Assessment of Compliance to Therapeutic Regimen among Patients with Ulcerative Colitis: Suggested guideline

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Abstract

Background: Ulcerative colitis is incurable, relapsing, and remitting intestinal disease that often requires lifelong treatment usage to maintain remission. Compliance is defined as the practice of obeying rules or requests made by people in authority. **Aim of the study**: this study aimed to assess patients' compliance to Therapeutic regimen among patients with ulcerative colitis. **Research Design**: Descriptive exploratory design was utilized to conduct this study. **Settings**: The study was conducted at gastroenterology outpatient clinic affiliated to Ain Shams University Hospitals. **Study subjects:** A purposive sample of 93 patients with ulcerative colitis was recruited in this study.**Tools:**1) patient interviewing questionnaire. 2) Patients' knowledge regarding ulcerative colitis questionnaire. 3) Compliance assessment tool. **Results:** the patient had 71% unsatisfactory knowledge about ulcerative colitis.79.6% of them had noncompliance regarding ulcerative colitis therapeutic regimen.59.2% of the studied patient had insufficiently active physical activity. **Conclusion:** Less than three quarters of the studied patients had unsatisfactory knowledge about ulcerative colitis. Also, more than three-quarters of the studied patients were non-compliant with the ulcerative colitis therapeutic regimen, More ever less than two third of the studied patients were insufficiently active regarding physical activity. **Recommendations:** Patients and their families should be provided with adequate knowledge about ulcerative colitis and the importance of proper compliance to therapeutic regimen, replication of the current study on a larger sample to achieve generalization of the results.

Keywords: Compliance, Therapeutic regimen, ulcerative colitis, guidelines.

Introduction:

Ulcerative colitis is inflammation of the large intestine (colon), especially of its mucous membranes, characterized by patches of tiny ulcers in the inflamed membranes. The most common symptoms of ulcerative colitis are bloody diarrhea and abdominal pain. Other symptoms include fatigue, weight loss, and loss of appetite. Ulcerative colitis tends to become chronic, with sustained fever and weight loss; complications and death may result. Specific causes, such as amebic or bacillary dysentery, are rarer than unknown or multiple causes ***(Uzzan et al., 2022).***

In patients with UC, ulcers and inflammation of the inner lining of the colon could incur symptoms of abdominal pain, diarrhea, and rectal bleeding. The exact cause of UC remains unknown. Current studies have shown that abnormal activation of the immune system, hereditary susceptibility and alteration of intestinal flora caused by mucosal barrier defects may play a role in the pathophysiology of UC ***(Shi,et al., 2019).***

Ulcerative colitis can be divided into three types according to the extent of the lesion: "proctitis," "left-sided colitis (up to the splenic flexure)," and "extensive colitis." The severity of UC is classified into "mild," "moderate," or "severe" based on clinical symptoms, signs, and blood test results ***(Nakase, 2022).***

Several therapeutic drug classes are available for the treatment of UC: salicylates, corticosteroids, thiopurines, calcineurin inhibitors, anti-tumor necrosis factor (TNF) agents, anti-adhesion molecules, and, more recently, small molecules directed against the Janus kinase (JAK) pathways, and ustekinumab ***(Danese,et al., 2020).***

Compliance is defined as the practice of obeying rules or requests made by people in authority. In healthcare, the most commonly used definition of compliance is "patient's behaviors (in terms of taking medication, following diets, or executing life style changes) coincide with healthcare providers' recommendations for health and medical advice" ***(Lehman, 2020).***

Therapeutic non-compliance occurs when an individual's health-seeking or maintenance behavior lacks congruence with the recommendations as prescribed by a healthcare provider, non-compliance could have a major effect on treatment outcomes and direct clinical consequences ***(Estanboliy,et al., 2021).***

Guidelines try to standardize outcomes by achieving consensus on the best way to do things. Guidelines provide a useful reference for busy clinicians, "a place to easily go and see the data and become familiar with it." Additionally, guidelines influence policy, with strong recommendations having the potential for incorporation into quality improvement initiatives or affecting insurance reimbursement ***(Raine,et al., 2022).***

Significance of the study:

Ulcerative colitis has a remitting and relapsing course that mainly affects the colon and has a high global prevalence, according to a set of large-scale epidemiological studies. Epidemiological reports show that the highest annual incidence of UC was 24.3 per 100,000 person-years in Europe, 19.2 per 100,000 person-years in North America, and 6.3 per 100,000 person-years in Asia and the Middle East ***(Fang, et al., 2022).***

Compliance to therapeutic regimen is a crucial part of patient care and indispensable for reaching clinical goals. By opposition noncompliance leads to poor clinical outcomes, increase in morbidity and death rates, and unnecessary health care expenditure ***(Fernandez, et al., 2019).***

So, there was an urgent need to conduct this study to assess patient's compliance to therapeutic regimen that act as a starting point to institute measures that directly improve compliance to a higher rate and develop guideline of compliance to therapeutic regimen to improve compliance for patients.

Aim of the Study:

The current study aimed to: Assess the compliance to therapeutic regimen among patients with ulcerative colitis through the following:

1. Assessing the level of patients` knowledge regarding therapeutic regimen of ulcerative colitis.
2. Assessing patients' compliance to Therapeutic regimen.
3. Developing a suggested guideline regarding compliance to Therapeutic regimen among patients with ulcerative colitis.

Research Questions:

What is the level of compliance to therapeutic regimen among patients with ulcerative colitis?

Operational definition

Patient Compliance:

Describe the degree to which a patient correctly follows medical advice, most commonly, it refers to medication or drug compliance, nutrition, management of stress, physical activity and follow up.

Subjects and methods:

Research Design:

The descriptive exploratory design utilized to conduct the current study was defined by exploratory research as a way of learning about the topic. Exploratory research can help fill a gap in knowledge about a new or under-researched topic ***(Dubey& Kothari, 2022).***

Setting:

The study was conducted at a gastroenterology outpatient clinic affiliated to with Ain Shams University Hospitals; it received patients from different governorates all over Egypt with different ages and socioeconomic standards. It was located on the ground floor and consisted of two rooms. The room had 2 beds (two partitions).

Subject

A purposive sample of 93 patients with ulcerative colitis admitted to the gastroenterology outpatient clinic in Ain Shams University Hospitals from October 2022 to March 2023 was recruited to determine compliance of patients with ulcerative colitis, they were chosen according to inclusion criteria.

Inclusion criteria:

1. Adult patients from both genders and conscious.
2. Free from psychological diseases.
3. Able to communicate and agree to participate in the study.

Tools of Data Collection:

The data was collected through the following tools:

1. Patient structured interview questionnaire: This tool was developed by

Investigator based on literature review ***(Armuzzi & Liguori, 2021, Fritsch et al., 2021, Dubinsky et al., 2022 and Janice et al., 2022)*** and written in Arabic language. **It was divided into two parts:**

Part one: Socio-demographic data of studied patients :This part was used to assess socio-demographic characteristics of the patients with ulcerative colitis Including age, gender, marital status, level of education, job, residence, housing status, and monthly income enough for treatment **cost.**

Part two: patient medical history: This part was used to assess the patient's present history (e.g. onset of ulcerative colitis, signs and symptoms, area of the colon injury, prescribed medications, and bad habits for patients) and past history (e.g. Timing of ulcerative colitis, having any chronic disease, previous surgical intervention and gastroenterology endoscopy and family history for ulcerative colitis (having relative suffering from ulcerative colitis.

II: Patients' knowledge regarding ulcerative colitis questionnaire:

It was developed by investigator based on review of relevant recent related literatures ***(Janice, et al., 2022, Holly, 2020 and Kucharzik,et al., 2020)***.Was written in simple Arabic language .It was used to assess Patients' knowledge. Include six parts:

Part 1: Assess Patients' knowledge regarding ulcerative colitis (as definition, age, causes, and risk factors for ulcerative colitis), including (6) closed-end questions.

Part 2: Assess the patient's knowledge regarding signs and symptoms of ulcerative colitis. Including (9) closed- end questions.

Part 3: Assess the patient's knowledge regarding the diagnosis of ulcerative colitis, including (3) closed- end questions.

Part 4: Assess the patient's knowledge regarding complications of ulcerative colitis, including (9) closed- end questions.

Part 5: Assess the patient's knowledge regarding the treatment of ulcerative colitis, Included (11) closed end questions.

Part 6: Assess a patient's knowledge of compliance with the therapeutic regimen for ulcerative colitis. (As medication, diet, stress management and physical activity), Included (12) closed end question

❖ **Scoring system:**

The total score of knowledge was (50) marks. Each correct answer was given one mark and the incorrect answer was given zero. It was classified as follows based on statistical analysis:

- ≥ 70% was considered the satisfactory level of knowledge when the total marks were ≥ 35 marks.
- < 70% % was considered the unsatisfactory level of knowledge when the total marks were < 35 marks.

III: Patients' compliance assessment tool:

This tool was concerned with Patients' compliance regarding ulcerative colitis therapeutic regimen through assessing medication, diet, stress management, physical activity, and follow-up compliance. **It was divided into five parts.**

Part 1: Compliance with Medication questionnaire:

Morisky medication adherence scale (MMAS-8), this scale was adapted from ***(Morisky, et al., 2008)***. It contains 8 questions. Each question of the scale has three responses as follows:

All the time (2) scores
Sometimes (1) score
Never (0) score

The total score on the scale were ranging from 0 to 16

- ➢ A total score equal to or more than 80% of the patient was considered compliant (13-16).
- ➢ A total score of less than 80% the patient was considered non-compliant (0-12).

Part 2: Compliance with Diet questionnaire:

This tool was developed by Investigator in the Arabic language based on a review of relevant recent related literature ***(Devries, et al., 2019, Radziszewska et al., 2020, Bischoff, et al., 2020 and Jane, et al., 2022)***. It included (14) items, divided into (7) items about diet compliance for patients with ulcerative colitis and (7) items about food to be avoided for patients with

Godin Scale Score	Interpretation
24 units or more	Active
14 – 23 units	Moderately Active
Less than 14 units	Insufficiently Active/Sedentary

ulcerative colitis. Each question of the scale has three responses as follows:

All the time (2) scores
Sometimes (1) score
Never (0) score

The total score of the scale were ranging from 0 to 28

- A total score equal to or more than 80% of the patient was considered compliant (23-28).
- A total score of less than 80% the patient was considered non-compliant (0-22).

Part 3: Compliance with stress management questionnaire:

This tool was developed by the investigator in the Arabic language based on a review of relevant recent related literature ***(Lloyd, et al., 2023, Paul,et al., 2021 and Romas & Sharma,et al., 2021)***. Included (14) items, used to assess patients' compliance with stress management, each question of the scale has three responses as follows:

All the time (2) scores
Sometimes (1) score
Never (0) score

The total score of the scale were ranging from 0 to 28.

- A total score equal to or more than 80% of the patient was considered compliant (23-28).
- A total score of less than 80% the patient was considered non-compliant (0- 22).

Part 4: Compliance with physical activity questionnaire:

Godin leisure-time exercise questionnaire (GLTEQ) was adapted from ***(Godin, 2011)***. The GLTEQ, a self-administered measuring tool for assessing physical activity, The questionnaire contains three items measuring the frequency of strenuous (e.g., jogging), moderate (e.g., fast walking), and mild (e.g., easy walking) exercise for periods > 15 minutes during the individual's free time throughout a typical week. While calculating individuals' physical activity/exercise scores in the questionnaire: total score = strenuous/exhausting (9 METs × times/week) + moderate (5 METs × times/week) + light (3METs× times/week).

Part 5: Compliance to follow up questionnaire:

This tool was developed by the investigator in Arabic based on a review of relevant recent literature ***(Malarvizhi &Gugan, 2019 and Kane, 2022)***. Included (4) items used to assess Patients' compliance with follow-up. Each question of the scale has three responses as follows:

All the time (2) scores
Sometimes (1) score
Never (0) score

The total score of the scale were ranging from 0 to 8

- A total score equal to or more than 80% of the patient was considered compliant (6-8).
- A total score of less than 80% the patient was considered non-compliant (0- 5).

II- Operational design:

The Operational design included preparatory phase, content validity and reliability, pilot study and fieldwork.

Preparatory phase:

It included reviewing of related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop the theoretical part of the study and data collection tools.

Validity and reliability:

The validity of the proposed tools was achieved to assess face and content validity. This stage was achieved through a jury of five experts, three of them professors, one assistant professor, and one lecturer from the medical-Surgical nursing department at the faculty of nursing, at Ain Shams University. The experts reviewed the tools for clarity, relevance, comprehensiveness, and simplicity; minor modifications were done.

Reliability:

The tools were measured to ensure that an assessment tool produces stable with consistent result overtimes. The reliability coefficient for the study tools were calculated using the correlation coefficient Cronbach's alpha test which is a model of internal consistency was used in the analysis of Patients' knowledge questionnaire 0.818, Patients' compliance assessment tool (medication, diet, stress

management and follow up)0.748, and Patients' physical activity assessment tool 0.773.

Pilot Study:

A pilot study was conducted on 9 patients (10% of total study subjects) of the patients under study to test the feasibility and applicability of the tools. The patients who were included in the pilot study were added to the sample because no modification was done after conducting the pilot study.

Field work:

The purpose of the study was simply explained to the patients who agreed to participate in the study prior to data collection. Data collections started from October 2022 until March 2023. Data were collected by the researcher during patient interviews two days per week, Saturday from 9.00 am to 1.00 pm and Wednesday from 11.00 am to 2.00 pm at the gastroenterology outpatient clinic in Ain Shams University Hospitals, during the patient's attendance at the outpatient clinic for follow up. The time needed for completing the tools was about 20-30 minutes for every patient. The patients were assured that the information collected would be treated confidentially and that it would be used only for the purpose of the study (verbal consent was taken from the patients).

III- Administrative design:

An official written Permission for conducting the study was obtained from the Faculty of Nursing, Ain Shams University to the director of the gastroenterology outpatient clinic in Ain Shams University Hospitals, Cairo governorate, Egypt. Then informed consent to participate in the current study was taken after the purpose of the study was clearly explained to each patient.

Ethical considerations:

The ethical research consideration in this study included the following:

- Approval of protocol was obtained from the ethical Committee in the faculty of nursing at Ain Shams University before starting the study.
- The investigator clarified the objective and aim of the study to the patients included in the study.
- The investigator assured maintained anonymity and confidentiality of the subjects' data.
- Patients were informed that they were allowed choose to participate or not in the study and that they have the right to withdraw from the study at any time without giving any reasons.
- Values, culture, and beliefs were respected.

IV- Statistical Design:

The statistical analysis of data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 22. Data were presented using descriptive statistics in the form of frequencies and percentages for categorical data, the arithmetic mean (X), and standard deviation (SD) for quantitative data. Qualitative variables were compared using the chi-square test (X) 2, P-value to test the association between two variables, and Pearson correlation test (R- test) to the correlation between the study variables.

Degrees of significance of results were considered as follows:

- P-value > 0.05 Not significant (NS)
- P-value ≤ 0.05 Significant (S)
- P-value ≤ 0.01 Highly Significant (HS).

Results:

Table (1): shows that, 60.2% of the studied patients their age was 20-<40 years, with Mean and SD of age was 37.51 ± 10.11 years. As regard to gender and marital status, 63.4% and 78.5% of them were female and married, respectively. Also, 63.4% of the studied patients were working. Moreover, 76.3% and 66.7% of them were residing in urban areas and have three rooms at home, respectively. Also, 98.9% and 100.0% of them have enough ventilation and clean drinking water and sanitation in the house, respectively. Moreover, 98.9% of the studied patients were living with family, 72.0% of them have four members in the family. In addition, 75.3% of them reported that, the monthly income was not enough to treatment lost and 79.6% have secondary education. Also, 18.3% of them have university education.

Table (2): shows that, 80.6% and 83.9% of the studied patients have unsatisfactory level of total knowledge regarding the nature and diagnosis of ulcerative colitis, respectively. Also, 59.1% and 66.7% of them have unsatisfactory level of total knowledge regarding the symptoms and treatment of ulcerative colitis, respectively. Moreover,

76.3% and 71.0% of them have unsatisfactory level of total knowledge regarding the complications and therapeutic regimen of ulcerative colitis, respectively.

Figure (1): shows that, 71.0% of the studied patients have unsatisfactory level of total knowledge regarding ulcerative colitis. While, 29.0% of them have satisfactory level of total knowledge.

Table (3): shows that, 60.2% and 78.5% of the studied patients were non-compliance regarding medication and appropriate diet, respectively. Also, 69.9% and 76.3% of the studied patients were non-compliance regarding stress management and follow up, respectively. Regarding total compliance score, 79.6% of the studied patients were non-compliance regarding ulcerative colitis therapeutic regimen. The mean ± SD of total compliance score was 54.45 ± 6.62.

Figure (2): shows that, 59.2% of the studied patients were insufficiently active regarding physical activity. While, 24.7% of them were moderate active. Also, 16.1% of them were active.

Table (4): indicated that, there was highly significant positive correlation between total knowledge score and total compliance score among the studied patients at (r= 0.526). Also, there was highly significant positive correlation between total knowledge score and physical activity among the studied patients at (r=0.501). Furthermore, there was highly significant positive correlation between total compliance score and physical activity among the studied patients at (r=0.482).

Table (1): Frequency distribution of the studied patients according to their socio demographic characteristics (n=93).

Socio-demographic characteristics	No.	%
Age (years)		
20-<40	56	60.2
40-<60	36	38.7
≥ 60	1	1.1
Mean ± SD 37.51 ± 10.11		
Gender		
Male	34	36.6
Female	59	63.4
Marital status		
Married	73	78.5
Single	16	17.2
Divorce	4	4.3
Occupation		
Working	59	63.4
Not working	34	36.6
Residence		
Rural	22	23.7
Urban	71	76.3
Number of rooms at home		
Once	1	1.1
Two	30	32.3
Three	62	66.7
More than three	0	0.0
Is there enough ventilation in the house		
Yes	92	98.9
No	1	1.1
Is there clean drinking water and sanitation in the house		
Yes	93	100.0
No	0	0.0
With whom you live		
Alone	1	1.1
With the family	92	98.9
With others	0	0.0
If the answer is with the family how many family members? (n=92)		
Three members	5	5.4
Four members	67	72.0
More than four members	20	21.5
Monthly income		
Enough to Treatment lost	23	24.7
Not Enough to Treatment lost	70	75.3
Educational level		
Does not read/write	0	0.0
Read and write	2	2.1
Secondary education	74	79.6
University education	17	18.3

Table (2): Frequency distribution of the studied patients according to subtotal knowledge subscales regarding ulcerative colitis **(n=93).**

Items	Satisfactory		Unsatisfactory		Mean ± SD
	No.	%	No.	%	
Nature of ulcerative colitis	18	19.4	75	80.6	3.37 ± 1.21
Symptoms of ulcerative colitis	38	40.9	55	59.1	5.60±1.54
Diagnosis of ulcerative colitis	15	16.1	78	83.9	1.73±0.83
Complications of ulcerative colitis	22	23.7	71	76.3	4.93±1.91
Treatment of ulcerative colitis	31	33.3	62	66.7	6.31±2.08
Therapeutic regimen of ulcerative colitis	27	29.0	66	71.0	6.74±2.16

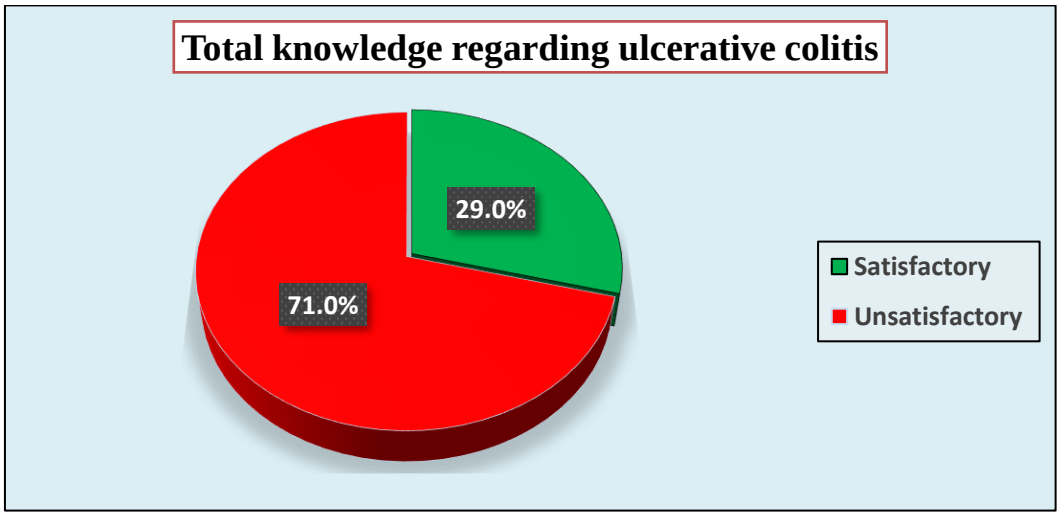

Figure (1): Percentage distribution of the studied patients according to their total knowledge regarding ulcerative colitis **(n=93).**

Table (3): Frequency distribution of the studied patients according to total compliance regarding ulcerative colitis therapeutic regimen **(n=93).**

Items	Compliance		Non-compliance		Mean ± SD
	No.	%	No.	%	
Medication	37	39.8	56	60.2	11.35 ± 2.41
Appropriate diet	20	21.5	73	78.5	18.42 ± 3.39
Stress management	28	30.1	65	69.9	19.60 ± 2.77
Follow up	22	23.7	71	76.3	5.08 ± 1.57
Total compliance	**19**	**20.4**	**74**	**79.6**	**54.45 ± 6.62**

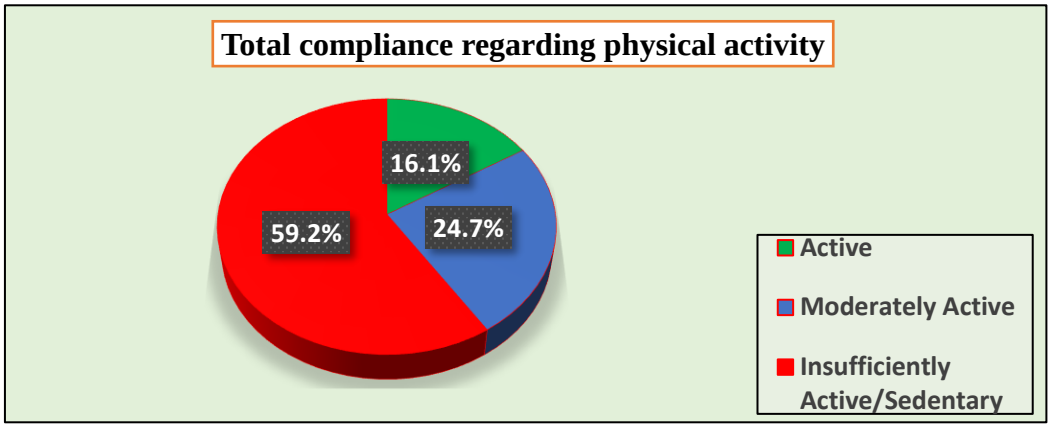

Figure (2): Percentage distribution of the studied patients according to their total compliance regarding physical activity **(n=93).**

Table (3): Correlation between total knowledge score, total compliance score and physical activity among the studied patients **(n=93).**

Items	Total knowledge		Total compliance	
	r	P-Value	r	P-Value
Total knowledge			**0.526**	**0.000****
Total physical activity	**0.501**	**0.000****	**0.482**	**0.000****

R= correlation coefficient test * p<0.05 (statistically significance)

Discussion:

Ulcerative colitis is incurable, relapsing, and remitting intestinal disease that often requires lifelong treatment usage to maintain remission ***(Lee, 2020)***. Poor compliance with a prescribed therapeutic regimen may have a major impact on treatment outcomes, especially for patients with a chronic illness ***(Anghel, et al., 2019)***. So, nurses are in the unique position of being able to provide education, counseling, and communication to patients with a multitude of problems and develop interventions that enhance their compliance with prescribed regimens ***(Naeck-Boolauky, et al., 2020).***

Regarding patients' demographic characteristics, the results of the present

Study revealed that less than two-thirds of the study sample's ages ranged from 20 to 40 years old, from the researcher's 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 is consistent with what was reported by ***Magrì, 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.

In relation to gender, the present result showed that less than two-thirds of the studied patients were female. From the researcher's point of view; this finding may be due to female's exposure to stress more than males due to pregnancy and lifestyle. This result supported by ***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. And this result was incongruent with ***Luo, et al., (2018)***, in a study entitled "Chinese research into severe ulcerative colitis has increased in quantity and complexity." who found that men are more susceptible to ulcerative colitis than women.

Concerning marital status, the results revealed that, more than three-quarters of the studied patients were married. This may be due to that, the fact that married people were liable to ulcerative colitis more than single because they always face psychological stress from their social role. This result supported by ***Fu, et al.,***

(2020), in an entitled study "Associations between disease activity, social support and health-related quality of life in patients with inflammatory bowel diseases: the mediating role of psychological symptoms." who found that more than two-thirds of the studied patients were married.

One of the noticeable findings of the study was that less than two-thirds of the studied patients were working. This may be due to the age group of this study being working age (20-40) years old. This result supported by ***Nachury, et al., (2021)***, in a study entitled Patients' real-world experience with inflammatory bowel disease: A cross-sectional survey in tertiary care centers from the GETAID group." who found that less than two-thirds of the studied patients were working.

Regarding residence, the current study showed that more than three-quarters of the studied patients were living in urban areas. This may be due to the unavailable of specialized hospitals in rural areas and the Westernization of lifestyle. This result is in accordance with ***Andrade, et al., (2020)***, in a study entitled "Adherence to Medical Treatment in Inflammatory Bowel Disease Patients from a Referral Center in Bahia-Brazil", who found that the majority of the studied patients were living in urban areas.

Regarding housing status, the current study showed that two-thirds of the patients under study live in a house consisting of three rooms, most of them had enough ventilation, all of them had clean water, and sanitation, most of them lived with a family and less than three-quarters their family consisting of four members. This may be due to more than three-quarters of patients in the current study living in urban areas. This result supported by ***Abd-Elgany, et al., (2020).***in a study entitled "Biopsychosocial needs for patients with chronic renal failure" who found that most of them had enough ventilation and clean water, and sanitation, and most of them lived with a family.

Regarding monthly income, the current study showed that three-quarters of the studied patients did not have enough income for treatment costs. This may be due to the high costs of continuous treatment and follow-up. This result was incongruent ***Ahmed & Hassan, (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" who found that the minority of the studied patients have an insufficient monthly income.

Concerning to level of education, the study result reveals that the majority of the studied patients have secondary education. This result is supported by ***Sharma, et al., (2021)***, in a study entitled "Cognitive Dysfunction in ulcerative colitis patients in Remission and its comparison with Patients with irritable bowel syndrome and healthy controls" who found that less than two-thirds of the studied patient's secondary education.

Concerning knowledge about the disease's meaning, risk factors, and causes (nature of ulcerative colitis) and diagnosis of ulcerative colitis, the study results reveal that the majority of the studied patients had unsatisfactory levels of knowledge. This may be due to the disease's nature being similar to many common gastrointestinal disorders, so they can't distinguish between them. This result is supported by ***Berding, et al., (2017)***, in a study entitled" Beneficial Effects of Education on Emotional Distress, Self-Management, and Coping in Patients with Inflammatory Bowel Disease: A Prospective Randomized Controlled Study " who found that most of the studied patients had unsatisfactory levels of knowledge before the educational program.

Concerning knowledge items (such as symptoms, complications of the disease, treatment, and therapeutic regimen of ulcerative colitis), the study results reveal that less than two-thirds of the studied patients had unsatisfactory levels of knowledge regarding symptoms, more than three-quarters had unsatisfactory knowledge regarding complications, two-thirds had unsatisfactory knowledge regarding treatment and less than two-thirds had unsatisfactory knowledge regarding therapeutic regimen of ulcerative colitis. the results of the current study may be due to, not all the patients having all the symptoms of ulcerative colitis, which is usually similar to common gastrointestinal disturbance and usually not oriented with the therapeutic regimen of ulcerative colitis of the disease.

This result is supported by ***Simian, et al., (2017)***, in a study entitled "Assessment of disease-related knowledge and possible factors associated with the knowledge level among Chilean patients with inflammatory bowel disease" who found that less than three-quarters of the studied patients were had unsatisfactory levels of knowledge.

Concerning total knowledge regarding ulcerative colitis, the study results reveal that less than three-quarters of the studied patients had unsatisfactory levels of total knowledge regarding ulcerative colitis; this may be due to their reflection of uncommon disease and stated that hadn't past family history for ulcerative colitis which leads to deficient information and feedback about ulcerative colitis. This result is supported by ***Mohamed, et al., (2022)***, in a study entitled "Effect of Life Style Modification on the health status for Patients with Ulcerative Colitis" who found that more than three-quarters of the studied patients were, had unsatisfactory levels of total knowledge regarding ulcerative colitis.

Regarding the study, of patient compliance to medication, this study presents that less than two-thirds of the patients under the study had noncompliance with medication. This may be due to the studied patient's neglect of medication when they felt that they are improved and also due to treatment-associated side effects. This result is supported by ***Balaii, et al., (2018)***, in a study entitled" Determining the degree of adherence to treatment in inflammatory bowel disease patients" who found that more than two-fifth of the studied patients had not complied with medication.

Regarding the study, of patient compliance with the diet, this study shows that more than three-quarters of the studied patients did not comply with the diet. This may be due to the inability of the studied patients to stick to the recommended balanced diet most of the time due to the average economic status and living conditions or may be due to the habits and beliefs that grow with them over time. As well as drinking soda drinks, eating excess sugars, and fast foods. This result is supported by ***Vrdoljak, et al., (2020)***, in a study entitled " Mediterranean Diet Adherence and Dietary Attitudes in Patients with Inflammatory Bowel Disease" who found that the majority of the studied patients had not complied with the diet.

Regarding the study on patient compliance with stress management, this study shows that more than two-thirds of the patients in the study did not comply with stress management. This may be due to that the studied patients expressed that they hadn't any previous educational program, awareness, and guidance for managing stress and its relation to decreasing the risk of ulcerative colitis. This result is supported by ***Larsson, et al., (2017)***, in a study entitled " Stress, coping and support needs of patients with ulcerative colitis or Crohn's disease: a qualitative descriptive study" who found that mentions the patient not compliance with stress management.

Regarding the study, patient compliance to the follow-up, this study presents that more than three-quarters of the patients under the study were non-compliant regarding follow-up. This may be due to that the studied patients don't recognize the importance of follow-up visits to promote health and reduce the risk of ulcerative colitis regain. In addition, they long are waiting times which decline the follow-up visits. On the other hand, when they felt improved they stop their follow-up visits. This result disagreed with ***Pellegrino, et al., (2022)***, in a study entitled " Therapeutic adherence recorded in the outpatient follow-up of inflammatory bowel diseases in a referral center: Damages of COVID-19 " who found that more than one-third of the studied patients were non-compliant regarding follow up.

Regarding the study, patient compliance to physical activity, this study presents that less than two-thirds of the patients under the study were insufficiently active, a quarter of the patients under the study were moderately active and the minority of the patients under the study were active. This is may be due to decreases awareness of patients about the benefits of recommended exercise for treating ulcerative colitis and the patients never started or motivated to apply the recommended physical exercise which reflects insufficient compliance with physical activity. This result is supported by ***Fagan, et al., (2021)***, in a study entitled " Physical Activity in Patients with Inflammatory Bowel Disease: A Cross-Sectional Study " who found that more than one-third of the studied

patients had low physical activity, less than two-thirds had moderate physical activity and the minority had high physical activity.

Regarding the Correlation between total knowledge score and total compliance score and physical activity, the study results reveal a highly significant positive correlation between total knowledge score, total compliance score, and physical activity 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.

This result was in agreement with a study done by ***Park, et al., (2020)***, in a study entitled "Higher levels of disease-related knowledge reduce medical acceleration in patients with inflammatory bowel disease " who found Disease-specific knowledge positively impacts compliance to therapy and patient satisfaction with their treatment among those with chronic illnesses including ulcerative colitis.

Regarding the Correlation between total knowledge score and physical activity, the study result reveals a highly significant positive correlation between total knowledge score and physical activity among the studied patients. This result was in agreement with a study done by ***Xiao&Ye (2022)***, in a study entitled " Application of Health Education Based on Phased Transition Theory Model in Continuous Nursing for Patients with Inflammatory Bowel Disease" who found a positive correlation between total knowledge score and physical activity.

Regarding the Correlation between total compliance score and physical activity, the study result reveals a highly significant positive correlation between total compliance score and physical activity among the studied patients. This result was in agreement with a study done by ***Plachta, et al. (2023)***, in a study entitled " Health Status, Quality of Life, Psychosocial Well-being, and Wearables Data of Patients With Active Ulcerative Colitis Receiving Filgotinib Therapy (Filgo Colitis Study): Protocol for a Real-world Observational Study" who found a positive correlation between total compliance score and physical activity.

Conclusion:

Less than three quarters of the studied patients had unsatisfactory knowledge about ulcerative colitis. Also, more than three-quarters of the studied patients were non-compliant with the ulcerative colitis therapeutic regimen, More ever less than two third of the studied patients were insufficiently active regarding physical activity

Recommendations:

The result of this study projected the following recommendations:

- Replication of the current study on a larger sample to achieve generalization of the results.
- Designing patients' educational programs to improve their knowledge regarding ulcerative colitis.
- Establishment of booklet, and pamphlet to increase patient's awareness about ulcerative colitis.
- Periodical Follow up for patients with ulcerative colitis to maintain compliance with therapeutic regimen by community health nurse.
- Enhancing the healthcare team-patient relationship to facilitate patients' compliance, through increasing knowledge about the disease among nurses and patients.

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