidal-Lletjós et al., 2017)**.

It was found that more than half of the studied patients were females. This was found in other previous studies conducted by **Esmat et al., (2014)** reported that out of 135 patients, 72 (53.3%) were females with male to female ratio was 1: 1.14. This was also similar with previous studies **(Rubin et al., 2000, Loftus et al., 2004)**.

Recently, **Elbadry et., al (2022)** studied total of 897 patients with UC. Their mean age was 5.3 ± 12.5 years. Consistently with our findings, the authors reported females' predominance in their study (51.4% of patients were females and 48.6% were males).

As regards residence, more than half of studied patients came from rural areas. The incidence of IBD in rural areas strongly implicates the role of environmental risk factors in developing the disease. Previous studies have shown that IBD occurs more commonly in urban areas. This phenomenon partly explains the growing incidence of UC in these developing areas as they experience greater urbanization, which exposes populations to considerably different environmental factors, including exposures to pollutants and lifestyle change **(Bernstein, 2008, Klement et al., 2008).**

However, the lifestyle in rural areas has been urbanized, and this change should be studied selectively. **Zuo et al., (2018)** indicated that rapid urbanization in the developing world is associated with an increasing incidence of several autoimmune diseases, including IBD. Urbanization affects gut microbiota through westernization of diet, increased pollution levels, increased use of antibiotics, and better hygiene status. A westernized diet is high in animal proteins and fats and low in carbohydrates. This diet will alter gut microbiota.

In the current study, the majority of patients believe that nutrition is an important cause for disease relapse or remission, so patients follow specific dietary regimen for disease control and the majority of them use food supplements.

Patients tend to modify their diet after diagnosis to prevent relapse, even in this study, up to 74% felt that diet was more important in disease control than medication. A previous study found that only one-third of patients felt that diet was more important in disease control than medication. Approximately 40% of patients reported taking vitamins or food supplements **(Limdi et al., 2016).**

CONCLUSION

Different dietary factors have a great effect on patients with UC. The majority of patients in the current study had fairly adequate beliefs about the effect of diet on their disease. They believed that nutrition is an important cause for the disease, may cause the relapse and consider the important role of adapted nutrition in stopping the disease relapse. Patients consuming high fiber diets were found to have better disease outcomes with low disease severity and received conventional therapy. These findings evaluate the important role of nutritionists and clinicians in treating ulcerative colitis patients and in guiding information needs through a collaborative patient-centered approach. In addition, patient education and disease knowledge is a key determinant of the clinician patient relationship and a key outcome modifier in chronic disease. However, the available studies for this condition are very limited in our country, so we need further studies covering different governorates and including a greater number of patients.

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