Effect of Educational Guidelines for Ulcerative Colitis Patients on their Adherence to Treatment Regimen and Clinical Outcomes

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Abstract

Background: Ulcerative colitis has no cure and is a lifelong disorder with a significant impact on both physical and mental health. Educational guidelines focus on increasing the patient knowledge of UC and making them more familiar with the disease. **Research aim:** Was to evaluate the effect of educational guidelines for ulcerative colitis patients on their adherence to treatment regimen and clinical outcomes. **Research design:** Quasi- experimental design was utilized. **Setting:** This study was conducted at inpatient and outpatient clinic of liver department and gastrointestinal system at Benha University Hospital, Egypt. **Subjects:** A convenient sample of all available adult patients with ulcerative colitis disease (70 patients) who were admitted to the previous setting. **Tools:** Three tools for data collection were used as follows: (I) structured interviewing questionnaire. (II) Eight- items Morisky Medication Adherence Scale. (III) Tool III: Mayo Score to assess clinical health outcomes. **Results:** The study showed that statistically significant improvement in the total adherence to treatment regimen for studied patients from low adherence pre guidelines among 71.4% of them to high adherence after 1 month and 3 months post educational guidelines among (72.9% & 68.6% respectively), while, 24.3% of studied patients had severe clinical outcomes pre guidelines compared to (80% & 91.4% respectively) 1 month and 3 months post educational guidelines of the studied patients had normal clinical outcomes. **Conclusion:** Implementation of educational guidelines had a negative effect on improving ulcerative colitis patients' adherence to treatment regimen and clinical outcomes. **Recommendation:** The study should be replicated on a large sample from different geographical distribution to generalize the findings.

Keywords: Educational guidelines, ulcerative colitis, patients' adherence, treatment regimen, patients' outcomes

Introduction

Ulcerative Colitis (UC) is one of the two forms of inflammatory bowel disease. It affects 5 million people globally and is a chronic and recurring inflammation of the gastrointestinal tract with clinical presentation of abdominal pain, chronic diarrhea, rectal bleeding, and weight loss. The cause and the etiology of UC remain poorly understood. UC is chronic and incurable diseases that require long-term, continuing medication to use for management. The treatment for UC involves the use of various classes of medications. Appropriate use of these medications is crucial for the remission and improvement in the quality of life of the patients suffering from UC **(Wangchuk et al., 2024).**

Medication adherence, defined as "the extent to which a person's medication-taking

behavior corresponds with agreed recommendations from a health care provider" is one of the most important aspects of appropriate medication use. There is rich evidence highlighting the association between patients' adherence to UC medication and reduction in negative health outcomes. Nonadherence makes patients at high risk for colorectal cancer, more hospitalizations and more surgeries **(Vernia et al., 2024).**

Nonadherence to medication occurs in up to 45% of patients and is linked to disease aggravation, unsatisfactory clinical outcomes, high health care consumption and increased costs. Studies have found that patients non adherent to maintenance UC medications have five times increased risk of. factors associated with medication nonadherence by grouping them into four themes; namely demographic factors (ethnicity and smoking status), clinical factors (diagnosis, duration of disease, frequency of clinical follow-up), medication factors (barriers to taking medication) and psychosocial factors (attitudes and beliefs) **(King et al., 2025).**

Educational guidelines focus on increasing the patient knowledge of UC and making them more familiar with the disease. This typically involves imparting knowledge on every aspect of the disease but with a special emphasis on the importance of medication dosing schedule, encourage medication taking behavior and reinforce adherence by means of 'shaping, reminding (cues), or rewarding desired behavior, collaborative problem-solving approach wherein both, the patient and therapist jointly identify, challenge, and modify maladaptive thoughts and behaviors that adversely affect medication adherence **(Pacheco et al., 2023).**

Significance of study:

Ulcerative colitis is a lifelong inflammatory disease affecting the rectum and colon to a variable extent. In 2023, the prevalence of ulcerative colitis was estimated to be 5 million cases around the world, and the incidence is increasing worldwide **(Berre et al., 2023).** A multicenter study conducted between May 2018 and August 2021 across 14 tertiary gastroenterology units in Egypt found that 81% of 1,104 IBD patients had UC, with a male-to-female ratio of 1:1.15. The mean age at diagnosis was 35.1 years, and the study observed a significant increase in UC diagnoses over the past decade, highlighting a rising incidence **(Elbadry et al., 2022).**

Low adherence to drug treatment has been identified as a serious public health problem with a magnitude ranging from 15% to 93% for patients with chronic diseases, with an estimated average of 50%, depending on the method applied. The lack of adherence generates direct and indirect costs, in addition to clinical, social and environmental repercussions, so it is important to plan and implement solutions to effectively address this issue. Special attention must be given to chronic diseases. However, few studies have aimed interventions to improve medication adherence specifically to ulcerative colitis **(Hawes& Sanders, 2023).**

So, there is urgent need to carry out educational guidelines for patients with ulcerative colitis to improve their knowledge and adherence to treatment regimen.

Aim of the study

This study aimed to evaluate the effect of educational guidelines for ulcerative colitis patients on their adherence to treatment regimen and clinical outcomes.

Research hypotheses:

H1-Patients' knowledge score related to ulcerative colitis disease could be higher post implementation of educational guidelines than before.

H2-Patients' adherence to treatment regimen could be significantly improved post implementation of educational guidelines than before.

H3-Patients' clinical outcomes could be positively improved after educational guidelines implementation than before.

H4- There could be a significant correlation between patients' knowledge, adherence to treatment and their clinical outcomes post implementation of educational guidelines.

Subjects and methods

Design

Quasi experimental research design was used, which is appropriate for examining cause and effect relationships where random assignment is not possible. Independent variable include: the educational guidelines intervention provided to ulcerative colitis patients while dependent variable include: adherence of patients to their treatment regimen and clinical outcomes related to ulcerative colitis management.

Setting

This study was conducted at inpatient and outpatient clinic of liver department and gastrointestinal system at Benha University Hospital, Egypt.

Subjects

A convenient sample of all available adult patients with ulcerative colitis disease (70 patients) who were admitted to department of liver and gastrointestinal system inpatient ward and outpatient clinic able to communicate and verbalize their conditional status and willing to participate in the study

Tools of data collection

Two tools for data collection were used as follows:

Tool I: Structured interview questionnaire:

It was designed by the researchers, based on reviewing recent and related literatures, written in Arabic language **(Aremu et al., 2022; Cooper& Gosnell, 2022; Lynch& Hsu, 2023)**. It aimed to assess the patients' knowledge about ulcerative colitis and included three parts as follows:

Part I: Personal data and medical data:

This part was included (46) questions:

- **Personal data** including (17) questions as: age, sex, marital status, education, occupation, income, housing condition, and life style habits.
- Medical data including (29) questions as: Past health histories, family history, present history of the disease, and therapeutic regimen.

Part II: Patients' knowledge assessment:

It was used to assess the patients' knowledge about ulcerative colitis, included information related to disease and treatment regimen by using pre and post educational guidelines.

It included two sections:

Section I: Included (11) MCQ questions covered patients' knowledge about disease definition, causes, age group, common sites of disease, signs, symptoms, types, diagnosis, and complications.

Section II: Included (11) MCQ questions covered patients' knowledge regarding therapeutic regimen for ulcerative colitis as types of treatment, side effects of medications, nutritional therapy, surgical therapy.

Scoring system:

The correct answer was given (1) score and incorrect answer was given (0) score. These scores were summed up and converted into percent score. Total knowledge score: 22 score equal (100%).

The total level of patients ' knowledge score was categorized as follows:

- Score ≥ 75% (≥18 score) of total score was considered satisfactory level of knowledge.
- Score < 75 % (<18 score) of total score was considered unsatisfactory level of knowledge.

Part III: Barriers affecting adherence to treatment regimen questionnaire:

It was used to identify barriers affecting adherence to treatment regimen among patients with ulcerative colitis. It composed of five categories including factors related to patient, religion and social factors, medications, examination and follow up, health care providers and disease related factors.

Tool II: Eight- items Morisky Medication Adherence Scale (MMAS-8):

This tool was adopted from **(Hu et al., 2020)**. It was used to evaluate adherence to treatment regimen. It composed of 8 items, the first 7 items, response categories are dichotomous with yes- No and 5-point response for the last item.

Scoring system:

The scale is scored by assigning 1 score to each question answered "NO" in questions 1-7, a question 8 is scored as : rarely / never **(1 score),** once in a while **(,75 score),** sometimes **(,50 score),** usually **(,25 score),** and all the time **(0 score).**

Less than 6 score are interpreted as low adherence. 6-7 score as medium adherence.8 score as high adherence

Tool III: Mayo Score to assess patients' clinical health outcome:

This tool was adopted from **(Rizello et al., 2019).** It is known as ulcerative colitis activity index. It was used to assess severity of disease and response to treatment. It composed of sub scores from four categories such as stool frequency, rectal bleeding, endoscopic appearance and physician assessment. The tool score ranging from 0-12 and each item rating from 0-3.

Scoring system:

The scoring system was calculated based on items of mayo score: remission period when the total answers are 0-12 score, mild from 3-5 score, moderate from 6-10 score, severe from 11-12 score.

Preparation of tools

This phase included reviewing the available literature and different studies related to research problem, and theoretical knowledge of its various aspects of the study, using textbooks, evidence based articles, internet periodicals, and magazines in order to prepare tools for collection of data about this study.

Educational guidelines booklet:

It was designed by the researchers through a reviewing of recent, related literatures, and scientific references based on patients' needs **(Carter, 2020; Solitana et al., 2020; Spellman, 2020; Smith, 2021; France et al., 2022; and Pal, 2022)** This information's planned to cover all knowledge regarding ulcerative colitis. This booklet includes the following items: anatomy and physiology of colon, definition of ulcerative colitis, causes, signs, symptoms, types, diagnosis, treatment regimen, nutrition requirement, surgical treatment, barriers of adherence, improvement of medication adherence, complications that results from non -adherence, and importance of follow up.

Tools Validity

Content validity was established for testing relevance, simplicity, clarity, comprehensiveness, applicability of the question and any ambiguity through a jury,

with help of 5 experts in field of nursing (two professor and three assistant professor in medical surgical nursing department, faculty of nursing, Benha university), necessary modification was done accordingly.

Reliability

Reliability of the study tools was done statistically to assure that the tools are reliable before data collection. Testing reliability was done through Alpha Cronbach test. Reliability for patient knowledge questionnaire (Tool I) =0.769. Reliability for barriers affecting adherence to treatment regimen questionnaire = 0.805. Reliability for Morisky adherence scale = 0.810.

Ethical and administrative considerations:

Permission to carry out the study from Scientific Research Ethics Committee code number **(REC-MDN-P117)** in the Faculty of nursing at Benha University and Medical director of Benha university Hospital after explanation of the purpose of study. Patients' approval was taken after an explanation the purpose of study, they also informed them that their participation is optionally, and they have rights to withdraw at any time without any consequences. Then, verbal and written consent was obtained from each participant enrolled into the study; the researchers was assured maintaining anonymity and confidentiality of data. All information was gathered only for the purpose of study.

Pilot study:

A pilot study carried out prior to data collection on 10% of the study sample (7 patients) from the total number of the studied patients and they were included in the study. The pilot study aimed to test the feasibility, clarity and applicability of the tools also to determine the time needed for filling the structured questionnaire. No modification done for the study tools, so patients of the pilot study were included in the study.

Field work (Data collection):

Meeting the patients to clarify the aim of the study before starting data collection procedure to establish good relationship with them and explain the aim and the nature of the study. Data was collected from the beginning of March 2024 to the end of November 2024 (9months). The process of data collection was achieved through four phases:

Assessment phase

This phase includes selection of patients who meet the inclusion criteria. Data was collected at morning and afternoon shift three days/ week (Saturday, Monday and Wednesday). Data collection and teaching session were conducted in the morning and afternoon shift. Each interview took time about (35-45 minutes). This phase aimed to collect data from patients under the study to assess patients' knowledge related to ulcerative colitis and treatment regimen, barriers affecting adherence to treatment regimen (tool I), assess adherence to treatment regimen (tool II) and assess clinical health outcomes (tool III).

II) Planning phase

Based on assessment phase, the educational content, expected outcomes and media in the form of booklet written in Arabic language and reviewed by supervisors then the validity was done by a panel of five experts from medical surgical nursing field based on review of related and recent literature after explaining the purpose of study to the patients. Teaching materials were prepared as video, pictures, and colored booklet.

III) Implementation phase

This phase included the application of educational guidelines. The data was collected from inpatient ward and outpatient clinic. The researchers was interviewed with patients (70 patients) divided into 10 groups

(7 patients in each group) to explain the nature of the study. The researchers was attended three days/ week in the morning and afternoon shift. The researchers met every group for 3 sessions (35-45minutes) for each session:

First session was about anatomy of colon, physiology of colon, definition of ulcerative colitis, causes, signs, symptoms, types and diagnosis.

Second session was about treatment regimen of ulcerative colitis that included medications therapy, nutritional therapy and surgical intervention.

Third session was about barriers of adherence to treatment regimen, ulcerative colitis complications and elements to cope with barriers to improve adherence to treatment regimen, importance of continuous follow up for ulcerative colitis patients. Then revision about what was explained in previous sessions. The patients were allowed to ask any questions or explanation of any items included in the session. At the end of the sessions, a colored book was given for each patient.

IV) Evaluation phase

The adherence of ulcerative colitis patients to treatment regimen was assessed through pretest and posttest after 1 month and after 3 months. Assessed patients' knowledge related to ulcerative colitis and treatment regimen, barriers affecting adherence to treatment regimen (tool I), assess adherence to treatment regimen (tool II). Evaluate patients' clinical outcomes after providing educational guidelines after 1month and 3 months using tool (3).

Results

Table (1) demonstrated the percentage distribution of the studied patients regarding to their sociodemographic characteristics. It revealed that 52.9% of the studied patients were aged 20-<30 years old with mean age was 29.68 ± 0.84 years, 72.9% were females, 54.3% were single, and 64.3% were secondary educated. Concerning work status, 55.7% of the studied patients were working, and they reported that the source of income was sufficient and 44.3% reported that it was not sufficient and they did not another source of income. Related to housing conditions, 52.9% of the studied patients were from urban areas.

Figure (1) demonstrated that there was a statistically significant difference in total knowledge level of the studied patients between pre and post guidelines implementation phases with p value < 0.05. Where 15.7% of the patients had satisfactory level of total knowledge about ulcerative colitis pre guidelines implementation, which changed to 75.7%, 66.7% respectively at immediate post educational guidelines and 3 months post guidelines implementation.

Table (2) illustrated that there was a statistically significant differences regarding patients' adherence to treatment regimen between pre and post guidelines implementation phases, in term of improvement in their adherence to treatment. Where the highly significant areas were in terms: sometimes forget to take the medications, take all medications yesterday and have difficulty remembering to take all the medications at 1 month post educational guidelines implementation with p value <0.001.

Figure (2) demonstrated difference between the studied patients regarding to their total adherence to treatment regimen for ulcerative colitis pre and post educational guidelines implementation phases. There were significant improvement regarding the total adherence to treatment regimen for ulcerative colitis 1 months and 3 months post educational guidelines, where (72.9%, 68.6% respectively) of studied patients achieved high

adherence to treatment regimen compared to 71.4% achieved low adherence pre guidelines.

Table (3) revealed that disease related factors were the 1st ranking affecting barriers with 88.7% of total mean score followed by patients related factors with 79.3% of mean score and 76.6% for medication related factors .

Table (4) displayed that there were highly statistically significant differences between the studied patients' clinical outcomes pre and 1 month post educational guidelines and between pre and 3 months post educational guidelines with (P value < 0.001& 0.001 respectively). Where post 1months and 3 months of the educational guidelines (82.9%, 88.6% respectively) of the patients reported a usual numbers of daily stools compared to 54.3% reported 3-4 more stools than usual pre guidelines. and (78.6%, 82.9% respectively) of the studied patients reported no rectal bleeding post 1 month and 3 months of educational guidelines compared to 60% of them reported blood in most stools pre guidelines. Related to endoscopic findings, (82.9%, and 85.7% respectively) of the studied patients had normal or inactive colitis in endoscopic examination post 1 month and 3 months of educational guidelines compared to 75.7% had moderate colitis: friability, marked erythema, vascular pattern absent, and erosion, all were seen pre educational guidelines. According to physician assessment, post 1 month and 3 months of educational guidelines implementation (77.1%, 87.1% respectively) of studied patients were normal compared to 70% of studied patients were moderate colitis pre guidelines.

Figure (3) depicted that post 1 month and 3 months of educational guidelines implementation (80%, 91.4% respectively) of the studied patients had normal clinical outcomes compared to 75.7% had moderate clinical outcomes and 24.3% had severe clinical outcomes pre guidelines implementation.

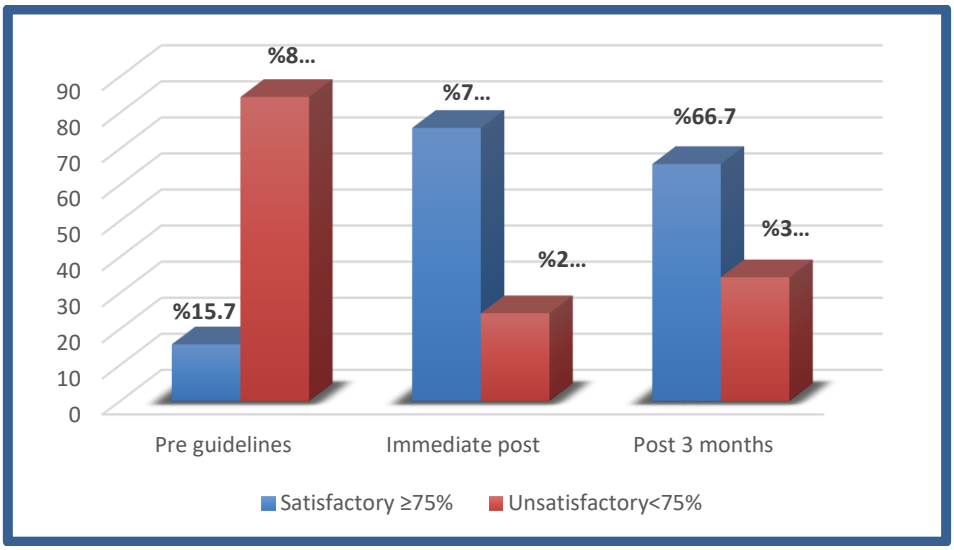
Table (5) revealed that there were highly statistical significant correlation between total knowledge score and total adherence score 3 months post educational guidelines with r-0.443 and P value at<0.001 and there was statistical significant correlation between total knowledge score and total adherence score with P value at ≤0.05 pre educational guidelines. There were statistical significant correlation between total knowledge score and clinical outcome severity with P value at p ≤0.05 and r=-0.298.-0.317 respectively pre educational guidelines and post 3 months of educational guidelines. There was highly statistical significant correlation between total adherence score and clinical outcomes severity with P value at 0.001, <0.001 respectively pre educational guidelines and post 3 months of educational guidelines and r=-0.404,-0.425 respectively.

Table (6) presented multiple linear regression analyses for predictor variables of patients' clinical outcomes post 3 months of educational guidelines. It was best predicted by total knowledge and adherence scores, patients related factors, health care providers and disease related factors moreover presence of comorbid disease with p value = (0.001**,0.005*, 0.012*, 0.016*, 0.026*and 0.038*, respectively), accounting for 65.3% of the variance of patients' clinical outcome severity.

Table (1): Frequency and percentage distribution of the studied patients regarding to their personal data (No.=70).

Sociodemographic characteristics	(No.)	%
Age (in years)		
20 -<30	37	52.9
30 -<40	20	28.6
40 -<50	11	15.7
50-60	2	2.9
X ± SD	29.68 ± 0.84	
Sex		
Male	19	27.1
Female	51	72.9
Marital status		
Single	38	54.3
Married	14	20.0
Divorced	12	17.1
Widowed	6	8.6
Educational Level		
Preparatory education	6	8.6
Secondary education	45	64.3
University education	19	27.1
Working status		
Working	39	55.7
Not working	31	44.3
If yes, the source of income (reported by patient)		
Sufficient	39	55.7
Not sufficient	31	44.3
If the source if income is not sufficient, having another source		
Yes	0	0.0
No	70	100.0
Housing conditions		
Residence		
Rural	33	47.1
Urban	37	52.9
Number of family members		
X ± SD	**5.39 ± 1.06**	
Number of rooms in the house		
X ± SD	**3.35 ± 0.76**	
Crowding index *		
X ± SD	**1.63 ± 0.27**	
The area of the house suitable for the number of family members		
Yes	64	91.4
No	6	8.6

*Number of co-residents (excluding newborn) divided by number of rooms (excluding kitchen and bathrooms)



**** Highly Significant at p ≤0.001.**

(1) Difference between knowledge pre and immediately post educational guidelines implementation

(2) Difference between knowledge pre and 3 months post educational guidelines implementation.

Figure (1). Difference between the studied patients' total knowledge about ulcerative colitis pre and post educational guidelines implementation periods (No. =70).

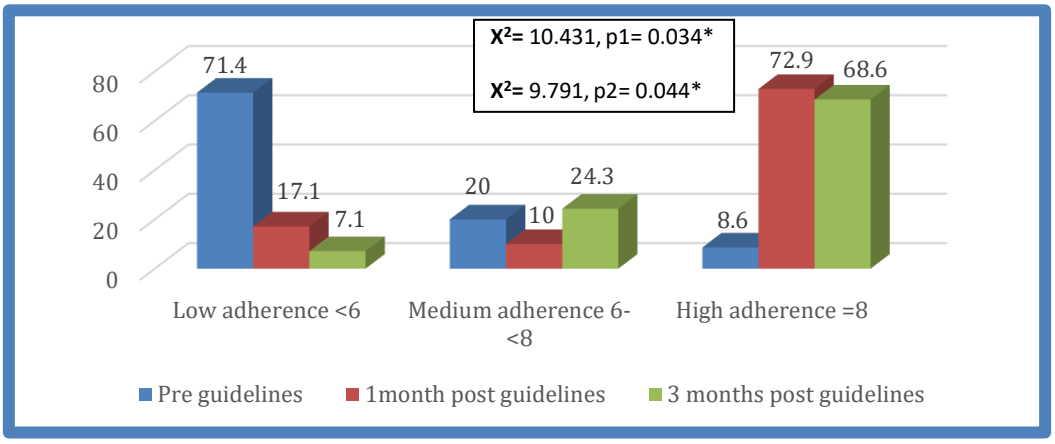
Table (2): Difference between the studied patients' adherence to treatment regimen pre and post educational guidelines implementation phases (No.=70).

Patients' adherence		Pre-educational guidelines (No.=70)		1 month Post educational guidelines (No.=70)		3 months Post educational guidelines (No.=70)		X^2 P value (1)	X^2 P value (2)
		Yes	No	Yes	No	Yes	No		
		(No.) %	(No.) %	(No.) %	(No.) %	(No.) %	(No.) %		
Sometimes forget to take the medications		51 (72.9)	19 (27.1)	13 (18.6)	57 (81.4)	22 (31.4)	48 (68.6)	11.953 FE 0.001**	5.948 0.015*
Sometimes miss taking the medications for reasons other than forgetting over the past 2 weeks		50 (71.4)	20 (28.6)	22 (31.4)	48 (68.6)	23 (32.9)	47 (67.1)	9.849 FE 0.002*	9.075 FE 0.003*
Cut back or stopped taking medication without telling the doctor because of feeling worse when taking it		50 (71.4)	20 (28.6)	16 (22.9)	54 (77.1)	16 (22.9)	54 (77.1)	8.296 FE 0.003*	8.296 FE 0.003*
Sometimes forget to bring medications, while traveling or leaving home		57 (81.4)	13 (18.6)	4 (5.7)	66 (94.3)	17 (24.3)	53 (75.7)	8.933 FE 0.019*	5.121 FE 0.029*
Take all medications yesterday		15 (21.4)	55 (78.6)	56 (80.0)	14 (20.0)	47 (67.1)	23 (32.9)	9.342 FE 0.001**	4.773 FE 0.030*
When feeling like the symptoms are under control, stop taking the medication		47 (67.1)	23 (32.9)	20 (28.6)	50 (71.4)	25 (35.7)	45 (64.3)	7.668 FE 0.007*	4.047 0.044*
Feel hassled about sticking to the treatment plan as taking the medication every day is a real inconvenience		56 (80.0)	14 (20.0)	18 (25.7)	52 (74.3)	20 (28.6)	50 (71.4)	7.000 FE 0.007*	6.058 FE 0.014*
Have difficulty remembering to take all the medications	Never	0 (0.0)		63(90.0)		58(82.9)		11.512 FE 0.001**	4.478 0.034*
	Once in a while	0 (0.0)		7(10.0)		12(17.1)			
	Sometimes	31 (44.3)		0(0.0)		0(0.0)			
	Usually	39 (55.7)		0(0.0)		0(0.0)			

(FE) Fisher's exact test *** Significant at p ≤0.05.** ****Highly significant at p ‹0.001.**

(1) Difference between adherence to treatment regimen pre and 1 month post educational guidelines

(2) Difference between adherence to treatment regimen pre and 3 months post educational guidelines



*** Statistically Significant at p ≤0.05.**

(1) Difference between total adherence pre and 1 month post educational guidelines implementation

(2) Difference between total adherence pre and 3 months post educational guidelines implementation

Figure (2). Difference between the studied patients' total adherence to treatment regimen for ulcerative colitis pre and post educational guidelines implementation periods (No.=70).

Table (3): Distribution of total mean scores among the studied patients regarding barriers affecting adherence to treatment regimen pre and post educational guidelines implementation periods (No.=70).

Affecting barriers	Max score	(No.=70)		Ranking
		Mean ± SD	% of mean	
Patients related factors	3	2.38 ± 0.74	79.3%	2
Religious and social factors	6	2.82 ± 0.97	47.0%	6
Medications related factors	3	2.30 ± 0.74	76.6%	3
Examination and follow up related factors	3	2.02 ± 1.30	67.3%	4
Health care providers related factors	4	1.98 ± 1.40	49.5%	5
Disease related factors	4	3.55 ± 0.50	88.7%	1
Total	23	3.08± 0.74	-	

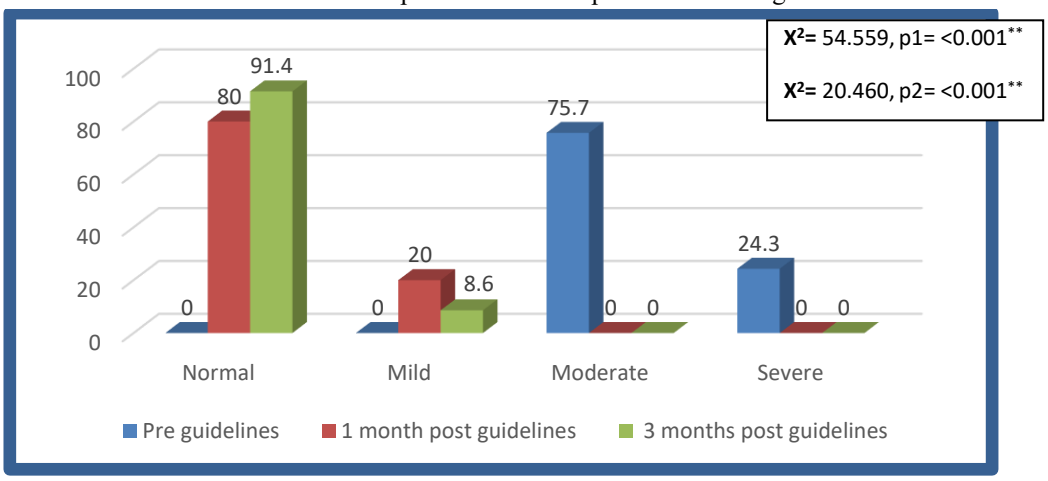
Table (4): Difference between the studied patients' clinical outcomes pre and post educational guidelines implementation periods (No.=70).

Clinical outcomes	Pre-educational guideline	1 month Post educational guideline	3 months Post educational guideline	X^2 P value (1)	X^2 P value (2)
	No.(%)	No.(%)	No.(%)		
Stool pattern					
Patient reports a usual number of daily stools +0	0(0.0)	58(82.9)	62(88.6)	10.726 FE 0.001**	17.198 <0.001**
1-2 more stools than usual +1	0(0.0)	11(15.7)	8(11.4)		
3-4 more stools than usual +2	38(54.3)	1(1.4)	0(0.0)		
5 or more stools than usual +3	32(45.7)	0(0.0)	0(0.0)		
Rectal bleeding					
None +0	0(0.0)	55(78.6)	58(82.9)	16.109 FE <0.001**	22.669 <0.001**
Blood streaks seen in the stool less than half the time +1	0(0.0)	13(18.6)	12(17.1)		
Blood in most stools +2	42(60.0)	2(2.9)	0(0.0)		
Pure blood passed +3	28(40.0)	0(0.0)	0(0.0)		
Endoscopic finding					
Normal or inactive colitis +0	0(0.0)	58(82.9)	60(85.7)	36.373 FE <0.001**	45.152 <0.001**
Mild colitis: mild friability, erythema, and decrease in vascularity +1	0(0.0)	11(15.7)	10(14.3)		
Moderate colitis: friability, marked erythema, vascular pattern absent, and erosion seen +2	53(75.7)	1(1.4)	0(0.0)		
Severe colitis: ulceration and spontaneous bleeding +3	17(24.3)	0(0.0)	0(0.0)		
Physician assessment					
Normal +0	0(0.0)	54(77.1)	61(87.1)	24.098 FE <0.001**	48.395 <0.001**
Mild colitis +1	0(0.0)	12(17.1)	12.9)		
Moderate colitis +2	49(70.0)	4(5.7)	0(0.0)		
Severe colitis +3	21(30.0)	0(0.0)	0(0.0)		

**Highly significant at p ‹0.001.

(1) Difference between clinical outcomes pre and 1 month post educational guidelines

(2) Difference between clinical outcomes pre and 3 months post educational guidelines



**Highly significant at p ‹0.001.

(1) Difference between clinical outcomes severity pre and 1 month post educational guidelines

(2) Difference between clinical outcomes severity pre and 3 months post educational guidelines

Figure (3). Difference regarding severity of clinical outcomes among the studied patients pre and post educational guidelines implementation periods (No.=70).

Table (5): Correlation between total knowledge with total adherence score and severity of clinical outcomes among the studied patients pre and post educational guidelines implementation periods (No.=70).

Variables	Study periods	Total Knowledge score		Total adherence score	
		R	P value	r	P value
Total adherence score	Pre educational guidelines	0.273	0.022*	-	-
	Post 3 months of educational guidelines	0.443	<0.001**	-	-
Clinical outcomes severity	Pre educational guidelines	-0.298	0.021*	-0.404	0.001 **
	Post 3 months of educational guidelines	-0.317	0.007*	-0.425	<0.001 **

****Highly significant at p ≤0.001.** *** Significant at p ≤0.05**

Table (6): Multiple Linear Regression Analyses for Predictor Variables of patients' clinical outcomes post 3 months of educational guidelines (N=70)

Patients' clinical outcomes	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	-10.244-	4.089		-2.505-	.015
Age	-.258-	.366	-.135-	-.705-	.483
Presence of comorbid disease	11.863	5.532	.356	2.144	**.038***
Time since diagnosis with ulcerative colitis	.195	.326	.098	.598	.552
Total knowledge score	-54.551	15.492	-.617	-3.521	**.001****
Total adherence score	-47.865	15.936	-.442	-3.004	**.005***
Patients related factors	1.353	.523	.626	2.587	**.012***
Religious and social factors	.321	.303	.194	1.060	.294
Medications related factors	.421	.435	.195	-.968-	.337
Examination and follow up related factors	.384	.521	.310	.736	.465
Health care providers related factors	.863	.349	.753	2.472	**.016***
Disease related factors	1.654	.725	.512	2.280	**.026***
Adjusted R^2= 0.653		**P = <0.001***			

(**B**) Beta Co-Efficient (SEB) Standard Error

Discussion

Ulcerative colitis (UC) is a chronic relapsing inflammatory bowel disease that primarily affects colon and rectum, causing inflammation in the innermost lining of large intestine. Adherence to treatment regimens is a cornerstone of effective UC management; many patients struggle to maintain consistent compliance due to complexity of therapies, misunderstanding disease chronic nature, or psychosocial challenges. Educational guidelines tailored to address these barriers by equipping patients with knowledge, fostering self-efficacy, and promoting collaborative decision making. The implementation of such guidelines not only enhance adherence but also correlates with improved clinical outcomes **(Manzari et al., 2024).**

Regarding age, the current study revealed that more than half of the studied patients their age were twenty to less than thirty years old with mean age of 29.68 ± 0.84 years old, from the researchers' point of view; this result may be due to this age group preferring fast and fried foods which are rich in fat and hot spices and increasing exposure to live stress and responsibility. This finding was consistent with what was reported by **Magri et al., (2022)** in a study entitled "clinical and epidemiological features of ulcerative colitis

patients in Sardinia, Italy: results from a multicenter study." who found that more than two-fifths of the studied patients diagnosed between the ages of 17 and 40 years old and also agreed with **Shao et al., (2023)** who studied about " Knowledge, attitude, and practice of patients living with inflammatory bowel disease in china" and reported that most of participants aged 20-30(32.9%) years.

Regarding gender, the results of the current study revealed that the majority of the studied patients were females. From the researchers' point of view; this finding may be due to female's hormonal changes and exposure to stress more than males due to pregnancy and lifestyle. These finding were in consistent with **Askar et al., (2022)** in a study entitled "Outcome of ulcerative colitis patients after one year of biological therapy in selected Egyptian patients." who found that less than two-thirds of the studied patients were female. But these results were incongruent with **Jayasooriya et al., (2023)** in a study entitled " adherence to 5-aminosalicylic acid maintenance treatment in young people with ulcerative colitis: a retrospective cohort study in primary care in UK clinical practice research data link" and reported more than half of studied patients were males.

Regarding to marital status, the results revealed that more than half of the studied patients were single. From the researchers' point of view, this finding may due to ulcerative colitis occur in young age between 15-30years and this is the age of married in Egypt. These finding were in consistent with **Fekede&Berhanu, (2020)** in a study entitled "sociodemographic features, clinical characteristics and treatment patterns of inflammatory bowel diseases in patients seen at tikure anbessa specialized hospital in Addis Ababa, Ethiopia" and stated that more than half of studied patients were single.

But, this finding disagreed with **Alnaffakh et al., (2023)** who carried out a study about "self-care among ulcerative colitis patients in Al-Najaf city in the southern region of Iraq specialized hospital for gastrointestinal and liver disease and surgery" and found that the majority of the studied participants (58.3%) were married.

Regarding educational level, the results of current study revealed that the majority of the studied patients were secondary education. From the researchers' point of view, this finding may due to ulcerative colitis occur in young age between 15-30years and cause burden in family members because of recurrent attacks of flare up. This result was in the same line with **Fekede&Berhanu, (2020)** in a study entitled "sociodemographic features, clinical characteristics and treatment patterns of inflammatory bowel diseases in patients seen at tikure anbessa specialized hospital in Addis Ababa, Ethiopia" that revealed that more than two thirds of the studied patients were secondary education.

But, this finding disagreed with **Ibrahim et al., (2024)** who carried out the study about " Risk factors in patients with ulcerative colitis: Case control study", the study was carried out in Al-Najaf city in the southern region of Iraq specialized hospital for gastrointestinal and liver disease and surgery" and found that more than two fifth of studied patient were graduated from college or institute.

Regarding working status, the current study revealed that more than half of studied patients were working. This may be due to the age group of this study being working age (20-40) years old. This finding is consistent with **Nachury et al., (2021)** who carried out the study about" Patients' real-world experience with inflammatory bowel disease: A cross-sectional survey in tertiary care centers from the GETAID group" and found

that less than two thirds of the studied patients were working.

Regarding the source of income, the current study showed that more than half of studied patients had sufficient source of income. This result is in the same line with **Fauze, (2022)** in a study entitled "effectiveness of an instructional program on patients with ulcerative colitis adherence for medication and diet to prevent colorectal cancer: case and control study on patient who attended to gastroenterology and Hepatology teaching hospital in Iraq" and reported more than half of case group at barley sufficient income and less than three quarters of control group have sufficient income.

Regarding residency, the results of the current study found that more than half of the studied patients were living in urban areas. From the researchers' point of view, this finding may be due to lifestyle depending on bad habits that exacerbate the flare up of disease and unavailable of specialized hospitals in rural areas. This finding is consistent with **Alnaffakh et al., (2023)** who carried out a study about "self-care among ulcerative colitis patients in Al-Najaf city in the southern region of Iraq specialized hospital for gastrointestinal and liver disease and surgery" and found that more than two thirds of the studied patients were living in urban areas.

Regarding housing status, the current study showed that mean number of (family members, number of rooms in the house, crowding index) were (5.39 ± 1.06 members, 3.35 ± 0.76 rooms, 1.63 ± 0.27) respectively and area of the house suitable for number of family members in the majority of the studied patients. This result in the same line with **Mahmoud et al., (2024)** who carried out study about " assessment of compliance to therapeutic regimen among patients with ulcerative colitis: suggested guideline in gastroenterology outpatient clinic affiliated to Ain Shams university hospitals" and stated that two-thirds of the patients under study live in a house consisting of three rooms, most of them lived with a family and less than three-quarters and their family consisting of four members.

The current study results revealed that there was significant improvement regarding to their total knowledge about ulcerative colitis pre and post educational guidelines implementation periods. The level of knowledge was significantly improved immediately post educational guidelines and 3 months post guidelines where (more than three quarters and more than two thirds respectively) compared to less than quarter pre educational guidelines implementation. The results of current study were in the same line with **Shabaan et al., (2022)** study reported that the majority of the patients tested had a lack of understanding about their ailment before educational instructions, while the response of them for the most questions of knowledge was highly increased just after the intervention session in comparison to their response before intervention.

The current study revealed that there were highly statistical significant differences between adherence to treatment regimen pre and 1month post educational guidelines implementation periods regarding sometimes forget to take the medications where more than four fifth of the studied patient not forget to take the medication after 1 month post educational guidelines compared to less than one third pre guidelines. Also, there were highly statistical significant differences regarding take all medications yesterday and have difficulty remembering to take all the medications with P value is 0.001.

Also, there were statistical significant differences between adherence to treatment regimen pre and 3month post educational guidelines implementation periods regarding sometimes forget to take the medications,

sometimes miss taking the medications for reasons other than forgetting over the past 2 weeks, cut back or stopped taking medication without telling the doctor because of feeling worse when taking it, sometimes forget to bring medications, while traveling or leaving home, take all medications yesterday, when feeling like the symptoms are under control, stop taking the medication, feel hassled about sticking to the treatment plan as taking the medication every day is a real inconvenience and have difficulty remembering to take all the medications with P value is ≤ 0.05.

The current study results were in the same line with **AbdElwhab et al., (2025)** study about "nursing intervention program to improve adherence of elderly patients with chronic diseases toward their medication" and reported after the end of the program the negative items of Morisky Medication Adherence Scale for example (forget to take medication, having medication only when symptoms get worse, stop taking medications without consulting the doctor, change the dose of medication without consulting a doctor, having medicines that are advertised on TV and radio, or medicines that are prescribed by relatives or friends without consulting the doctor) changed from negative response to positive response as compared to pre-program. Finally, there was a highly statistically significant difference between all items of Morisky Medication Adherence Scale with pre and post program (p≤0.001**).

Also, the current study results were in the same line with **Feig et al., (2024)** study about "designing for medication adherence in inflammatory bowel disease" and reported adherence can be improved using interventions that equip patients with the knowledge, tools, and motivation they need to take existing biotherapeutics as prescribed. These interventions can be classified into educational, behavioral, cognitive behavioral and multifaceted approaches.

Also, the current study results were in the same line with **Ahmed& Hassan (2022)** study about "instruction program for patients with ulcerative colitis about preventive measures for colorectal cancer in Iraq" and reported that the participants have had low level of knowledge in most domains regarding ulcerative colitis and preventive measures. The overall total level of knowledge was inadequate; the mean of score was 15.32 ± 2.527 in pretest and the mean score was 19.46 ± 0.838 in posttest.

The current study results revealed that there was significant improvement regarding the total adherence to treatment regimen for ulcerative colitis 1 month and 3 months post educational guidelines, where more than two thirds of studied patients became high adherence to treatment regimen compared to more than two thirds of studied patients were low adherence pre guidelines. this result was in the same line with **Fauze (2022)** study reported that A 45.7% of the study group were adhered to a healthy diet at pretest while the percent of their adherence was improved to 62.4% at posttest, their adherence for medication was 42.2% at pretest, and their adherence for medication was improved to 78.3% at posttest. Additionally, the current study results were in the same line with **Franco et al., (2022)** study about "high prevalence of non-adherence to ulcerative colitis therapy in remission" and reported that a high prevalence of non-adherence (77.8%) was found among patients with UC in remission.

Additionally, the current study results were in consistent with **Amiesimaka et al., (2024)** study about "improving medication adherence levels in inflammatory bowel disease (IBD) patients in New Zealand" and reported a comparison of pre- and three-month post-intervention results using the Morisky Medication Adherence Scale (MMAS-8) and Crohn's and Colitis

Knowledge Assessment Questionnaire showed that high adherence increased from 30.91% to 78.18% of patients, while medium adherence dropped from 62.73% to 18.18%, just as low adherence fell from 6.36% of patients to 3.64% of them.

Additionally, the current study results were in the same line with **Balaii et al., (2018)** study about "determining the degree of adherence to treatment in inflammatory bowel disease patients in Iran" and reported Based on MMAS-8 responses; we identified 63 (46%) patients as low adherers and 57 (41.6%) patients as medium and 17 (12.4%) high adherers. The MMAS-8 score in the low adherer group was significantly different from that of medium and high adherer group ($p < 0.001$).

Furthermore, these results were in the same line with **King et al., (2025)** study about " medication non-adherence in inflammatory bowel disease: a systematic review identifying risk factors and opportunities for intervention" and reported that knowledge and understanding of IBD and its treatment were the most frequent modifiable predictors of non-adherence.

Also, these results were agreed with **Chapman et al., (2020)** study about "personalized adherence support for maintenance treatment of inflammatory bowel disease in United Kingdom" and reported at 1 and 3 months, the intervention group had significantly fewer concerns about IBD medication $p \leq 0.01$ and at three months, fewer doubts about treatment necessity, fewer reported practical barriers, and higher reported adherence [$p < 0.05$]. Relative to controls at follow-up, the Intervention Group were more satisfied with information about IBD medicines, and viewed pharmaceuticals in general more positively.

The current study revealed that disease related barriers affecting adherence to treatment regimen considered as the 1st ranking with the majority of total mean score while religious and social factors were considered the 6th and the last in rank with less than half of total mean score among the studied patients. From researchers point of view this is related to the severity of symptoms occur in all patients during exacerbation period.

According to disease related barriers, all studied patients suffering from abnormal condition of stool in an exacerbation periods of the disease. This result was in the same line with **Nag & Romero, (2022)** study about "development and content validation of patient-reported outcomes tools for ulcerative colitis and Crohn's disease in adults with moderate-to-severe disease" and reported five symptoms (urgent bowel movements, abdominal pain, frequent bowel movements, bloody stools, diarrhea/watery stools) were reported by 83-100% of participants with ulcerative colitis during exacerbation period.

The current study revealed that there were highly statistical significant differences between clinical outcomes pre and 1 month post educational guidelines with P value is ≤ 0.001 and there were highly statistical significant differences between clinical outcomes pre and 3 months post educational guidelines with P value < 0.001. The current study result was in the same line with **Pacheco et al., (2023)** study about "impact of an intervention program on drug adherence in patients with ulcerative colitis in Brazil" and found that patients who participated in the intervention demonstrated significantly higher adherence rates and improve clinical outcomes.

The current study revealed that, the majority of the studied patients1months and 3 months post educational guidelines reports a usual numbers of daily stools compared to more than half of studied patients reported 3-4 more stools than usual pre guidelines. Additionally, the majority of the studied

sample report no rectal bleeding 1 month and 3 months post educational guidelines compared to more than half of studied patients reported blood in most stools pre guidelines.

Furthermore, the majority of the studied sample had normal or inactive colitis in endoscopic examination 1months and 3 months post educational guidelines compared to more than three quarters had moderate colitis: friability, marked erythema, vascular pattern absent, and erosion seen pre educational guidelines. According to physician assessment the majority of studied patients were normal 1 month and 3 months post educational guidelines compared to more than two thirds of studied patients were moderate colitis pre guidelines.

The current study results were in the same line with **Ahmed et al., (2019)** study about "effect of a nursing educational booklet on the severity of the disease and patients quality of life in Assiut University" and reported that after two months from nursing booklet implementation; it was found that half of the patient in the control group were categorized as having severe stage of disease, this percentage was decreased to reach nearly one quarter of patients in the study group, also only ten percent of patients in the control group was categorized as having a mild stage of disease, while, this percentage increased to became forty at the study group of patient, which was considered as a great results in decreasing the disease activity.

The current study results revealed that there were highly statistical significant correlation between total knowledge score and total adherence score 3 months post educational guidelines with r-0.443 and P value at<0.001 and there was statistical significant correlation between total knowledge score and total adherence score with P value at ≤0.05 pre educational guidelines. There were statistical significant correlation between total knowledge score and clinical outcome severity with P value at p ≤0.05 and r=-0.298.-0.317 respectively pre educational guidelines and post 3 months of educational guidelines. There was highly statistical significant correlation between total adherence score and clinical outcomes severity with P value at 0.001, <0.001 respectively pre-educational guidelines and post 3 months of educational guidelines and r=-0.404,-0.425 respectively.

The current study results were in the same line with **Mahmoud et al., (2024)** study and revealed a highly significant positive correlation between total knowledge score and total compliance score among the studied patients. This may be due to that the present study revealed that less than three-quarters of studied patients had an unsatisfactory level of total knowledge about ulcerative colitis which reflects a lack of awareness, and the importance of being compliant with the therapeutic regimen.in addition, the unsatisfactory level of knowledge affect negatively on their compliance and leads to the neglect of follow-up visits.

The current study results were in the same line with **Xie et al., (2023)** study about "development and validation of a questionnaire to test Chinese patients' knowledge of inflammatory bowel disease" and reported significant association between medication adherence and disease knowledge.

The current study results revealed that presented multiple linear regression analyses for predictor variables of patients' clinical outcomes post 3 months of educational guidelines. It was best predicted by total knowledge and adherence scores, nature of work as well as patients, health care providers and disease related factors moreover presence of comorbid disease with p value = (0.001**,0.005*, 0.012*, 0.016*, 0.026*and 0.038*, respectively), accounting for 65.3%

of the variance of patients' clinical outcome severity.

The current study result was in the same line with **Argollo et al., (2019)** study about "comorbidities in inflammatory bowel disease" and reported that a multidisciplinary approach, with close monitoring of disease activity and early detection of comorbidities can benefit patients with IBD leading to better disease outcomes, improved response and adherence to treatment, quality of life, and decreased costs.

The current study results were in the same line with **Blunck et al., (2022)** study about "effectiveness of patients training in inflammatory bowel disease knowledge" and reported that increased disease related knowledge positively affects clinical outcomes in inflammatory bowel diseases. Additionally, higher health literacy levels are associated with better patient reported outcomes and fewer depressive symptoms in IBD patients.

Furthermore, the current study results were in the same line with **Pacheco et al., (2023)** study about "impact of an intervention program on drug adherence in patients with ulcerative colitis in Brazil" and found that patients who participated in the intervention demonstrated significantly higher adherence rates and reported an enhanced quality of life compared to those who did not receive the intervention. This suggests that targeted program can effectively promote adherence and improve clinical outcomes in UC patients.

Also, the current study results were in the same line with **Weizman et al., (2020)** study about "providing hospitalized ulcerative colitis patients with practice guidelines improves patient-reported outcomes in Canada" and reported Patients who received the educational intervention reported higher trust in physician at discharge (69.5 vs. 62.6, P = 0.004) and this was sustained at 6 months (77.7 vs. 68.0, P = 0.001). Patient satisfaction in the education intervention group was higher at discharge.

Conclusion

There was highly statistically significant improvement of patients' knowledge regarding ulcerative colitis immediate post and 3 months post implementation of educational guidelines than pre- guidelines implementation. Also, there were improvements in patients' health outcomes with statistically significant differences at ($p<0.001$). In addition, there was a statistically significant positive correlation between total patients' knowledge and total adherence to treatment regimen post educational guidelines implementation.

Recommendations

- In service education should be provided in hospital to improve patients' knowledge regarding ulcerative colitis and treatment regimen through acquiring knowledge which must be updated periodically.
- Standard booklets should be available in areas of ulcerative colitis in Arabic language.
- Posters and simple illustrations about ulcerative colitis should be available in every gastrointestinal unit.

Further research: The study should be replicated on a large sample from different geographical distribution to generalize the findings.

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تأثير الإرشادات التعليمية لمرضى إلتهاب القولون التقرحي على معرفتهم وإلتزامهم بالنظام العلاجي

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إلتهاب القولون التقرحي هو الشكل الأكثر شيوعاً من أمراض الأمعاء الإلتهابية في جميع أنحاء العالم. وينطوي بشكل مميز على إلتهاب الغشاء المخاطي للقولون. لا يوجد علاج للإلتهاب التقرحي وهو إضطراب يستمر مدى الحياة وله تأثير كبير على الصحة البدنية والعقلية. وتركز الإرشادات التعليمية على زيادة معرفة المرضى بمرض القولون التقرحي وجعلهم أكثر إلماماً بالمرض. لذا هدفت هذه الدراسة إلى تقييم تأثير الإرشادات التعليمية لمرضى إلتهاب القولون التقرحي على إلتزامهم بالنظام العلاجي والنتائج الإكلينيكية. تم استخدام تصميم شبه تجريبي. أجريت هذه الدراسة في القسم الداخلي والعيادات الخارجية لقسم الكبد والجهاز الهضمي في مستشفى بنها الجامعي على عينة ملائمة من جميع المرضى البالغين المتاحين المصابين بمرض إلتهاب القولون التقرحي (٧٠ مريضاً) الذين تم إستقبالهم بقسم الكبد والجهاز الهضمي في القسم الداخلي والعيادات الخارجية القادرين. تم استخدام ثلاث أدوات لجمع البيانات على النحو التالي: (أولاً) استبيان مقابلات منظمة. (ثانيًا) مقياس موريسكى للإلتزام بالأدوية المكون من ثمانية بنود. (ثالثا): مقياس مايو لتقييم النتائج الصحية الإكلينيكية. أظهرت الدراسة أن هناك تحسنًا ملحوظًا من الناحية الإحصائية في الإلتزام بالنظام العلاجي للمرضى الخاضعين للدراسة بعد تطبيق الإرشادات التعليمية مباشرة وبعد ٣ أشهر من تطبيق الإرشادات، كما كان هناك علاقة إيجابية بين الإلتزام بالنظام العلاجي والنتائج الإكلينيكية بعد ٣ أشهر من تطبيق الإرشادات التعليمية و كان لتنفيذ الإرشادات التعليمية تأثير إيجابي في تحسين إلتزام المرضى بالنظام العلاجي والنتائج الإكلينيكية لإلتهاب القولون التقرحي. وقد أوصت الدراسة بوجوب تكرار دراسة مماثلة على عينة كبيرة وأماكن أخرى لتعميم النتائج.