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Effectiveness of a Nurse-Led Educational Program on Ulcerative Colitis Patients' Knowledge and their Lifestyle

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ABSTRACT

Ulcerative colitis (UC) is a chronic inflammatory bowel disease that adversely affects patients' quality of life. Nurse-led educational interventions may enhance patients' knowledge, lifestyle practices, and self-management abilities. This quasi-experimental study evaluated the effectiveness of a structured nurse-led educational program among patients with UC attending the Gastroenterology and Hepatology Teaching Hospital in Sulaimani City between August 2024 and August 2025. A total of 152 patients were allocated into intervention (n = 76) and control (n = 76) groups based on willingness and feasibility to participate. The intervention group received an 8-week nurse-led educational program addressing diet, physical activity, symptom management, and medication adherence, while the control group received routine care. Data were collected using a structured questionnaire and analyzed using independent and paired t-tests and Chi-square tests (IBM Statistical Package for the Social Sciences Statistics version 24). Ethical approval was obtained (Approval No. 6), and blinding was not feasible. After minor withdrawals, 75 participants remained in each group, due to personal reasons and the inability to complete follow-up assessments. The intervention group demonstrated a statistically significant improvement in mean knowledge scores following the program ($P < 0.001$). Lifestyle behaviors also improved significantly, with most participants achieving fair to good levels, whereas the majority of the control group remained at a poor level ($P < 0.001$). The study concludes that nurse-led educational programs are effective in improving knowledge and lifestyle behaviors and should be incorporated into routine care for patients with UC.

Index Terms: Ulcerative Colitis, Nurse-Led Educational Program, Patients' Knowledge, Lifestyle Modification

1. INTRODUCTION

Ulcerative colitis (UC) is one of the inflammatory bowel diseases (IBD) that consists of recurrent and progressive inflammation of the colon, starting at the rectum and extending to the entire colon. The inflammatory response mainly occurs in the mucosa and submucosa [1]. While the exact cause of UC is still unknown, present research indicates the presence of an inappropriate, persistent immune response and dysregulated gut microbiome in the presence of certain genetic factors [2], [3].

UC is a global health burden, with an estimated 2.2 million individuals living with the disease in Europe, and with global incidence predicted to rise. Epidemiological data indicate a higher prevalence in Northern Europe and North America, which may be associated with lifestyle factors common in Western countries. The development of UC is attributed interplay between genetic predisposition and environmental or lifestyle influence [4].

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UC significantly impacts the health system and patients' quality of life [5]. Physical, psychological, and social consequences disrupt daily functioning and family life [6]. Although mortality is low, morbidity is high; patients often suffer from anxiety, depression, and stress-induced flare-ups [7]. Common symptoms included diarrhea, abdominal pain, rectal bleeding, and weight loss, which collectively impair well-being [4].

Despite its relatively low mortality rates, UC is associated with substantial morbidity. Patients with active disease are at increased risk of psychological disorders, including anxiety and depression, as well as impaired social and occupational functioning [8]. Psychosocial stress has been identified as a key factor influencing the pathophysiology of UC. About 70% of patients report that psychosocial stress either triggers disease flare-ups or contributes to the disease progression in the clinical course [7].

The clinical manifestations of UC vary depending on the severity and extent of the inflammation, and most commonly include the following: Increased frequency of bowel movements, bloody diarrhea with mucus, abdominal discomfort, weight loss, fatigue, and anemia [4]. Such symptoms have quite a strong influence on patients' quality of life. The symptoms of UC most predominantly occur in a relapsing-remitting pattern. Epidemiological the studies of UC reflect a significant rise in global prevalence with variability across different regions of the world [9].

Changes in lifestyle play an important role in the management of UC in terms of minimizing the risk of relapses and optimizing outcomes [10], [11]. Health-related behaviors, such as diet, exercise, stress management, and smoking cessation have all been important in maintaining long-term medication adherence in achieving and preserving remission [12].

Medication adherence continues to be a complex issue in the management of chronic diseases, such as UC, a condition requiring long-term therapy for attaining and maintaining clinical remission. Consequently, adherence to prescribed treatment protocols forms an integral component of comprehensive disease management. Present literature has focused on adherence to prescribed medications as the primary strategy for inducing and sustaining remission in UC [12].

Nurses play a key role in improving knowledge, self-management, and quality of life among patients with UC. Nurse-led educational and follow-up interventions enhance patients' understanding of the disease, promote adherence to treatment, and support lifestyle modification. Evidence indicates that patients receiving nurse-led care report significantly better health-related quality of life compared with those receiving conventional care [13]. In addition, nurse-led counseling has been shown to improve psychological well-being and coping skills in patients with IBD, highlighting the essential contribution of nursing interventions to holistic disease management [14].

Understanding lifestyle behaviors and medication adherence among patients with UC requires a theoretical structure that explains why patients engage or fail to engage in health-promoting behaviors. For this dissertation, the health promotion model (HPM) by Nola Pender was selected as the guiding framework. HPM provides a comprehensive and human-centered explanation of how personal experiences, beliefs, and environmental influences shape an individual's health actions. The model aligns particularly well with the goals of this study, which include improving patients' lifestyle habits and enhancing medication adherence through a nurse-led intervention [15].

Nurse-led models for chronic disease management have shown improvements for self-care, education, and psychosocial support of patients living with IBD [14], [16]. Therefore, this study aims to assess the impact of a nurse-led intervention program on patients' knowledge and lifestyle for patients with UC.

2. MATERIAL AND METHODS

2.1. Study Design and Setting

A quantitative quasi-experimental study was implemented using a non- probability purposive sampling approach. From August 1, 2024, to August 5, 2025, at the Gastroenterology and Hepatology Teaching Hospital in Sulaiamani City. This design was chosen because it allows for the evaluation of an educational intervention in a real clinical setting where randomization may not be feasible. Ethical approval was obtained from the Scientific Research Ethics Committee of Raparin University (No 6).

2.2. Study Population and Sample Technique

A total of 300 patients diagnosed with UC were eligible for the study. 152 patients were allocated into intervention (n = 76) and control (n = 76) groups based on willingness and feasibility to participate. Participants were recruited using non-probability purposive sampling. Participants were allocated to either the intervention or control group based on

their willingness and ability to participate in the educational program. 76 patients who agreed to attend the nurse-led educational sessions were assigned to the intervention group, while the remaining 76 patients, who continued to receive routine hospital care without participation in the program, were assigned to the control group. The sample size calculations were performed through a power analysis, which incorporated finite population correction, along with a 95% confidence level, 5% margin of error, and 50% expected prevalence.

2.2.1. Criteria for inclusion and exclusion

2.2.1.1. Inclusion criteria

- Adult patients aged 18 years and older
- Diagnosed with UC
- Receiving care at the gastroenterology and hepatology teaching hospital
- Able to communicate effectively
- Willing to participate in the study and provide informed consent.

2.2.1.2. Exclusion criteria

- Patients with significant dominant chronic comorbidities that could interfere with participation
- Patients with cognitive disorders that preclude understanding or participation
- Patients with any physical or psychological condition that might hinder participation in the assessments or the educational intervention.

Both groups were recruited from the same healthcare facility and were comparable regarding key socio-demographic characteristics such as age, sex, marital status, and education level; the groups were sufficiently matched.

Group allocation was based on participants' willingness and ability to attend the educational sessions, consistent with a quasi-experimental design. Randomization and blinding were not feasible due to the educational nature of the intervention. To reduce the potential for selection bias, baseline demographic and clinical characteristics were compared between the two groups, and no statistically significant differences were found before the intervention. The study was conducted at a teaching hospital specializing in Gastroenterology and Hepatology in Sulaimani City, Kurdistan Region of Iraq. This hospital is considered the main tertiary referral center for gastrointestinal diseases in the region and provides comprehensive diagnostic, therapeutic, and follow-up services for patients with IBDs, including UC.

2.3. Ethical Consideration

Ethical approval was granted by the Scientific Research Ethics Committee of Raparin University (meeting number 6 on August 15, 2024). Formal authorization was subsequently obtained from the Directorate of Health in Sulaimani and the administration of the Gastroenterology and Hepatology Teaching Hospital. The objectives and methodologies of the research were explained to all participants. Confidentiality was assured, and written informed consent was obtained. Participation was voluntary, and participants were free to withdraw at any point without penalty.

2.4. Instrument of the Study

Data were collected using a structured, validated questionnaire developed specifically for this study and pre-tested to ensure clarity, content validity, cultural relevance, and sensitivity. Validation was conducted by a panel of 22 experts in nursing, gastroenterology, and health education. The questionnaire comprised the following domains.

The questionnaire comprised the following domains:

- Sociodemographic and clinical characteristics: This included age, gender, marital status, education, occupation, income, residence, duration of illness, age at diagnosis, and family history of UC.
- Patient education about UC: This section included 12 items that assessed the patient's understanding of the disease, its symptoms, and its management.

Lifestyle questionnaire: It consists of three parts

- Dietary habits questionnaire: Thirteen modified items adapted from Fauze (2022), assessed the frequency of consuming common foods and beverages (e.g., tea, coffee, sugary drinks, fried and spicy foods, fruits, vegetables, high-fiber foods, saturated fats) as well as meal patterns and daily water intake Main question: Do patients follow healthy dietary practices appropriate for UC?

Physical activity: Six modified items from the international

- Physical activity: Six modified items from the international physical activity questionnaire (IPAQ) developed by Craig *et al.* (2003) [17], evaluated engagement in vigorous and moderate physical activities and walking frequency and duration.

Main question: What is the level and intensity of physical activity among patients with UC.

- Psychosocial status and quality of life: A modified version of the short IBD questionnaire originally developed by Irvine (1996) [18], assessed emotional well-being, social

functioning, daily activities, and perceived support over the previous 2 weeks.

Main question: How does UC affect patients' psychological well-being, social life, and daily functioning?

2.5. Scoring and Interpretation

Scores on lifestyle and adherence were interpreted using Bloom's cut-off points, which indicates:
Good (75–100%)
Fair (50–74%)
Poor (<50%).

This standardized scoring system allowed for the precise quantification and comparison of the knowledge, behaviors, and lifestyle practices of respondents in both study groups. Score Outcomes in the positive range indicated higher performance levels on activities, including. It includes physical exercise, dietary management, psychosocial well-being, and control of symptoms.

2.6. Validity

To establish content validity, the study instrument was reviewed by 22 experts in gastroenterology nursing, adult nursing, medicine, pharmacology, psychology, and health education, ensuring the tool was clear, culturally appropriate, and aligned with study objectives. Minor modifications were made based on expert feedback. So far, the modifications have been employed, and the final copy of the instrument is completed and has become a valid and appropriate tool for data collection.

2.7. Pilot Study

A pilot study with 20 patients was subsequently conducted. It took place from July 14 to July 28, 2024. The results of the pilot study are finished. Pilot participants were excluded from the final study to prevent data contamination. Furthermore, the pilot study attempted to reach the following objectives: Enhance validity and reliability, confirm clarity and modify as necessary, and determine preliminary time requirement.

2.8. Reliability

Reliability analysis yielded a Cronbach's alpha, which was used for the determination of the reliability of the study instrument. The result of the Cronbach's alpha was 0.83, indicating strong internal consistency.

2.9. Data Collection Procedure

Participants were recruited during routine clinic visits. After obtaining written informed consent, data were collected via face-to-face interviews. The intervention group received a structured nurse-led educational program on lifestyle modification and self-management; the educational program was translated into the patients' native language and provided in printed form for easy comprehension and use. While the control group received standard care. Follow-up assessments were conducted at 8 weeks post-intervention.

The educational program was delivered using a combination of printed brochures, PowerPoint presentations, and interactive discussions to ensure clear understanding and engagement. In addition, an online channel was also established to maintain ongoing communication with patients, allowing continuous support, guidance, and follow-up beyond the in-person sessions. Due to the nature of the educational intervention, participants and data collectors could not be blinded to group assignment; however, data analysis was performed by a researcher blinded to group allocation to reduce potential bias.

2.10. Statistical Analysis

Statistical analysis was conducted using IBM Statistical Package for Social Sciences Statistics (Version 24). Descriptive statistics, including frequencies and percentages for categorical variables and means and standard deviations for continuous variables, were used to summarize the data. Inferential analyses, specifically the Chi-square test, Independent Samples *t*-tests, and analysis of variance, were employed to evaluate differences between groups. The threshold for statistical significance was established at *P*-value: Very highly significant ($P < 0.000$), highly significant ($P < 0.001$), significant ($P < 0.05$), non-significant ($P > 0.05$).

3. RESULTS

Table 1 presents the sociodemographic characteristics of participants in the intervention and control groups. Most participants in both groups were aged 25–50 years (60.0% vs. 48.0%), with no significant difference ($P = 0.334$). Gender distribution showed a significant association ($P = 0.022$): Females predominated in the intervention group (61.3%), whereas males were more frequent in the control group (57.3%). Residence also differed significantly ($P = 0.029$), with a higher proportion of urban residents in the intervention group (66.7%) and suburban residents in the control group (50.7%). No significant differences were observed between groups in terms of marital status, education, occupation, economic status, smoking, or alcohol use

TABLE 1: Sociodemographic characteristics of patients with ulcerative colitis in the intervention and control groups

Variable	Category	Pre-intervention *n* (%)		*P*-value	Post-intervention *n* (%)		*P*-value
		Intervention (*n*=76)	Control (*n*=76)		Intervention (*n*=75)	Control (*n*=75)	
Age (years)	<25	8 (10.5)	11 (14.5)	0.338	8 (10.7)	11 (14.7)	0.334
	25–50	46 (60.6)	37 (48.7)		45 (60.0)	36 (48.0)	
	>50	22 (28.9)	28 (36.8)		22 (29.3)	28 (37.3)	
	Mean±SD	41.05±12.70	43.21±13.80	—	41.10±12.80	43.20±13.90	—
Gender	Male	29 (38.2)	43 (56.6)	0.023	29 (38.7)	43 (57.3)	0.022
	Female	47 (61.8)	33 (43.4)		46 (61.3)	32 (42.7)	
Residence	Urban	50 (65.8)	36 (47.4)	0.046	50 (66.7)	35 (46.7)	0.029
	Sub-urban	23 (30.3)	38 (50.0)		22 (29.3)	38 (50.7)	
	Rural	3 (3.9)	2 (2.6)		3 (4.0)	2 (2.7)	
Marital status	Single	13 (17.1)	19 (25.0)	0.240	13 (17.3)	19 (25.3)	0.240
	Married	58 (76.3)	55 (72.4)		57 (76.0)	54 (72.0)	
	Widowed	2 (2.6)	2 (2.6)		2 (2.7)	2 (2.7)	
	Divorced	3 (3.9)	0 (0.0)		3 (4.0)	0 (0.0)	
Education level	Illiterate	11 (14.5)	14 (18.4)	0.308	11 (14.7)	14 (18.7)	0.315
	Read and write	3 (3.9)	6 (7.9)		3 (4.0)	6 (8.0)	
	Primary	20 (26.3)	15 (19.7)		20 (26.7)	14 (18.7)	
	Intermediate	11 (14.5)	17 (22.4)		11 (14.7)	17 (22.7)	
	Secondary	6 (7.9)	8 (10.5)		6 (8.0)	8 (10.7)	
	Institute/college	25 (32.9)	15 (19.7)		24 (32.0)	15 (20.0)	
	MSc/PhD	0 (0.0)	1 (1.3)		0 (0.0)	1 (1.3)	
Occupation	Government employee	19 (25.0)	19 (25.0)	0.851	19 (25.3)	19 (25.3)	0.851
	Private employee	1 (1.3)	0 (0.0)		1 (1.3)	0 (0.0)	
	Self-employed	10 (13.2)	13 (17.1)		10 (13.3)	13 (17.3)	
	Retired	5 (6.6)	4 (5.3)		5 (6.7)	4 (5.3)	
	Housewife	29 (38.2)	29 (38.2)		28 (37.3)	28 (37.3)	
	Unemployed	7 (9.2)	4 (5.3)		7 (9.3)	4 (5.3)	
	Student	5 (6.6)	7 (9.2)		5 (6.7)	7 (9.3)	
Economic status	Insufficient	35 (46.1)	41 (53.9)	0.506	34 (45.3)	40 (53.3)	0.502
	Barely sufficient	39 (51.3)	32 (42.1)		39 (52.0)	32 (42.7)	
	Sufficient	2 (2.6)	3 (3.9)		2 (2.7)	3 (4.0)	
Smoking status	Never smoker	47 (61.8)	40 (52.6)	0.242	46 (61.3)	39 (52.0)	0.240
	Passive smoker	8 (10.5)	4 (5.3)		8 (10.7)	4 (5.3)	
	Ex-smoker	16 (21.1)	24 (31.6)		16 (21.3)	24 (32.0)	
	Present smoker	5 (6.6)	8 (10.5)		5 (6.7)	8 (10.7)	
Alcohol consumption	No	73 (96.1)	73 (96.1)	—	72 (96.0)	72 (96.0)	—

Chi-square test, (–) = Not applicable. SD: Standard deviation

($P > 0.05$). Overall, gender and place of residence were the only sociodemographic variables that differed significantly between groups.

Table 2 summarizes the clinical characteristics of patients with UC. Most participants had a disease duration of 1–10 years (60.0% of cases, 68.0% of controls), with no significant difference between groups ($P = 0.588$). Young-onset disease was more common among cases (42.7%) than controls (28.0%), while middle-age onset predominated in controls (58.7% vs. 52.0%), but these differences were not significant ($P = 0.076$). A positive family history was reported more frequently in cases (24.0%) than controls (10.7%), approaching significance ($P = 0.075$). Prior hospitalizations (≈50%), surgical history, and comorbidities were comparable across groups (all $P > 0.05$).

Overall, none of the baseline clinical characteristics differed significantly between cases and controls.

Table 3 presents the comparison of mean total scores for healthy lifestyle practices between the intervention and control groups at pre- and post-intervention stages. At the pre-intervention stage, the mean total score for the intervention group was 41.61 (standard deviation [SD] = 11.25), and for the control group, it was 44.37 (SD = 9.53). The $P = 0.105$ indicates no statistically significant difference between the groups at baseline. At the post-intervention stage, the

TABLE 2: Baseline clinical characteristics of patients with Ulcerative colitis in the intervention and control groups

Baseline clinical characteristics	Category	Pre-intervention Intervention *n* (%)	Control *n* (%)	*P*-value	Post-intervention Intervention *n* (%)	Control *n* (%)	*P*-value
Duration of ulcerative colitis (years)	6 months–1 year	8 (10.5)	6 (7.9)	0.591	8 (10.7)	6 (8.0)	0.588
	1–10 years	46 (60.5)	52 (68.4)		45 (60.0)	51 (68.0)	
	>10 years	22 (28.9)	18 (23.7)		22 (29.3)	18 (24.0)	
Age at first diagnosis (years)*	Young onset	33 (43.4)	21 (27.6)	0.059	32 (42.7)	21 (28.0)	0.076
	Middle-age onset	39 (51.3)	45 (59.2)		39 (52.0)	44 (58.7)	
	Late onset	4 (5.3)	10 (13.2)		4 (5.3)	10 (13.3)	
Family history of ulcerative colitis	No	56 (73.7)	67 (88.2)	0.076	55 (73.3)	66 (88.0)	0.075
	Yes	18 (23.7)	8 (10.5)		18 (24.0)	8 (10.7)	
	I don't know	2 (2.6)	1 (1.3)		2 (2.7)	1 (1.3)	
Previous hospital admission for UC	No	41 (53.9)	37 (48.7)	0.516	40 (53.3)	37 (49.3)	0.624
	Yes	35 (46.1)	39 (51.3)		35 (46.7)	38 (50.7)	
History of UC-related surgery	No	58 (76.3)	52 (68.4)	0.276	57 (76.0)	52 (69.3)	0.360
	Yes	18 (23.7)	24 (31.6)		18 (24.0)	23 (30.7)	
Presence of another chronic disease	No	55 (72.4)	55 (72.4)	—	54 (72.0)	54 (72.0)	—
	Yes	21 (27.6)	21 (27.6)		21 (28.0)	21 (28.0)	
Total		76 (100.0)	76 (100.0)		75 (100.0)	75 (100.0)	

Chi-square test, (–) = Not applicable

TABLE 3: Comparison of mean healthy lifestyle total scores between the intervention and control groups before and after the educational program

Group	n (Pre)	Mean score % (Pre)	SD (Pre)	P-value (Pre)	n (Post)	Mean score % (Post)	SD (Post)	P-value (Post)
Intervention	76	41.61	11.25	0.105	75	70.20	6.99	<0.001
Control	76	44.37	9.53		75	39.14	8.45	

Chi-square test

intervention group showed a substantial improvement, with a mean score of 70.20 (SD = 6.99), compared to 39.14 (SD = 8.45) for the control group. The $P = 0.000$ indicates a highly significant difference between the groups after the intervention.

Table 4 presents the association between the intervention and control groups in relation to healthy lifestyle practices, measured at pre- and post-intervention stages. At the pre-intervention stage, most participants in both groups were categorized as having a "poor" healthy lifestyle (Intervention: 78.9%; Control: 67.1%), and 21.1% of the intervention group versus 32.9% of the control group were classified as "fair." No participants were classified as "good" in any group. The p-value of 0.1001 indicates no significant difference between the groups before the intervention. The post-intervention stage presented an astounding shift in the intervention group: 1.3% were classified as "poor, 78.7% were "fair", and 20.0% of the population attained a "good" healthy lifestyle. In contrast, the control group largely remained in the "poor" category (89.3%), with only 10.7% classified as "fair" and none as "good." The $P = 0.000$ indicates a highly significant difference between the groups after the intervention.

Table 5 presents mean scores across seven domains—Physical Activity, Diet and UC, Symptom Management, Psychosocial, Overall Healthy Lifestyle, and Information on Ulcerative – at pre- and post-intervention stages.

3.1. Pre-Intervention

The groups were generally comparable at baseline. Physical Activity scores were 13.49 versus 13.71 (Intervention vs.

Control, $P = 0.932$), Diet 40.38 versus 44.23 ($P = 0.049$), Symptom Management 56.26 versus 54.58 ($P = 0.551$), Psychosocial 56.32 versus 64.96 ($P = 0.002$), Overall Healthy Lifestyle 41.61 versus 44.37 ($P = 0.105$), and knowledge on UC 17.53 versus 20.12 ($P = 0.071$). Small differences were noted in diet and psychosocial scores, but overall groups were comparable.

3.2. Post-Intervention

The Intervention group improved significantly across all domains: Physical Activity 58.44 versus 8.11, Diet 78.84 versus 37.13, Symptom Management 89.26 versus 50.10, Psychosocial 90.27 versus 55.60, Overall Healthy Lifestyle 70.20 versus 39.14, and Knowledge on UC 87.41 versus 22.08. These results demonstrate the effectiveness of enhancing knowledge and lifestyle behaviors.

Table 6 shows the association between the Intervention and Control groups across seven domains at pre- and post-intervention stages.

3.3. Pre-Intervention

Most participants in both groups had Poor levels across domains. For example, Physical Activity Poor: 94.7% in both groups; Diet Poor: 84.2% Intervention versus 65.8% Control ($P = 0.021$); Psychosocial Poor: 36.84% Intervention versus 10.53% Control ($P = 0.001$). Other domains, including Symptom Management, Overall Healthy Lifestyle, and Information on UC, showed no significant differences. Overall, groups were generally comparable, with minor differences in Diet and Psychosocial factors.

The intervention group demonstrated significant improvements. Physical Activity Poor dropped to 13.3% in the intervention group as compared to 100% in the control group ($P = 0.023$). The rate of Good Diet attainment in the intervention group reached 68.0% compared to 0% in the control group ($P < 0.05$). Fair and Good levels also markedly increased in other domains, demonstrating the effectiveness of the intervention.

4. DISCUSSION

The findings of the present study highlight the importance of patient education in the management of UC. Given the chronic and relapsing nature of UC, sustained adherence to treatment remains a major challenge, often influenced by

TABLE 4: Association between study groups and healthy lifestyle levels before and after the intervention

Healthy lifestyle level	Pre-intervention			*P*-value	Post-intervention			*P*-value
	Intervention *n* (%)	Control *n* (%)	Total *n* (%)		Intervention *n* (%)	Control *n* (%)	Total *n* (%)	
Poor	60 (78.9)	51 (67.1)	111 (73.0)	0.100	1 (1.3)	67 (89.3)	68 (45.3)	<0.001
Fair	16 (21.1)	25 (32.9)	41 (27.0)		59 (78.7)	8 (10.7)	67 (44.7)	
Good	0 (0.0)	0 (0.0)	0 (0.0)		15 (20.0)	0 (0.0)	15 (10.0)	
Total	76 (100)	76 (100)	152 (100)		75 (100)	75 (100)	150 (100)	

Chi-square test

TABLE 5: Comparison of mean percentage scores of patients' knowledge and healthy lifestyle domains between the intervention and control groups before and after the educational program

Domain	Group	Pre-intervention			*P*-value	Post-intervention			*P*-value
		n	Mean score (%)	SD		*n*	Mean score (%)	SD	
Physical activity	Intervention	76	13.49	16.10	0.932	75	58.44	13.39	<0.001
	Control	76	13.71	15.38		75	8.11	11.46	
Diet and ulcerative colitis	Intervention	76	40.38	10.81	0.049	75	78.84	8.82	<0.001
	Control	76	44.23	12.99		75	37.13	13.11	
Symptom management	Intervention	76	56.26	17.18	0.551	75	89.26	10.30	<0.001
	Control	76	54.58	17.48		75	50.10	17.03	
Psychosocial domain	Intervention	76	56.32	18.53	0.002	75	90.27	10.72	<0.001
	Control	76	64.96	15.34		75	55.60	17.49	
Overall healthy lifestyle	Intervention	76	41.61	11.25	0.105	75	70.20	6.99	<0.001
	Control	76	44.37	9.53		75	39.14	8.45	
Knowledge of ulcerative colitis	Intervention	76	17.53	9.13	0.071	75	87.41	8.07	<0.001
	Control	76	20.12	8.43		75	22.08	9.34	

Independent samples t-test. SD: Standard deviation

TABLE 6: Association between intervention and control groups regarding knowledge of Ulcerative colitis and healthy lifestyle levels before and after the educational program

Domain	Level	Pre- intervention			*P*-value	Post-intervention			*P*-value
		Intervention *n* (%)	Control *n* (%)	Total *n* (%)		Intervention *n* (%)	Control *n*(%)	Total *n* (%)	
Physical activity	Poor	72 (94.7)	72 (94.7)	144 (94.7)	—	10 (13.3)	75 (100.0)	85 (56.7)	0.023
	Fair	4 (5.3)	4 (5.3)	8 (5.3)		55 (73.4)	0 (0.0)	55 (36.6)	
	Good	0 (0.0)	0 (0.0)	0 (0.0)		10 (13.3)	0 (0.0)	10 (6.7)	
Diet and ulcerative colitis	Poor	64 (84.2)	50 (65.8)	114 (75.0)	0.021	0 (0.0)	63 (84.0)	63 (42.0)	<0.001
	Fair	12 (15.8)	24 (31.6)	36 (23.7)		24 (32.0)	12 (16.0)	36 (24.0)	
	Good	0 (0.0)	2 (2.6)	2 (1.3)		51 (68.0)	0 (0.0)	51 (34.0)	
Symptom management	Poor	24 (31.6)	30 (39.5)	54 (35.5)	0.569	0 (0.0)	37 (49.3)	37 (24.6)	<0.001
	Fair	42 (55.3)	36 (47.4)	78 (51.3)		11 (14.7)	32 (42.7)	43 (28.7)	
	Good	10 (13.2)	10 (13.2)	20 (13.2)		64 (85.3)	6 (8.0)	70 (46.7)	
Psychosocial domain	Poor	28 (36.8)	8 (10.5)	36 (23.7)	0.001	0 (0.0)	27 (36.0)	27 (18.0)	<0.001
	Fair	36 (47.4)	47 (61.8)	83 (54.6)		6 (8.0)	37 (49.3)	43 (28.7)	
	Good	12 (15.8)	21 (27.6)	33 (21.7)		69 (92.0)	11 (14.7)	80 (53.3)	
Overall healthy lifestyle	Poor	60 (78.9)	51 (67.1)	111 (73.0)	0.101	1 (1.3)	67 (89.3)	68 (45.3)	<0.001
	Fair	16 (21.1)	25 (32.9)	41 (27.0)		59 (78.7)	8 (10.7)	67 (44.7)	
	Good	0 (0.0)	0 (0.0)	0 (0.0)		15 (20.0)	0 (0.0)	15 (10.0)	
Knowledge of ulcerative colitis	Poor	75 (98.7)	76 (100.0)	151 (99.3)	0.316	0 (0.0)	73 (97.3)	73 (48.7)	<0.001
	Fair	1 (1.3)	0 (0.0)	1 (0.7)		5 (6.7)	2 (2.7)	7 (4.7)	
	Good	0 (0.0)	0 (0.0)	0 (0.0)		70 (93.3)	0 (0.0)	70 (46.6)	
Total		76 (100)	76 (100)	152 (100)		75 (100)	75 (100)	150 (100)	

Fisher's exact test

complex therapeutic regimens, limited disease knowledge, and psychosocial factors. The educational intervention implemented in this study addressed these barriers by enhancing patients' understanding of the disease, strengthening self-efficacy, and supporting shared decision-making, which may explain the observed improvements in adherence and lifestyle practices. Similar studies have reported that structured educational strategies are associated with better treatment adherence and improved clinical outcomes in patients with UC [19]. Before the intervention, both groups demonstrated poor baseline knowledge regarding UC, consistent with findings from Egypt [9]. Following the nurse-led educational program, the intervention group showed marked improvements across all knowledge domains, while no meaningful change was observed in the control group. These results support international evidence demonstrating the effectiveness of structured education in improving disease understanding and self-management among UC patients.

Lifestyle behaviors, particularly dietary adherence and physical activity, also improved significantly after the intervention. Similar improvements have been reported in regional studies from Baghdad and Egypt, where educational programs positively influenced diet adherence and physical activity levels [9], [11]. Although dietary modification is important, present ESPEN guidelines caution against overly restrictive diets during remission, emphasizing balanced and individualized approaches.

Psychosocial well-being improved substantially in the intervention group, with significant reductions in distress, consistent with international evidence linking education-based interventions to improved mental health outcomes [9]. Finally, the intervention group demonstrated significantly better overall healthy lifestyle practices compared with the control group, reinforcing the role of nurse-led education as an effective, low-cost strategy for comprehensive UC management.

In the present study, participants had a mean age in the early forties, which is slightly younger than reports from regional studies in Mosul and South India, where mean ages ranged from 46 to 49 years [20], [21]. This difference may reflect earlier diagnosis or increased healthcare access in the study setting. Female predominance in the intervention group aligns with previous Iraqi data, although gender distributions vary internationally, suggesting possible sociocultural influences on healthcare utilization.

The mean ages of the intervention and control group patients were 41.11 ± 12.8 and 43.2 ± 13.9, respectively. Most participants aged were between 25 and 50 years old.

This mean age was slightly younger than that reported in other studies in the region, which were 46.3 years in Mosul and 49.3 years in South India, respectively [20], [21]. The intervention group had 61.3% females and 38.7% males, while the control group had 42.7% females and 57.3% males, in contrast to previous findings in Iraq by [8].

In terms of marital status, the majority of the participants from both groups were married. The intervention group had a 76% response rate, while the Control group had a 72% response rate, which corresponds to the marital status reported in other studies from the region [22], [23]. Urban residency was more common within the intervention group (66.7%) than among the control group (46.7%), which again is consistent with findings in Baghdad [8]. Income distribution varied, with less than half of the intervention group and more than half of the control group reporting insufficient income, which differs from the findings in Al-Najaf, Iraq (2024) [6].

Medical history analysis showed that more than half of cases and controls had UC for 1–10 years (60.0% of the intervention group and 68.0% of controls). This finding is consistent with the results of Van Gennep *et al.* (2021), who reported that over half of their participants had been diagnosed with UC for over 11 years [24].

A negative family history of UC was more prevalent among participants in the intervention group and the control group. This finding is inconsistent with the results reported by [20], but differs from other studies, in which most participants lacked a family history, and found that 82.5% of their study population had no family history of the disease [9]. Approximately one-quarter of participants in the present study reported a contributory family history.

Before the educational program, nearly all participants in both groups had limited knowledge regarding UC pathophysiology, symptoms, complications, and dietary management. Following the implementation of the nurse-led educational program, the intervention group showed considerable improvements in all the knowledge areas, with increases of more than 50% in each of the knowledge items. On the other hand, the control group experienced no change. These were also consistent with previous studies where improved knowledge was realized among patients after the intervention [9], [25].

The dietary pattern of participants showed significant variations in the consumption of tea and coffee, milk and dairy products, fatty and fried foods, and fruits and vegetables. As some nutrients dietary balance is crucial to patient self-managed care that alleviates intestinal inflammation and swelling associated with UC. Before the program, results showed most of the participants in both the intervention group (84.2%) and the control group (65.8%) had poor dietary balance adherence to the prescribed diet.

Whereas in the intervention group, after intervention, 68% achieved good adherence, the control group showed slight variation. This finding is in agreement with the findings from previous studies on the effects of educational programs on adherence to a prescribed diet [8], [26]. However, despite these associations, evidence so far remains inconclusive, and present guidelines from 2020 by ESPEN advise against strict dietary restrictions during remission [27].

Diet is considered one of the most important modifiable factors affecting the course of IBD. Various studies report that red meat, dairy products, and processed foods may worsen the illness, whereas fruits, legumes, and chicken are protective. Indeed, their findings agree with the 2025 review, which describes symptom-exacerbating foods as including red meat, dairy, and processed foods, but fruits, beans, and chicken aid in prevention [26].

Physical activity level was similarly impacted. Initially, the present study indicated that before the program, almost all participants had low levels of physical activity in both groups, with none reporting high physical activity. Post-intervention, moderate-level PA was achieved in the intervention group (73.4%). While the control group showed no improvement. At baseline, there was no statistically significant difference in the level of physical activity between the participants in the intervention group and those in the control group. A clinically significant difference was observed after the intervention ($P = 0.023$). This is consistent with the study [9], which found that physical activity was higher in the intervention group.

Improvement in psychosocial outcomes was also observed post-education. In pre-nurse-led education, less than half of the intervention group and just over half of the control group reported moderate psychosocial problems. After the intervention, 92.2% of the intervention group reported low psychosocial distress, and minimal upgrades in distress were shown in the control group. The difference in the psychological status of the groups was significant, $P \leq 0.000$. These results align with Mohamed *et al.* (2022), where improvements in educational interventions are also related to psychosocial well-being and stress management.

The intervention was also effective in the management of symptoms. At baseline, bowel symptoms in both groups were similar ($P = 0.569$) and were characterized by a reduced frequency of stool with more consistency and a decreased urge to defecate. These findings are in agreement with the literature on the role of patient education and communication, particularly about sensitive symptoms that patients experience with UC [28]. This communication gap is of great magnitude since patients often do not express these sensitive symptoms and tend to lean toward unsanctioned online sources, which also demands a more proactive approach in communication from the health system itself [29].

Finally, the intervention group showed the best improvement in healthy lifestyle habits. At baseline, all groups had low adherence to healthy lifestyles. More than two-thirds of the intervention group reached a moderate level and more than a quarter a healthy lifestyle during the intervention, while in the control group, the majority sustained a poor lifestyle, which led to a very significant difference between the two groups at the time of the intervention program ($P < 0.001$). These findings are in line with previous research by Abdelwahab *et al.* (2021), describing the effectiveness of educational interventions on lifestyle changes in patients with UC [10]. From the researcher's point of view, the benefits of daily healthy habits are an improvement in the individual's health and the prevention of more serious health problems.

5. CONCLUSION

In this quasi-experimental, single-center study, the nurse-led educational program was associated with significant improvements in patients' knowledge, dietary habits, physical activity, psychosocial well-being, symptom management, and overall lifestyle adherence. These findings suggest that structured, nurse-led education may enhance self-management and treatment adherence among patients with UC in similar clinical settings. Further multi-center studies are needed to confirm these results and evaluate their generalizability.

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REFERENCES

[1] Z. Khademi, P. Saneei, A. Hassanzadeh-Keshteli, H. Daghaghzadeh, H. Tavakkoli, P. Adibi and A. Esmaillzadeh. "Association between inflammatory potential of the diet and ulcerative colitis: A case-control study". *Frontiers in Nutrition*, vol. 7, p. 602090, 2020.

[2] M. Zhou, J. He, Y. Shen, C. Zhang, J. Wang and Y. Chen. "New frontiers in genetics, gut microbiota, and immunity: A Rosetta stone for the pathogenesis of inflammatory bowel disease". *BioMed Research International*, vol. 2017, p. 8201672, 2017.

[3] M. E. Mohamed, S. A. Elsayed, H. R. Madkor, H. M. S. Eldien and O. M. Mohafez. "Yarrow oil ameliorates ulcerative colitis in mice model via regulating the NF-κB and PPAR-γ pathways". *Intestinal Research*, vol. 19, no. 2, pp. 194-205, 2021.

[4] J. Langhorst, M. Schöls, Z. Cinar, R. Eilert, K. Kofink, A. Paul, *et al*. "There is more than pharmacology: Comprehensive lifestyle-modification in patients with ulcerative colitis - A randomized controlled trial". *Advances in Integrative Medicine*, vol. 6, p. S137, 2019.

[5] H. Meyiz, Y. Ait Ahmad, H. Ouaya and I. Mellouki. "Evaluation of quality of life in patients treated for inflammatory bowel disease: A cross-sectional study of 100 cases". *Scholars Journal of Applied Medical Sciences*, vol. 7, pp. 1278-1283, 2023.

[6] R. M. M. Al Karaawi and J. J. Kadhim. "Identifying risk factors of patients with ulcerative colitis". *Kufa Journal for Nursing Sciences*, vol. 14, no. 1, pp. 209-218, 2024.

[7] T. Kucharzik, A. U. Dignass, R. Atreya, B. Bokemeyer, P. Esters, K. Herrlinger, *et al*. "Updated S3-guideline colitis ulcerosa: German society for digestive and metabolic diseases (DGVS)". *Zeitschrift Für Gastroenterologie*, vol. 56, no. 9, pp. 1087-1169, 2018.

[8] F. Fauze. "Effectiveness of an instructional program on patients with ulcerative colitis adherence for medication and diet to prevent colorectal cancer: Case and control study". *Iraqi National Journal of Nursing Specialties*, vol. 35, no. 1, pp. 70-81, 2022.

[9] N. A. E. Mohamed, A. L. Ahmed and S. M. Elhadary. "Effect of lifestyle modification on the health status for patients with ulcerative colitis". *Egyptian Journal of Nursing and Health Sciences*, vol. 3, no. 1, pp. 45-67, 2022.

[10] D. A. Abdelwahab, S. M. Alaa El-deen, A. E. Rezian and A. Elhkouly. "Effect of implementing evidence-based guidelines on lifestyle modification for adult patients with renal stone undergoing ESWL procedure". *Egyptian Journal of Nursing and Health Sciences*, vol. 2, no. 1, pp. 13-52, 2021.

[11] E. Abd Elkhalek Mekky, M. Moustafa Ragheb, H. Ahmed Mohamed Hassan and A. Tolba Fathy. "Effect of educational program on ulcerative colitis patients' knowledge and their clinical outcomes". *Journal of Nursing Science Benha University*, vol. 6, no. 2, pp. 294-315, 2025.

[12] A. Testa, F. Castiglione, O. M. Nardone and G. L. Colombo. "Adherence in ulcerative colitis: An overview". *Patient Preference and Adherence*, vol. 11, pp. 297-303, 2017.

[13] L. Alvestad, L. P. Jelsness-Jørgensen, R. Goll, A. Clancy, T. Gressnes, P. C. Valle and A. R. Broderstad. "Health-related quality of life in inflammatory bowel disease: A comparison of patients receiving nurse-led versus conventional follow-up care". *BMC Health Services Research*, vol. 22, p. 1602, 2022.

[14] G. D. Smith, R. Watson, D. Roger, E. McRorie, N. Hurst, W. Luman and K. R. Palmer. "Impact of a nurse-led counselling service on quality of life in patients with inflammatory bowel disease". *Journal of Advanced Nursing*, vol. 38, no. 2, pp. 152-160, 2002.

[15] N. J. Pender, C. L. Murdaugh and M. A. Parsons. "*Health Promotion in Nursing Practice*". 6th ed. Pearson, Boston, MA, USA, 2011.

[16] A. Bashir and A. Ahmad. "The effectiveness of nurse-led interventions on chronic disease management". *International Journal of Midwifery and Nursing Practice*, vol. 7, no. 1, pp. 18-21, 2024.

[17] C. L. Craig, A. L. Marshall, M. Sjöström, A. E. Bauman, M. L. Booth, B. E. Ainsworth, M. Pratt, U. Ekelund, A. Yngve, J. F. Sallis and P. Oja. "International physical activity questionnaire: 12-country reliability and validity". *Medicine and Science in Sports and Exercise*, vol. 35, no. 8, pp. 1381-1395, 2003.

[18] E. J. Irvine, Q. Zhou and A. K. Thompson. "The short inflammatory bowel disease questionnaire: A quality of life instrument for community physicians managing inflammatory bowel disease. CCRPT investigators. Canadian Crohn's relapse prevention trial". *American Journal of Gastroenterology*, vol. 91, no. 8, pp. 1571-1578, 1996.

[19] Z. S. Manzari, M. S. Ghaderi, H. Vossoughinia, H. Rafiei and M. H. Mafi. "Comparison of the effect of self-care education with two methods, teach-back and smartphone application, on the adherence to treatment in patients with inflammatory bowel disease". *Saudi Journal of Gastroenterology*, vol. 30, no. 6, pp. 407-415, 2024.

[20] M. Babakir-Mina. "Epidemiological and clinical aspects of ulcerative colitis in Mosul city, Iraq". *Kurdistan Journal of Applied Research*, vol. 4, p. 56-66, 2019.

[21] S. Gunisetty, S. K. Tiwari, A. Bardia, M. Phanibhushan, V. Satti, M. A. Habeeb and A. A. Khan. "The epidemiology and prevalence of ulcerative colitis in the South of India," *Open Journal of Immunology*, vol. 2, no. 4, pp. 144-148, 2012.

[22] M. S. Alnaffakh, H. G. Alnassar and B. R. Mohammed Ali. "Self-care among ulcerative colitis patients," *Journal of Scientific Research in Medical and Biological Sciences*, vol. 4, no. 4, pp. 23-30, 2023.

[23] W. El-Matary, B. Dufault, S. P. Moroz, J. Schellenberg and C. N. Bernstein. "Education, employment, income, and marital status among adults diagnosed with inflammatory bowel diseases during childhood or adolescence". *Clinical Gastroenterology and Hepatology*, vol. 15, no. 4, pp. 518-524, 2017.

[24] S. Van Gennep, N. K. De Boer, M. E. Gielen, S. T. Rietdijk, K. B. Gecse, C. Y. Ponsioen, M. Duijvestein, G. R. D'Haens, M. Löwenberg and A. De Boer. "Impaired quality of working life in inflammatory bowel disease patients". *Digestive Diseases and Sciences*, vol. 66, no. 9, pp. 2916-2924, 2021.

[25] R. N. Shabaan, A. Hassaneen, H. Badran and S. El-Zayyadi. "Effect of educational instructions on knowledge of patients with ulcerative colitis". *Mansoura Nursing Journal*, vol. 9, no. 1, pp. 117-122, 2022.

[26] L. J. M. Koppelman, A. A. Oyugi, P. W. J. Maljaars and A. E. Van Der Meulen-De Jong. "Modifiable factors influencing disease flares in inflammatory bowel disease: A literature overview of lifestyle, psychological, and environmental risk factors". *Journal of Clinical Medicine,* vol. 17, p, 2296, 2025.

[27] S. C. Bischoff, J. Escher, X. Hébuterne, S. Kłęk, Z. Krznaric, S. Schneider, R. Shamir, K. Stardelova, N. Wierdsma, A. E. Wiskin and A. Forbes. "ESPEN practical guideline: Clinical nutrition in inflammatory bowel disease". *Clinical Nutrition*, vol. 39, no. 3, pp. 632-653, 2020.

[28] M. B. Van Der Waal, J. Flach, P. D. Browne, I. Besseling-Van Der Vaart, E. Claassen and L. H. Van De Burgwal. "Probiotics for improving quality of life in ulcerative colitis: Exploring the patient perspective". *PharmaNutrition*, vol. 7, p. 100139, 2019.

[29] T. Hibi, T. Ishibashi, Y. Ikenoue, R. Yoshihara, A. Nihei and T. Kobayashi. "Ulcerative colitis: Disease burden, impact on daily life, and reluctance to consult medical professionals: Results from a Japanese internet survey". *Inflammatory Intestinal Diseases*, vol. 5, no. 1, pp. 27-35, 2020.