

The Impact of MDT-Based Collaborative Nursing Education on Emotional Well-Being and Quality of Life in IBD Patients: A Randomized Controlled Trial

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Abstract

Introduction: Traditional discharge education for inflammatory bowel disease (IBD) patients tends to be brief and one-way, often leaving gaps in knowledge, self-care, and emotional support. The LEARNS model, a structured and interactive health education programme, may be more effective in addressing these needs and improving patient outcomes. **Objective:** To assess the impact of a LEARNS-based nursing education program on anxiety, depression, self-care ability, disease knowledge, and health-related quality of life in patients with inflammatory bowel disease. **Methods:** In a randomized controlled trial conducted at a tertiary hospital in 2024, 120 adult IBD inpatients were randomly assigned to either 12 weeks of LEARNS-based education combined with standard care (n = 60) or to standard care alone (n = 60). We assessed anxiety (Zung Anxiety Scale), depression (Zung Depression Scale), self-care ability (ESCA), disease knowledge (CCKNOW), and quality of life (IBDQ) at baseline and after 12 weeks of intervention. **Results:** After 12 weeks, the LEARNS group showed significantly lower anxiety (27.2 ± 5.0 vs. 32.0 ± 6.2 , $p < 0.001$) and depression (31.7 ± 7.6 vs. 36.8 ± 9.6 , $p = 0.012$) scores. Additionally, the LEARNS group had significantly higher self-care scores (130.2 ± 17.3 vs. 117.8 ± 13.6 , $p < 0.001$) and knowledge scores (15.6 ± 3.0 vs. 12.9 ± 2.6 , $p < 0.001$). However, there were no significant differences between the two groups in quality-of-life scores (IBDQ) ($p = 0.83$). **Conclusion:** The LEARNS health education model significantly improved anxiety, depression, self-care, and disease knowledge in IBD patients over 12 weeks. However, there was no significant improvement in quality of life, which highlights the need for further studies with longer follow-up to explore the long-term effects of the intervention. Integrating this patient-centered education approach into routine clinical practice can provide enhanced support for patients, but future multicenter studies with extended follow-up are necessary to confirm the lasting impact on quality of life.

Keywords:

Inflammatory Bowel Disease, Health Education, Self-Care Ability, Anxiety and Depression, Health-Related Quality of Life



INTRODUCTION

Inflammatory bowel disease (IBD), including Crohn's disease (CD) and ulcerative colitis (UC), is a group of chronic diseases that damage the digestive tract, commonly causing symptoms such as abdominal pain, diarrhea, and malnutrition. IBD is a long-term condition that currently has no cure (Aliu et al., 2024), and imposes a heavy economic burden on both the country and families. In an initial 10-year cohort study involving 1,321 IBD patients from eight European countries and Israel, the average medical cost was €1,871 per patient per year. IBD has become a global disease, with more than 1 million people in the United States and 2.5 million people in Europe estimated to have IBD. In recent years, the incidence of IBD has gradually increased in China (Gu et al., 2023).

The repeated occurrence of IBD, the heavy financial burden, and the lack of disease-related knowledge lead to negative emotions such as anxiety and depression. Studies have shown that up to one-third of IBD patients have symptoms of anxiety, and one-quarter exhibit symptoms of depression (Zhao & Chen, 2023). In addition, patients also exhibit multidimensional alienation experiences, including objective manifestations (sickness alienation, interpersonal alienation, self-alienation, labor alienation, environmental alienation) and subjective emotional perceptions (powerlessness, worthlessness, loneliness, world-weariness) (Gu et al., 2023). These negative emotions can aggravate the condition, increase the risk of disease activity, and complicate the clinical management of IBD (Chen et al., 2023).

Therefore, increasing disease-related knowledge to improve patients' psychological conditions and enhance self-care ability has become an urgent problem. Efficient and targeted health education can help patients acquire more disease-related knowledge, thereby improving their self-care abilities (Zhao et al., 2023). Good self-care can improve patients' medication compliance, alleviate symptoms, reduce the negative impact of the disease on individuals, and improve patients' quality of life. It can help reduce anxiety and depression symptoms in IBD patients, promote self-care behavior, improve clinical symptoms, and reduce the occurrence of readmissions (Hu, X., & Xu, L., 2024; Napolitano et al., 2024).

Currently, IBD management relies heavily on conventional health education models that often focus primarily on physical symptoms and medication adherence. However, traditional methods typically lack a psychosocial component, failing to adequately

address the emotional and self-care needs of patients. Traditional education often consists of brief, one-time oral instruction, which patients may passively memorize without truly internalizing or applying the information (Hao et al., 2022). Moreover, healthcare providers have limited mechanisms to assess whether patients comprehend and apply the information, leading to gaps in self-management (White et al., 2013).

The LEARNS model presents a novel and more comprehensive approach by integrating active, bidirectional information transfer, which not only educates patients but also evaluates their knowledge mastery and provides timely feedback. This process enhances the patient's understanding and corrects misconceptions, leading to improved disease cognition and self-management. The interactive learning component of LEARNS sets it apart from traditional methods, providing a dynamic and personalized learning environment that fosters patient engagement and behavior change. By addressing both psychological distress and self-care ability, LEARNS offers a more holistic approach to IBD care that targets both the mind and body (Su et al., 2023).

In contrast, most existing IBD education models focus narrowly on disease knowledge acquisition and medication adherence, often neglecting the psychosocial and emotional needs of patients. Research has shown that psychosocial interventions that address emotional well-being are crucial for improving overall disease outcomes, yet they are often underutilized in current IBD care practices (Tiles-Sar et al., 2025). The LEARNS model stands out by incorporating both disease-specific education and psychosocial support, helping IBD patients not only manage their condition but also improve their quality of life by reducing anxiety and depression (Liu et al., 2022).

Despite its success in other fields, such as heart failure, limb fractures, and shingles (Liu et al., 2022), the application of LEARNS in IBD care remains limited. Few studies have explored its effectiveness in addressing both emotional distress and self-care behavior in IBD patients. This study aims to fill this gap by investigating the impact of the LEARNS model on emotional well-being and self-care ability in IBD patients. The KABP (Knowledge, Attitude, Belief, Practice) theory forms the foundation of the LEARNS model, which facilitates behavior change through knowledge acquisition, belief formation, and behavioral modification (Chatterjee et al., 2020). By fostering patient engagement through interactive education, the LEARNS model aims to enhance self-management and medication adherence, ultimately improving quality of life for IBD patients.

METHODS

1. Design

This was a two-arm, parallel-group randomized controlled trial conducted to evaluate the impact of a LEARNS-based health education intervention on anxiety, depression, self-care ability, disease knowledge, and quality of life in patients with inflammatory bowel disease (IBD). Due to the nature of the intervention, blinding of participants and interventionists was not feasible. However, outcome assessors remained blinded to group allocation to minimize potential bias.

2. Sample Size and Sampling Technique

Setting

Participants in China were recruited from the Gastroenterology Department of Suining Central Hospital throughout 2024. IBD inpatients in the gastroenterology department were selected as the study participants.

Participants

We enrolled hospitalized adults (18-70 years) with endoscopically and histologically confirmed Crohn's disease or ulcerative colitis who demonstrated intact cognitive capacity and communication abilities. Exclusion criteria comprised: (1) major complications (intestinal obstruction, perforation, or malignancy); (2) life-threatening comorbidities; (3) physical disabilities limiting participation; or (4) recent (<6 months) enrollment in IBD education programs. All participants provided written informed consent.

Sample Size

The sample size calculation was performed using R Studio version 4.2.1 with the `pwr.t.test` function to calculate the sample size for t-tests comparing the intervention and control groups. Participants were selected based on the inclusion and exclusion criteria and voluntarily agreed to participate in the study. The study was conducted in the gastroenterology department of Suining Central Hospital throughout 2024. During this period, a total of 120 IBD inpatients were eligible. Of these, 2 patients declined to participate, and 11 patients did not meet the inclusion criteria. Specifically, 9 patients had severe complications, 1 patient had communication barriers, 2 patients had life-threatening malignant tumors, and another patient had participated in an IBD patient education program 6 months prior to the study.

For this study, the effect size (d) was set at 0.50, representing a moderate standardized difference between the means of the two groups. This value was determined based on previous empirical research and the anticipated variability within the study population. The significance level was set at 0.05, and the statistical power was established at 0.80

to ensure a sufficient probability of detecting a true effect. According to the sample size estimation conducted using the `pwr.t.test` function, a minimum of 51 participants per group was required. To account for an estimated 15-20% attrition rate due to loss to follow-up or incomplete data, the final sample size was increased to 60 participants per group. Therefore, the study ultimately enrolled 120 participants, with 60 in the intervention group and 60 in the control group. The study lasted for 12 weeks, and all questionnaires were completed by December 31, 2024.

Randomization and Masking

Participants were randomly assigned in a 1:1 ratio using a sequence generated from a table of random numbers by a research assistant not involved in the study. Group allocations were placed in sequentially numbered, opaque, sealed envelopes. When a participant was deemed eligible, the intervention manager opened the corresponding envelope to determine group assignment. Due to the nature of the app-based intervention, blinding of participants and interventionists was not feasible, as the intervention was easily identifiable to both parties. However, to ensure the rigor of the study design and minimize potential bias, outcome assessors remained blinded to group allocation throughout the study. The assessors were independent of the research team and were not involved in any aspects of participant recruitment or intervention delivery. This approach aimed to prevent any bias in the evaluation of primary and secondary outcomes, ensuring the objectivity of the results.

3. Instruments

Demographic Profile of Participants

The demographic profile of the participants includes: a) age, b) sex, c) highest educational level, d) type of employment, e) years since diagnosis, f) symptoms, g) marital status, h) average monthly income, i) whether they received IBD education within the last six months.

Self-Rating Anxiety Scale (SAS)

Developed by Zung in 1971, the SAS measures participants' subjective feelings of anxiety. The scale includes 20 items, divided into two categories: psychological and physiological factors. The 4-point Likert scale quantifies anxiety severity, with a total score that can indicate mild (50-59), moderate (60-69), or severe anxiety (70 or higher) (Wang et al., 2024). For this study, the Cronbach's alpha was calculated as 0.86.

Self-Rating Depression Scale (SDS)

Created by Zung in 1965, the SDS includes 20 items that assess somatic, psychological, psycho-affective, and psychomotor symptoms. It uses a 4-point Likert scale to measure depression severity. Scores ranging from 53 to 62 indicate mild depression, 63 to 72 moderate depression, and ≥ 73

severe depression (Zhou et al., 2020). In this study, Cronbach's alpha was 0.92.

Exercise of Self-Care Agency Scale (ESCA)

The ESCA, translated into Chinese in 2000, measures patients' self-care ability. It includes 43 items across four dimensions: health knowledge, self-concept, self-care responsibilities, and self-care skills. The scale shows high reliability (Cronbach's $\alpha = 0.77-0.92$), and scores above 113.52 indicate advanced self-care ability (Fu, 2022). In this study, the Cronbach's alpha was found to be 0.88.

IBDQ (Inflammatory Bowel Disease Questionnaire)

The IBDQ was developed by Graff et al. in 1999 to assess the quality of life in patients with IBD. The questionnaire includes four dimensions: bowel symptoms, physical health, emotional function, and social function, totaling 32 items. Each item is rated on a seven-point Likert scale, where 1 represents "very poor" and 7 represents "very good." The total score ranges from 32 to 224, with higher scores indicating better quality of life. The version has been validated, demonstrating good reliability and validity (Moskovitz et al., 2000). The Cronbach's alpha for the IBDQ in this study was 0.82.

Chinese version of CCKNOW (Crohn's and Colitis Knowledge Score)

The Chinese version of CCKNOW is a translated version of the original questionnaire developed by Eaden et al. in 1999, aimed at assessing the knowledge level of patients with inflammatory bowel disease (IBD). The questionnaire includes four dimensions: general knowledge, diet, medication, and complications, with a total of 24 items. Each item is a multiple-choice question, with 1 point for a correct answer and 0 points for an incorrect answer. The total score ranges from 0 to 24, with higher scores indicating better knowledge. The Chinese version of CCKNOW has been validated, showing good internal consistency and reliability (Zhu et al., 2013). For this study, the Cronbach's alpha was calculated as 0.91.

4. Intervention

Control Group

The control group received standard care, including adherence to prescribed medication regimens, general health education on medication use, basic dietary advice, and disease monitoring. Nurses provided guidance on lifestyle modifications, ensured medication adherence, and explained the importance of continuing treatment. In addition, patients were advised to avoid spicy foods, maintain a balanced diet, and engage in moderate physical activity. The main focus was on basic disease management and ensuring proper follow-up care. The control group did not receive personalized, systematic health education content, and the intervention was limited to conventional medical care and advice.

Intervention Group

In addition to the standard care received by the control group, the intervention group received health education based on the LEARNs model. 12-week long LEARNs model education programme with five major components:

Listen:

On the second day of hospitalization, nursing staff conducted a 20–30-minute one-on-one interview with each patient to assess their symptoms, medication adherence, lifestyle, and psychological needs. The goal was to establish a cooperative relationship and identify the patient's concerns, which would guide the subsequent education sessions.

Establish:

Following the Listen phase, nursing staff built a cooperative relationship by using open-ended questions and empathetic responses. This stage focused on addressing any concerns regarding treatment and medication adherence, fostering trust, and providing emotional support. The Feel-Fact-Flexible (3F) strategy was used for patients resistant to medication, helping them understand the importance of adherence.

Adopt & Reinforce:

Starting from the third day of hospitalization, group health education sessions were held three times a week (20-30 minutes per session). These sessions covered topics such as disease knowledge, medication management, symptom monitoring, diet and exercise recommendations, and psychological support. The education used a variety of formats, including audio recordings, videos, and written materials. Patients were grouped based on their preferences to ensure the education was tailored to their needs.

Name:

After each education session, patients were encouraged to ask questions. Nursing staff provided immediate feedback, answered questions, and acknowledged patient participation through positive reinforcement (e.g., praise, small rewards). If no questions were raised, the nursing staff would ask open-ended questions to stimulate discussion and encourage active engagement.

Strengthen:

One day before discharge, the key education topics were reviewed and reinforced. The focus was on medication adherence, lifestyle modifications, psychological support, and relapse warning signs. After discharge, patients continued to receive health education via WeChat, phone calls, and group sessions, ensuring ongoing support and engagement.

5. Data Analysis

Data analysis was conducted using SPSS version 29.0. Demographic characteristics were described using frequencies and composition ratios. The scores of the following scales were described using mean ± standard deviation (M±SD): Self-Rating Anxiety Scale (SAS), Self-Rating Depression Scale (SDS), Exercise of Self-Care Agency Scale (ESCA), Chinese version of the Crohn’s and Colitis Knowledge Score (CCKNOW), and Chinese version of the Inflammatory Bowel Disease Questionnaire (IBDQ). Independent sample t-test or Mann-Whitney U test was used to compare differences between groups before and after the intervention, while paired t-test or Wilcoxon signed-rank test was used for within-group comparisons. To control for confounding variables and assess the interaction effects between time and intervention allocation, a linear mixed model regression was applied, including patient ID as a random effect. A p-value of <0.05 was considered statistically.

6. Research Ethics

The study adhered to the ethical principles outlined in the Declaration of Helsinki and received approval from the institutional ethics committee of Suining Central Hospital (Ethics Approval No. KYLLKS20230148).

RESULTS

Characteristics of the Participants

The average age of all participants was 42.1 years (standard deviation, SD = 8.2). The majority were female (61.7%), married (75.8%), and held a bachelor’s degree or below (77.5%). Most participants were employed full-time (88.3%). The duration since diagnosis was similar between the two groups, with the intervention group showing slightly fewer years on average. Differences were observed in average monthly income, with a higher proportion of participants in the control group earning more than 7,000 yuan. Table 1 summarizes the baseline characteristics of participants by group, showing overall comparability across variables.

Table 1. Characteristics of the Participants

| Characteristics | Control (n=60) | Intervention (n=60) | p value |
|---------------------------------|---------------------|---------------------|---------|
| Age | 41.35 (9.33) | 42.90 (9.93) | 0.39 |
| Age category | | | 0.32 |
| 20–39 | 28 (47%) | 21 (35%) | |
| 40–59 | 29 (48%) | 36 (60%) | |
| 60+ | 3 (5%) | 3 (5%) | |
| Sex | | | 0.84 |
| Male | 24 (40%) | 23 (38%) | |
| Female | 36 (60%) | 37 (62%) | |
| Highest educational attainment | | | 0.37 |
| Bachelor or below | 45 (75%) | 48 (80%) | |
| Master's degree | 2 (3%) | 0 (0%) | |
| Doctoral degree | 13 (22%) | 12 (20%) | |
| Employment status | | | 0.87 |
| Full-time | 47 (78%) | 48 (80%) | |
| Part-time | 11 (18%) | 9 (15%) | |
| Retirement | 2 (4%) | 3 (5%) | |
| Years of diagnosis | 4.20 (2.90) | 3.70 (1.40) | 0.21 |
| Marital status | | | 0.80 |
| Married | 51 (85%) | 50 (83%) | |
| Unmarried | 9 (15%) | 10 (17%) | |
| Average monthly income | 5,670.00 (2,005.91) | 5,240.00 (1,694.30) | 0.21 |
| Average monthly income category | | | 0.17 |
| <4000 | 18 (30%) | 17 (28%) | |
| 4001–7000 | 29 (48%) | 36 (60%) | |
| >7000 | 13 (22%) | 7 (12%) | |

Table 2. Baseline and Follow-up Scores, Between-Group Comparisons, and Effect Estimates

| Outcome Measure | Group | Baseline(T0) Mean ± SD | Follow-up (T1) Mean ± SD | <i>p</i> | Effect Size (Cohen's d, 95% CI) | Group × Time Interaction Effect (95% CI) |
|------------------------|--------------|---------------------------|-----------------------------|-----------|------------------------------------|---|
| Anxiety (SAS) | Control | 38.10 ± 8.92 | 31.97 ± 6.17 | <0.001*** | 0.87 (0.45, 1.29) | -3.28 (-7.21, 0.51) |
| | Intervention | 36.98 ± 9.91 | 27.19 ± 5.03 | | | |
| Depression (SDS) | Control | 40.20 ± 11.28 | 36.81 ± 9.55 | 0.012* | 0.60 (0.19, 1.01) | -1.93 (-3.85, -0.06)* |
| | Intervention | 38.48 ± 11.20 | 31.67 ± 7.55 | | | |
| Self-Care (ESCA) | Control | 100.40 ± 12.00 | 117.78 ± 13.58 | <0.001*** | 0.79 (0.38, 1.21) | +12.00 (10.16, 13.82)*** |
| | Intervention | 101.55 ± 15.00 | 130.19 ± 17.34 | | | |
| Knowledge (CCKNOW) | Control | 11.00 ± 2.48 | 12.93 ± 2.60 | <0.001*** | 0.95 (0.53, 1.38) | +2.41 (1.07, 3.75)** |
| | Intervention | 11.26 ± 2.46 | 15.60 ± 3.00 | | | |
| Quality of Life (IBDQ) | Control | 147.65 ± 30.77 | 152.43 ± 33.77 | 0.829 | -0.09 (-0.50, 0.32) | -0.47 (-17.54, 16.60) |
| | Intervention | 144.25 ± 32.83 | 149.50 ± 37.22 | | | |

Note. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Pairwise comparison between control and intervention on the Anxiety, Depression, Self-care scores, IBD-Q, CCKNOW

Baseline comparisons confirmed successful randomization, with no significant differences between groups (all $p > 0.05$, Table 2).

After the 12-week intervention, linear mixed model analysis revealed a significant Group \times Time interaction effect for depression, self-care ability, and disease knowledge (all $p < 0.05$), but not for anxiety or quality of life (Table 2). Post-hoc analyses of between-group differences at follow-up (T1) showed that the LEARNS group achieved statistically significant and clinically meaningful improvements across all these outcomes, with moderate to large effect sizes (Cohen's d ranging from 0.60 to 0.95), compared to the control group.

In contrast, and consistent with the non-significant interaction effect, no between-group difference was observed for quality of life ($p = 0.829$; Cohen's $d = -0.09$).

DISCUSSION

Significant Reductions in Anxiety and Depression: Mechanisms and Contextualization

At 12 weeks post-intervention, the LEARNS group's anxiety scores fell from 31.97 ± 6.17 to 27.19 ± 5.03 ($p < 0.001$) and depression scores from 36.81 ± 9.55 to 31.67 ± 7.55 ($p = 0.012$). These effect sizes substantially exceed the modest improvements reported by Barberio et al. (2021; SMD for anxiety = -0.16 , depression = -0.22) and align with the high baseline prevalence of mood disorders in IBD described by Fracas et al. (2023). The "Listen-Establish" phases of LEARNS integrate empathic validation and collaborative goal-setting—core components of Motivational Interviewing—which enhance illness coherence and perceived behavioral control, thereby driving pronounced mood improvements (Miller & Rollnick, 2013).

Knowledge Acquisition: Necessary but Not Sufficient

Participants in the intervention arm showed a 2.41-point greater increase in the CCKNOW than controls ($p < 0.001$), and a 12.00-point higher rise in total self-care ability (ESCA) scores ($p < 0.001$). While CCKNOW reliably measures IBD-specific knowledge (Eaden et al., 1999; Wardle & Mayberry, 2014), the COM-B framework emphasizes that knowledge (Capability) alone cannot guarantee behavior change without adequate Opportunity and Motivation (Michie et al., 2011). Future iterations should therefore incorporate peer-support groups or family engagement to bolster external opportunities and intrinsic motivation.

Lagged Effect on Quality of Life

It is important to interpret the positive findings on mood and self-care within the context of the primary outcome: there was no significant between-group difference in disease-specific quality of life (IBDQ) at 12 weeks. This discrepancy suggests that while the LEARNS intervention was effective in improving psychological well-being and self-management capabilities, these gains did not translate into a measurable improvement in overall quality of life within the study period. This "lag effect" has been observed in other psychosocial interventions for IBD (Nguyen et al., 2021). Quality of life in IBD is multifactorial, heavily influenced by ongoing disease activity, symptoms, and social factors that may not be fully addressed by an education-focused intervention alone, especially in the short term (Neuendorf et al., 2016). Therefore, while the intervention shows promise for specific psychosocial outcomes, its effectiveness in enhancing overall QoL remains to be demonstrated and may require a longer follow-up duration, a more intensive intervention, or the integration of strategies that directly target physical symptom control and social functioning.

Digital Empowerment and Scalability

The hybrid model of in-person sessions reinforced through WeChat parallels the myIBDcoach platform, which in a 909-patient RCT reduced outpatient visits and hospitalizations while demonstrating cost-effectiveness in 83% of simulations (de Jong et al., 2020). Sweeney et al. (2022) further illustrated the feasibility of a multimodal digital self-management framework—incorporating videos, charts, and email reminders—for fatigue, pain, and urgency. Leveraging existing messaging platforms or electronic health record portals allows low-marginal-cost, large-scale dissemination of such blended interventions.

Individual Differences and Personalization

Fracas et al. (2023) reported that female IBD patients have a higher risk of anxiety/depression (65% vs. 50%) and that symptom severity correlates with disease activity. Moreover, adoption and engagement with digital health tools are influenced by digital literacy and socioeconomic status (Nguyen et al., 2021). Tailored strategies—such as intensified emotional support for high-risk groups, simplified user interfaces, and technical guidance—are needed to maximize efficacy across diverse patient subgroups.

Limitation

This study has several limitations that warrant consideration. First, the intervention was conducted at a single tertiary care hospital in China, which may limit the generalizability of our findings to broader IBD populations. Future studies should involve larger, more diverse samples across multiple centers to

enhance external validity. Second, the LEARNs programme was delivered via a hybrid of face-to-face sessions and WeChat reinforcement, requiring a certain level of digital literacy and reflecting specific cultural attitudes toward technology and healthcare; these factors may influence patient engagement and outcomes in other regions without careful contextual adaptation. Third, data collection relied predominantly on self-reported measures (HADS, IBDQ, ESCA, CCKNOW); although these instruments possess strong psychometric properties, subjective scales remain vulnerable to social desirability and recall biases. Lastly, the relatively short follow-up period of 12 weeks may not fully capture the sustainability of psychological, behavioral, and quality-of-life improvements. Further research with extended longitudinal tracking (6–12 months or longer), incorporation of objective biomarkers (e.g., C-reactive protein, faecal calprotectin), and clinical endpoints such as relapse rates is recommended to verify the long-term impact of the LEARNs intervention.

CONCLUSION

In conclusion, this randomized controlled trial demonstrates that the LEARNs model is a promising and feasible intervention for improving short-term psychological distress (anxiety and depression), self-care ability, and disease knowledge in adults with IBD. However, it is crucial to note that these positive changes were not accompanied by an improvement in disease-specific quality of life at the 12-week endpoint. This indicates that the intervention successfully targets specific psychological and behavioral mechanisms but may be insufficient alone to impact the broader construct of QoL in the short term. The findings should be interpreted with caution due to the study's single-center design, reliance on self-reported measures, and the relatively short follow-up period. Future research should prioritize longer-term, multicenter trials that incorporate both objective clinical markers and patient-reported outcomes to determine whether the psychosocial benefits of LEARNs can eventually translate into improved quality of life. Additionally, studies may consider integrating booster sessions or clinical management strategies to achieve more comprehensive and sustainable outcomes.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

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REFERENCES

- Aliu, A., Bosch, D. H. C. A., Keszthelyi, D., Ardabili, A. R., Colombel, J., Sawyer, R., Törnblom, H., Hart, A., Jonkers, D. M. a. E., Pierik, M. J., & Mujagic, Z. (2024). Review article: A practical approach to persistent gastrointestinal symptoms in inflammatory bowel disease in remission. *Alimentary Pharmacology & Therapeutics*, 59(12), 1470–1488. <https://doi.org/10.1111/apt.17988>
- Barberio, B., Zamani, M., Black, C. J., Savarino, E. V., & Ford, A. C. (2021). Prevalence of symptoms of anxiety and depression in patients with inflammatory bowel disease: A systematic review and meta-analysis. *The Lancet Gastroenterology & Hepatology*, 6(5), 359–370. [https://doi.org/10.1016/S2468-1253\(21\)00014-5](https://doi.org/10.1016/S2468-1253(21)00014-5)
- De Jong, M. J., van der Meulen de Jong, A. E., Romberg-Camps, M. J., Becx, M. C., Maljaars, J. P., Cilissen, M., ... Pierik, M. J. (2020). Cost-effectiveness of telemedicine-directed specialized vs standard care for patients with inflammatory bowel diseases in a randomized trial. *Clinical Gastroenterology and Hepatology*, 19(1), 206–207. <https://doi.org/10.1016/j.cgh.2020.06.016>
- Eaden, J. A., Abrams, K., & Mayberry, J. F. (1999). The Crohn's and colitis knowledge score: A test for measuring patient knowledge in inflammatory bowel disease. *American Journal of Gastroenterology*, 94(12), 3560–3566. <https://doi.org/10.1111/j.1572-0241.1999.01536.x>
- Fracas, E., Costantino, A., Vecchi, M., & Buoli, M. (2023). Depressive and anxiety disorders in patients with inflammatory bowel diseases: Are there any gender differences? *International Journal of Environmental Research and Public Health*, 20(13), 6255. <https://doi.org/10.3390/ijerph20136255>
- Gu, J. Y., Lin, Z., Sun, C. Y., & Wang, M. (2023). Qualitative research on the experience of alienation in patients with inflammatory bowel disease. *Journal of Nursing Science*, 38(13), 28–32. <https://doi.org/10.3870/j.issn.1001-4152.2023.13.028>

- Hao, N., Wang, B. B., Liu, Y. F., & Zhang, L. (2022). Effects of the teach-back health education model on the psychological status and self-care ability of patients with inflammatory bowel disease. *Journal of Clinical Psychosomatic Diseases*, 28(2), 47–50. <https://doi.org/10.3969/j.issn.1672-187X.2022.02.011>
- Hu, X., & Xu, L. (2024). Relationship between fear of progression and quality of life in inflammatory bowel disease: Mediating role of health literacy and self-care. *Journal of Advanced Nursing*, 80(10), 4147–4160. <https://doi.org/10.1111/jan.16138>
- Liu, Y. F., Zheng, W., Zhang, L., & Hao, N. (2022). Effects of telecare on anxiety, depression, and quality of life in patients with inflammatory bowel disease. *Journal of International Psychiatry*, 49(2), 373–380. <https://doi.org/10.13479/j.cnki.jip.2022.02.025>
- Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, 6, 42. <https://doi.org/10.1186/1748-5908-6-42>
- Moskovitz, D. N., Maunder, R. G., Cohen, Z., McLeod, R. S., & MacRae, H. (2000). Coping behavior and social support contribute independently to quality of life after surgery for inflammatory bowel disease. *Diseases of the Colon & Rectum*, 43(4), 517–521. <https://doi.org/10.1007/bf02237197>
- Miller, W. R., & Rollnick, S. (2013). *Motivational interviewing: Helping people change* (3rd ed.). Guilford Press.
- Napolitano, D., Schiavoni, E., Amatucci, V., Monaci, A., Martella, P., Orgiana, N., Benini, V., Di Massimo, A., Turchini, L., Giordano, L. N., Conticelli, C., Pettinari, V., De Vito, A., Virone, C., Lorusso, A., Fanali, C., Ribaudi, E., Bernabei, T., Gasbarrini, A., ... Cocchieri, A. (2024). N06 Self-care in patients affected by inflammatory bowel disease: SELF-IBD observational study in a single center. *Journal of Crohn's and Colitis*, 18(Suppl 1), i2192–i2193. <https://doi.org/10.1093/ecco-icc/jjad212.1378>
- Neuendorf, R., Harding, A., Stello, N., Hanes, D., & Wahbeh, H. (2016). Depression and anxiety in patients with inflammatory bowel disease: A systematic review. *Journal of Psychosomatic Research*, 87, 70–80. <https://doi.org/10.1016/j.jpsychores.2016.06.001>
- Nguyen, N. H., Martinez, I., Atreya, A., Sitapati, A. M., Sandborn, W. J., Ohno-Machado, L., & Singh, S. (2021). Digital Health Technologies for Remote Monitoring and Management of Inflammatory Bowel Disease: A Systematic review. *The American Journal of Gastroenterology*. ACG, 117(1), 78–97. <https://doi.org/10.14309/ajg.0000000000001545>
- Su, B., Fan, G. H., Wu, L. X., Yu, Y., Bao, Y., Liu, L. J., & Chen, S. S. (2023). Effects of the teach-back method health education on self-management ability and quality of life in patients with type 2 diabetes mellitus. *China Health Education*, 39(3), 283–287. <https://doi.org/10.16168/j.cnki.issn.1002-9982.2023.03.018>
- Sweeney, L., Windgassen, S., Artom, M., Norton, C., Fawson, S., & Moss-Morris, R. (2022). A novel digital self-management intervention for symptoms of fatigue, pain, and urgency in inflammatory bowel disease: Describing the process of development. *JMIR Formative Research*, 6(5), e33001. <https://doi.org/10.2196/33001>
- Tiles-Sar, N., Neuser, J., de Sordi, D., Baltes, A., Preiss, J. C., Moser, G., & Timmer, A. (2025). Psychological interventions for inflammatory bowel disease. *Cochrane Database of Systematic Reviews*, 2025(4), Article CD006913. <https://doi.org/10.1002/14651858.CD006913.pub3>
- Wardle, R. A., & Mayberry, J. F. (2014). Patient knowledge in inflammatory bowel disease: The Crohn's and Colitis Knowledge Score. *European Journal of Gastroenterology & Hepatology*, 26(1), 1–5. <https://doi.org/10.1097/MEG.0b013e328365d21a>
- Zhao, Z. L., & Chen, W. C. (2023). Research progress on anxiety and depression in IBD. *Chinese Journal of Hemorrhology*, 33(1), 151–157. <https://doi.org/10.3969/j.issn.1009-881X.2023.01.035>
- Zhao, M. S., Li, Y. L., Wang, G. Z., Zhang, N., & Ma, H. W. (2023). Research progress on intervention models for self-management in patients with inflammatory bowel disease. *Chinese General Practice Nursing*, 21(2), 163–166. <https://doi.org/10.12104/j.issn.1674-4748.2023.02.005>
- Zhu, Y., Lin, Z., Bian, Q., & Ding, X. F. (2013). Reliability and validity study of the Chinese version of the Crohn's disease and ulcerative colitis knowledge questionnaire. *Nursing Research*, 27(30), 3449–3451. <https://doi.org/10.3969/j.issn.1009-6493.2013.30.065>