Development of a Continuity of Care Program for Postoperative Enterostomy Patients With Colorectal Cancer Guided by Heider's Balance Theory

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AIM: Patients with colorectal cancer undergoing enterostomy often encounter complex physical, psychological, and social challenges after discharge. Effective continuity of care is essential to support postoperative recovery and long-term adaptation. However, existing care programs frequently lack a comprehensive and theoretically grounded framework. Guided by Heider's balance theory, this study developed a continuity of care program for postoperative enterostomy patients with colorectal cancer, thereby providing a reference for clinical nursing practice.

METHODS: A comprehensive search of domestic and international databases, guideline networks, and professional association websites was conducted to identify publicly available clinical practice guidelines, evidence summaries, and systematic reviews related to postoperative enterostomy care in patients with colorectal cancer. Two reviewers independently performed literature screening, quality appraisal, and data extraction, followed by cross-verification to develop a preliminary program draft. Using Heider's balance theory as the conceptual framework, a preliminary continuity of care program was formulated through evidence synthesis and qualitative analysis, and subsequently refined through a two-round Delphi expert consultation process.

RESULTS: A total of 512 records were initially identified, and seven high-quality articles were ultimately included after screening and quality appraisal. A preliminary continuity of care program was developed through evidence synthesis and refined using a two-round Delphi expert consultation. In each round, 20 questionnaires were distributed and all were returned, yielding response rates of 100.0%. Fourteen experts provided comments in the first round, and six provided additional feedback in the second round. The expert authority coefficients were 0.805 and 0.809, respectively, while Kendall's W coefficients were 0.162 and 0.163, both statistically significant. After iterative revision, the final program consisted of 4 first-level indicators, 10 second-level indicators, and 24 third-level indicators.

CONCLUSIONS: This study developed a theoretically grounded and expert consensus-based continuity of care program for postoperative enterostomy patients with colorectal cancer. The program may serve as a reference for clinical nursing practice, as well as for feasibility studies and intervention research.

Keywords: colorectal cancer; enterostomy; expert consultation; nursing program development

Introduction

Globally, colorectal cancer is a highly malignant tumor. According to the latest cancer statistics released by the National Cancer Center in 2022, colorectal cancer accounts for approximately 10.71% of all newly diagnosed cancers in China, ranking second only to lung cancer, with an incidence that continues to increase [1]. For many patients with rectal cancer, enterostomy surgery constitutes an indispensable component of treatment. Although this surgical approach effectively resolves excretory dysfunction, it also imposes significant physical and psychological burdens on patients [2,3]. For example, following enterostomy, patients not only confront physiological challenges such as altered bowel habits and stoma odor but also frequently experience psychological distress, including feelings of inferiority and stigma [4–6]. These challenges significantly impair post-discharge quality of life and the rehabilitation process. Continuity of care, as a comprehensive and sustained healthcare service model, has been shown to improve self-care capacity and quality of life for patients with enterostomies [7,8].

Although the implementation of continuity of care for postoperative enterostomy patients with colorectal cancer has achieved some success, several limitations persist [9]. For instance, existing continuity of care programs often focus

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primarily on physiological recovery after discharge, while overlooking the psychological and social adaptation needs of the patients [10,11]. Additionally, gaps remain in family coordination and stoma self-management during the continuity of care process. When education content and psychological support are transferred across different care settings after discharge, information fragmentation and service discontinuities frequently arise, thereby adversely affecting rehabilitation outcomes and quality of life [12]. Therefore, analyzing the lived experiences of patients during the continuity of care process and optimizing care programs based on these insights are of considerable significance for enhancing rehabilitation and quality of life. At the same time, most existing continuity of care programs lack a structured theoretical framework that effectively integrates psychological equilibrium and social role reconstruction into post-discharge management.

In this study, Heider's balance theory was adopted as the conceptual framework to shift the focus from isolated physiological indicators toward the overall 'individual-environment-health' balance. This theoretical integration facilitates a more comprehensive understanding of the cognitive and psychological adjustments required for long-term adaptation, thereby addressing the current lack of structured theoretical guidance in post-discharge care. Furthermore, the structural integration of the nursing program, encompassing daily living needs, psychological support, stoma management, and social support, provides a multidimensional approach to address the common 'information gaps' and 'service faults' observed in current practice. Finally, the rigorous development process combined high-level evidence-based nursing with two rounds of systematic Delphi expert consultation to ensure that the final index system demonstrates both scientific rigor and practical feasibility within China's healthcare system.

The aim of this study was to provide a theoretically grounded and structurally integrated framework to optimize postoperative nursing care for patients with colorectal cancer in China.

Methods

Formation of the Evidence-Based Practice Group for Continuity of Care in Postoperative Enterostomy Patients With Colorectal Cancer

The evidence-based practice group consisted of four trained members, including gastrointestinal surgeons and clinical nursing management specialists. Evidence retrieval, screening, and quality appraisal were conducted independently by two members. In cases of disagreement, discrepancies were resolved through discussion. Evidence synthesis and development of the preliminary continuity of care program were completed through group discussion.

Theoretical Framework: Heider's Balance Theory

Heider's balance theory was adopted as the conceptual framework to guide the development of the continuity of care program. According to this theory, individuals tend to maintain balance among themselves, others, and the surrounding environment; it has been widely used to explain psychological adaptation and social interaction behaviors. In this study, postoperative recovery was conceptualized as a dynamic balance across physical condition, psychological state, stoma management, and social support. Under this framework, four domains, life and physical care, psychological support, stoma care, and social support, were used to structure the care components. An initial set of nursing indicators was generated through evidence synthesis and qualitative analysis. Through two rounds of Delphi expert consultation, the relevance, importance, and feasibility of each indicator were evaluated and refined, ultimately leading to the establishment of the continuity of care program.

Evidence Retrieval

The databases searched included Chinese and English sources: UpToDate, BMJ Best Practice, Joanna Briggs Institute (JBI) database, Registered Nurses' Association of Ontario (RNAO), Guidelines International Network (GIN), National Institute for Health and Care Excellence (NICE), Scottish Intercollegiate Guidelines Network (SIGN), Wound, Ostomy and Continence Nurses Society (WOCN), Enhanced Recovery After Surgery (ERAS) Society, Medlive Clinical Guidelines, Cochrane Library, CINAHL, Dutch Medical Abstracts Database, China National Knowledge Infrastructure (CNKI), Wanfang Data, VIP Database, and professional association websites such as the Chinese Medical Association and Chinese Nursing Association. The retrieval period covered the inception of each database up to December 2022.

Evidence was retrieved using the 6S evidence hierarchy model (Systems, Summaries, Syntheses, Studies, Standards, and Sources). Searches were performed from higher to lower levels of evidence. Evidence systems and summary resources (e.g., UpToDate and BMJ Best Practice) were first consulted to identify clinically applicable recommendations. Guideline networks and professional society websites (e.g., RNAO, NICE, SIGN, WOCN, and ERAS) were subsequently searched to obtain clinical practice guidelines and best practice recommendations. Synthesis-level databases (e.g., the Cochrane Library and CINAHL) were then searched for systematic reviews. When higher-level evidence was insufficient to support specific care components, relevant primary studies were further identified from bibliographic databases, and practice-oriented resources were reviewed to supplement contextual understanding.

The search strategy focused primarily on clinical conditions and nursing interventions associated with colorectal cancer, enterostomy, and continuity of care. The search

terms included: "colorectal cancer", "colon cancer", "rectal cancer", "postoperative", "enterostomy", "stoma surgery", "continuity of care", "post-discharge care", "long-term care", and "program development".

Heider's balance theory was not used as a limiting search term during evidence retrieval. Instead, it served as a conceptual framework to guide the categorization and integration of care indicators in the subsequent program development process.

Literature Screening and Thematic Extraction

The inclusion criteria were as follows: studies involving adult patients with postoperative enterostomy secondary to colorectal cancer; studies addressing postoperative nursing issues in these patients; and literature containing evidence-based guidelines, best practices, practice recommendations, systematic reviews, recommended practices, or experiential summaries. Publications in either Chinese or English were considered eligible.

The exclusion criteria were as follows: patients with urostomy; studies involving pediatric populations; literature types such as guideline interpretations or project protocols; duplicate publications; and studies with incomplete data. Different types of evidence were included to comprehensively inform the development of the continuity of care program. Clinical practice guidelines and systematic reviews were prioritized as high-level evidence to support indicator development, while experiential summaries and practice reports were incorporated to supplement contextual understanding and reflect real-world clinical practice. Variations in evidence quality were addressed through structured appraisal and differential application of evidence during program development.

Literature screening and quality evaluation were conducted independently by two reviewers who had received formal training in evidence-based practice. Any disagreements regarding study inclusion or quality assessment were resolved through discussion within the research team. Distinct evaluation tools were applied according to the type of evidence. Only evidence that met the predefined quality standards was used to determine indicator content, while lower-level evidence was considered solely for background reference.

Quality Appraisal of Literature

All included studies were independently evaluated and reviewed by two members of the research team who had received systematic training in evidence-based medicine. In cases of disagreement or uncertainty, consensus was achieved through discussion among members of the evidence-based practice group. When conflicting evidence was identified, priority was given to studies with higher methodological quality and higher levels within the evidence hierarchy. When methodological quality was comparable, more recent evidence was preferentially considered. Clinical practice guidelines were evaluated using the 2017 updated Appraisal of Guidelines for Research and Evaluation II (AGREE II) tool [13], which evaluates six domains comprising 23 items and two overall assessment items. Systematic reviews were evaluated using AMSTAR 2 (2017 update) [14], which includes 16 items for methodological quality assessment. The Joanna Briggs Institute (JBI) Evidence-Based Healthcare Center (Australia, 2016) critical appraisal tools were used to assess randomized controlled trials, two types of quasi-experimental studies, cohort studies, case-control studies, descriptive studies, and expert consensus or opinion papers [15].

Different appraisal tools were applied based on the evidence type to ensure methodological appropriateness and avoid redundant assessment. Only evidence that met the predefined quality criteria based on the respective appraisal tools was used to determine the content and structure of the indicators, while lower-quality evidence was considered solely for contextual interpretation.

Delphi Consultation Method and Program Construction

Expert Selection

This study focused on stoma care nursing. Following discussion within the research team, 20 domestic medical and nursing experts were selected to participate in a two-round Delphi expert consultation. The inclusion criteria for experts were as follows: (1) healthcare professionals with $\geq$15 years of experience in stoma care; (2) a bachelor's degree or higher; (3) an associate senior professional title or above; (4) willingness to participate in the study and commitment to complete both consultation rounds. The expert panel comprised professionals from multiple disciplines related to ostomy care, including colorectal surgeons, ostomy care specialist nurses, nursing managers, and nursing educators or researchers. During the consultation process, experts were invited to independently evaluate the importance and feasibility of the proposed indicators, provide revision suggestions, and participate in consensus-building across multiple rounds of consultation. Experts from different regions and medical institutions were included to ensure anonymity and minimize bias arising from a single perspective.

Development of the Expert Consultation Questionnaire

The research team designed the expert consultation questionnaire and was responsible for data compilation and analysis. The questionnaire consisted of two components: the Expert Consultation Questionnaire for the Continuity of Care Program for Postoperative Enterostomy Patients with Colorectal Cancer Based on Heider's balance theory and the Expert Basic Information Survey. The Expert Consultation Questionnaire included two sections: instructions for completion and an evaluation table for each indicator. The instructions specified the use of a five-point Likert scale to rate the importance of each item from 1 (low importance) to 5 (high importance). Each item also included columns

Table 1. Characteristics of the included literature.

Source/Database/Organization	Author(s)	Research topic	Study population	Study design	Year of publication
RNAO	Registered Nurses' Association of Ontario [16]	Stoma care and prevention of complications	Postoperative enterostomy patients with colorectal cancer	Clinical practice guideline	2019
Medlive Clinical Guidelines	Johnston *et al.* [17]	Stoma care and prevention of complications	Postoperative enterostomy patients with colorectal cancer	Clinical practice guideline	2013
WOCN	Wound, Ostomy and Continence Nurses Society Guideline Development Task Force [18]	Postoperative stoma care	Postoperative enterostomy patients with colorectal cancer	Clinical practice guideline	2018
Medlive Clinical Guidelines	Ferrara *et al.* [19]	Management of adult stoma surgery	Postoperative enterostomy patients with colorectal cancer	Clinical practice guideline	2019
CNKI	Han *et al.* [20]	Continuity of care for stoma patients	Postoperative enterostomy patients with colorectal cancer	Practice report	2022
EHS	Antoniou *et al.* [21]	Stoma diagnosis, classification, and prevention of complications	Postoperative enterostomy patients with colorectal cancer	Clinical practice guideline	2018
ACPGBI	ACPGBI Parastomal Hernia Group [22]	Prevention and management of stoma-related complications	Patients with stoma	Expert consensus	2018

RNAO, Registered Nurses' Association of Ontario; WOCN, Wound, Ostomy and Continence Nurses Society; CNKI, China National Knowledge Infrastructure; EHS, European Hernia Society; ACPGBI, Association of Coloproctology of Great Britain and Ireland.

Table 2. Synthesis and analysis of best available evidence.

Domain	Evidence summary	Source	Evidence type	Evidence level	Recommendation level
Relationship between attitudes and behaviors	Patients' attitudes significantly influence their behaviors and health outcomes. Positive attitudes may promote rehabilitation and treatment adherence, whereas negative attitudes may contribute to adverse health outcomes.	RNAO	Guideline-based evidence	Level 3c	Level A
Psychological needs of postoperative enterostomy patients with colorectal cancer	Enterostomy surgery not only alters physiological function but also exerts significant psychological impacts. Patients frequently experience low self-esteem, anxiety, and depression, requiring structured psychological support and targeted interventions.	Medlive Clinical Guidelines	Guideline-based evidence	Level 2c	Level B
Physiological needs of postoperative enterostomy patients with colorectal cancer	Patients require comprehensive knowledge of stoma management, including routine care and prevention of complications. Education and training enhance self-care abilities, thereby improving confidence and quality of life.	WOCN	Expert opinion-based evidence	Level 3c	Level A
Individualized nursing care	Postoperative enterostomy patients present with diverse clinical conditions and individualized needs, necessitating individualized nursing care plans.	ACPGBI	Consensus-based evidence	Level 2c	Level B
Continuity of care	Regular follow-up and monitoring enable timely assessment of recovery status and facilitate adjustment of care plans accordingly.	EHS	Guideline-based evidence	Level 5	Level A
Family support	Educating family members on stoma care improves care quality while providing emotional support to alleviate patients' psychological burden.	CNKI	Expert opinion-based evidence	Level 5	Level A

for modification suggestions and additional indicators, allowing experts to revise, add, or delete items as appropriate. The Expert Basic Information Survey collected demographic and professional characteristics, including years of service, educational level, professional title, age, and current position.

Expert Consultation Procedure

The "Wenjuanxing" (Questionnaire Star) platform was used to distribute the consultation questionnaires, and two rounds of consultation were conducted. After the first round, the research team summarized and analyzed the responses. Based on the results, indicators and corresponding items were revised to generate the content for the second round. Following the second round of consultation, all opinions and recommendations were collected and systematically organized. By the completion of the second round, expert opinions were expected to reach a consensus.

The predefined criteria for expert consensus were a mean importance score $\geq$4.0 and a coefficient of variation (CV) $<$0.20. Items failing to meet these criteria were revised or deleted based on expert feedback and re-evaluated in subsequent rounds. All invited experts completed both consultation rounds; no withdrawals occurred, and the consultation process remained stable.

Statistical Methods

Data analysis was performed using SPSS 26.0 (IBM Corp., Armonk, NY, USA). The analyses included descriptive statistics of experts' baseline characteristics (e.g., age and educational level); expert engagement assessed by the effective response rate; experts' familiarity with each indicator assessed on a five-point scale; and the expert judgment coefficient evaluated across four dimensions, including theoretical knowledge, practical experience, literature reference, and subjective assessment.

Expert authority was calculated as the mean of the judgment coefficient and familiarity coefficient, with values $\geq$0.7 considered acceptable and $>$0.8 indicating high authority. The degree of consensus among experts was assessed using the coefficient of variation (CV) and Kendall's W coefficient. A CV $<$0.20 indicated low dispersion of expert ratings, while Kendall's W reflected the degree of concordance among experts.

Results

Characteristics of Included Evidence

A total of 512 relevant articles were initially identified. After automatic de-duplication using reference management software, 206 duplicate records were removed. Titles and abstracts were then screened manually, excluding 272 articles that did not meet the inclusion criteria, resulting in 34 articles for preliminary review. Following full-text review and in-depth assessment, seven high-quality studies were ultimately included in the analysis, as summarized in Table 1 (Ref. [16–22]).

The evidence was synthesized and organized into six best-evidence domains: (1) the relationship between attitudes and behaviors; (2) psychological needs of postoperative enterostomy patients with colorectal cancer; (3) physiological needs of postoperative enterostomy patients; (4) individualized nursing care; (5) continuity of care; and (6) family support. A summary of the evidence is presented in Table 2.

Expert Engagement

Expert engagement was assessed based on the questionnaire response rate. Two rounds of Delphi consultation were conducted. In the first round, 20 questionnaires were distributed, and all were returned, yielding a response rate of 100.0%, with 14 experts providing comments. In the second round, 20 questionnaires were again distributed and returned, maintaining a 100.0% response rate, and six experts provided additional feedback, indicating a high level of expert engagement.

Expert Authority Coefficient

Experts' familiarity with each indicator (Cs) was rated on a five-point scale from "very familiar" to "very unfamiliar", corresponding to scores ranging from 1 to 0.2. The expert judgment coefficient (Ca) was evaluated across four dimensions: theoretical analysis, practical experience, reference to domestic and international literature, and subjective judgment, with influence categorized as high, medium, or low (0.25, 0.20, 0.15). Each dimension was assigned a predefined weight, and the weighted scores across all four dimensions were summed to obtain the final Ca value.

The overall expert authority coefficient (Cr) was calculated as: $Cr = (Ca + Cs) / 2$, with values ranging from 0 to 1. A Cr $\geq$0.7 indicates acceptable authority, and a Cr $>$0.8 indicates high expert authority. Both Cs and Ca were self-reported by the experts. In the first round, Ca and Cs were both 0.805, resulting in Cr = 0.805. In the second round, Ca slightly increased to 0.810 and Cs to 0.808, yielding a Cr of 0.809.

Consensus of Expert Opinions

The degree of consensus among experts was evaluated using Kendall's W coefficient. In the first round, W = 0.162, χ^2 = 109.893, $p < 0.001$, indicating moderate agreement among experts with potential for further improvement. In the second round, W = 0.163, χ^2 = 114.516, $p < 0.001$.

Continuity of Care Program for Postoperative Enterostomy Patients With Colorectal Cancer Based on Heider's Balance Theory

After two rounds of Delphi consultation, the data were compiled and analyzed, resulting in the establishment of a scientifically robust and feasible management program for postoperative enterostomy patients with colorectal cancer. The detailed program framework is presented in Tables 3,4. Be-

tween the first and second rounds of the Delphi survey, several third-level indicators were revised based on expert feedback. Specifically, indicators with overlapping content were merged, those that did not meet the predefined consensus criteria were deleted, and wording was refined to enhance clarity. Consequently, the number of third-level indicators in the second round differed from that of the first round. The final index system shown in Table 4 reflects the optimized set of indicators established after consensus was achieved.

Discussion

Based on Heider's balance theory, this study developed a continuity of care program for patients with enterostomy after colorectal cancer surgery. Compared with existing continuity of care programs, this study provides a theoretically guided and structurally integrated index system rather than focusing solely on the evaluation of intervention effects. The following discussion addresses the theoretical framework, the expert consultation process, and the significance of the constructed index system.

Importance of Constructing a Continuity of Care Program for Postoperative Enterostomy Patients With Colorectal Cancer Based on Heider's Balance Theory

Enterostomy surgery not only alters patients' physiological functions but also exerts profound psychological effects. Postoperative patients frequently encounter multiple stressors, including changes in body image, lifestyle adjustments, and alterations in social roles [23,24]. These stressors may lead to negative emotional responses such as anxiety and depression, which can substantially influence rehabilitation outcomes and overall quality of life. Guided by Heider's balance theory, a continuity of care program should emphasize systematic attention to patients' psychological needs. By providing individualized psychological counseling and facilitating peer communication and support activities, such programs may assist patients in accepting and adapting to bodily changes, reconstructing self-identity, and promoting psychological equilibrium and adjustment.

Item Analysis of the Continuity of Care Program for Postoperative Enterostomy Patients With Colorectal Cancer Based on Heider's Balance Theory

This study conducted two rounds of Delphi consultation. In the first round, 20 questionnaires were distributed, and all were returned, yielding a 100.0% response rate, with 14 experts providing comments. In the second round, 20 questionnaires were again distributed, and all were returned, yielding a 100.0% response rate, and six experts offered additional feedback. These results suggest sustained expert engagement throughout the consultation process.

The expert authority coefficients were 0.805 in the first round and 0.809 in the second round, indicating that the experts' judgment and familiarity with the research indicators remained stable during the study, thereby providing a reliable foundation for the results. Kendall's W ranged from 0.162 to 0.163 across the two rounds, with minimal variation, reflecting persistent differences in ranking order among experts. The CV ranged from 0.06–0.17 in the first round and 0.05–0.17 in the second round. The slight narrowing of the lower bound suggests that expert opinions became more concentrated following iterative consultation.

In this Delphi process, Kendall's W did not reach a high level of consistency. This may be attributable to the multidimensional nature of the continuity of care program, which encompasses life needs, psychological adjustment, stoma care skills, and social support. It may also reflect differences in professional focus among experts engaged in clinical practice, nursing management, and education. Under such circumstances, achieving complete agreement on indicator rankings is difficult. When screening and retaining indicators, greater emphasis was placed on the mean importance score and CV rather than solely on ranking consistency. Most indicators demonstrated high mean importance scores and relatively low dispersion, and the overall level of agreement was considered sufficient for refining the indicator system and constructing the program framework. Although Kendall's W was modest, the consistently high importance scores and low dispersion (CV <0.20) across indicators support an acceptable consensus for framework construction studies. Ultimately, a continuity of care program for postoperative enterostomy patients with colorectal cancer, based on Heider's balance theory, was established, comprising 4 first-level indicators, 10 second-level indicators, and 24 third-level indicators.

From the final framework, the life needs domain encompasses both daily activities and physiological requirements. Specifically, these include guidance on transportation and travel, exercise and physical activity, bathing temperature and methods, dressing, stoma-related dietary guidance, sexual activity, and information on normal stool characteristics such as shape, color, and odor. The high mean scores of these indicators indicate that experts consider life to be an essential component of continuity of care for patients with enterostomies [25,26]. Among these, the high scores for transportation and exercise guidance reflect emphasis on restoring social participation and physical activity. Guidance on bathing and dressing highlights attention to details of daily living, which, when properly addressed, can significantly enhance patient comfort and quality of life.

Regarding physiological needs, high scores for dietary guidance and sexual activity demonstrate expert concern for patients' nutritional status and sexual quality of life. A balanced diet is essential for postoperative recovery in enterostomy patients, while sexual guidance facilitates restoration of normal family life and social functioning [27,28]. The psychological needs domain includes two primary aspects: strengthening positive psychological states and correcting negative emotional responses. Items such as providing

Table 3. Results of the first round Delphi consultation.

First-level indicator	Second-level indicator	Third-level indicator	Mean	Standard deviation	CV
1. Life needs			4.89	0.315	0.06
	1.1 Daily activity needs		4.74	0.452	0.10
		1.1.1 Guidance on transportation and travel	4.68	0.478	0.10
		1.1.2 Exercise and fitness guidance	4.68	0.478	0.10
		1.1.3 Guidance on bathing temperature and methods	4.63	0.496	0.11
		1.1.4 Guidance on dressing	4.68	0.478	0.10
	1.2 Physiological needs		4.74	0.452	0.10
		1.2.1 Guidance on stoma-related dietary structure	4.68	0.478	0.10
		1.2.2 Guidance on sexual activity	4.63	0.496	0.11
		1.2.3 Information on normal stool characteristics (shape, color, odor)	4.63	0.496	0.11
		1.2.4 Guidance on sleeping posture	4.58	0.507	0.11
2. Psychological needs			4.53	0.513	0.11
	2.1 Strengthening positive psychology		4.53	0.513	0.11
		2.1.1 Provision of psychological support and counseling	4.47	0.612	0.14
		2.1.2 Enhancing balanced communication between patients and caregivers; encouraging participation in support groups and activities	4.37	0.684	0.16
	2.2 Mitigation of negative psychological responses		4.42	0.607	0.14
		2.2.1 Provision of coping strategies and emotional management techniques	4.53	0.513	0.11
		2.2.2 Regular assessment and adjustment of psychological status	4.53	0.513	0.11
3. Stoma care needs			4.42	0.607	0.14
	3.1 Knowledge of stoma appliances		4.53	0.513	0.11
		3.1.1 Types of stoma bags and methods of procurement	4.53	0.513	0.11
	3.2 Knowledge of stoma bag replacement		4.47	0.612	0.14
		3.2.1 Methods and frequency of stoma bag replacement	4.42	0.607	0.14
		3.2.2 Precautions during stoma bag replacement	4.47	0.697	0.16
	3.3 Knowledge of stoma-related complications		4.42	0.607	0.14
		3.3.1 Risk factors for stoma-related complications	4.47	0.612	0.14
		3.3.2 Prevention and management of stoma-related complications	4.32	0.749	0.17
4. Social support needs			4.26	0.733	0.17
	4.1 Family support needs		4.32	0.749	0.17
		4.1.1 Establishment of family participation units based on Heider's balance theory after assessment	4.26	0.733	0.17
		4.1.2 Provision of stoma care training and competency assessment for family members	4.32	0.671	0.16
	4.2 Hospital Support Needs		4.37	0.597	0.14
		4.2.1 Establishment of a continuity of care management team (1. Development of unit relationships based on Heider's balance theory involving the stoma specialist nursing team/caregivers, patients, and stoma care; 2. Formation of a multidisciplinary team including attending physicians, stoma nurses, rehabilitation therapists, dietitians, psychologists, and IT personnel)	4.26	0.733	0.17

Table 3. Continued.

First-level indicator	Second-level indicator	Third-level indicator	Mean	Standard deviation	CV
		4.2.2 Regular follow-up and assessment (Weekly telephone follow-up between 18:00–20:00, lasting 30–50 minutes)	4.32	0.749	0.17
		4.2.3 Development of an online information platform (e.g., WeChat, QQ) for teleconsultation services	4.26	0.733	0.17
	4.3 Community and social support needs		4.47	0.697	0.16
		4.3.1 Establishment of stoma patient associations or support groups	4.37	0.684	0.16
		4.3.2 Implementation of stoma education and awareness activities (including lectures)	4.37	0.761	0.17

CV, coefficient of variation; IT, information technology.

psychological support and counseling, promoting balanced communication between patients and caregivers, encouraging participation in support groups and activities, offering coping strategies and emotional regulation techniques, and regularly assessing and adjusting psychological status all received high mean scores. This indicates that experts generally believe the psychological needs of enterostomy patients should not be overlooked in continuity of care. Psychological support and counseling may alleviate anxiety, depression, and other negative emotions, thereby enhancing patients' confidence in managing their condition. Encouraging participation in support groups and activities facilitates social connections and peer support, promoting adaptation to postoperative life [29].

The stoma care needs domain includes knowledge related to stoma appliances, stoma bag replacement, and potential complications. These indicators demonstrated high mean scores with relatively small standard deviations, indicating strong consensus among experts. High scores for stoma appliance knowledge and stoma bag replacement reflect emphasis on patients' mastery of essential stoma care skills. Proficiency in these skills enables independent stoma management, reduces the risk of infection, and improves quality of life. The high score for knowledge of complications demonstrates expert concern for patients' ability to prevent and manage stoma-related complications, facilitating timely identification and intervention [30].

The social support needs domain encompasses family support, hospital support, and broader societal support. Social support constitutes a critical component of continuity of care for enterostomy patients. Family support provides emotional comfort and practical assistance, hospital support ensures sustained professional guidance and care, and broader social support expands the patient's support network, facilitating reintegration into society [31].

The final continuity of care program for postoperative enterostomy patients with colorectal cancer, based on Heider's balance theory, comprises the following components:

(1) Life needs nursing interventions: Patients should receive guidance on transportation and travel. When traveling by airplane, ship, or other modes of transportation, patients should carry adequate stoma care supplies for timely replacement. During air travel, cabin pressure changes may increase intestinal gas; therefore, the use of open-ended stoma bags or bags equipped with carbon filters is recommended. When traveling by car, protective stoma covers can be used to prevent pressure from seatbelts.

Postoperative patients should select appropriate forms of exercise according to their recovery status. After full recovery, low-impact activities such as walking, jogging, or Tai Chi are recommended. Excessive exercise that increases intra-abdominal pressure should be avoided, as it may cause stoma mucosal prolapse. Strenuous activities such as weightlifting, basketball, or soccer should be avoided to prevent trauma to the stoma. During bathing, patients should maintain an appropriate water temperature, typically between 37 °C and 40 °C, to prevent irritation or burns to the peristomal skin. Mild, fragrance-free soap or dedicated stoma-cleansing products are recommended, and vigorous rubbing of the peristomal area should be avoided. After bathing, the stoma and surrounding skin should be gently patted dry with a soft towel to ensure complete dryness. The peristomal skin should be regularly inspected for redness, swelling, or exudation, and any abnormalities should be promptly addressed.

Appropriate clothing selection is essential to protect the stoma and enhance comfort. Patients should wear soft, loose-fitting garments to minimize compression or friction on the stoma. Waistbands should be adjusted to avoid pressure on the stoma, and protective devices such as stoma shields or support belts may be used. For special occasions or activities, patients may empty or replace the stoma bag in advance and should carry necessary stoma care supplies. Patients should follow the recommendations of their physicians or dietitians by selecting easily digestible foods rich in fiber and nutrients. Foods that may cause excessive gas, diarrhea, unpleasant odor, or constipation should be limited. Adequate daily fluid intake should be maintained, food should be chewed thoroughly, and high-fiber or difficult-to-digest foods should be consumed cautiously.

Table 4. Results of the second round of Delphi consultation.

First-level indicator	Second-level indicator	Third-level indicator	Mean	Standard deviation	CV
1. Life needs			4.95	0.229	0.05
	1.1 Daily activity needs		4.79	0.419	0.09
		1.1.1 Guidance on transportation and travel	4.74	0.452	0.10
		1.1.2 Exercise and physical activity guidance	4.74	0.452	0.10
		1.1.3 Guidance on bathing temperature and methods	4.68	0.478	0.10
		1.1.4 Guidance on clothing selection	4.74	0.452	0.10
	1.2 Physiological needs		4.79	0.419	0.09
		1.2.1 Guidance on stoma-related dietary structure	4.74	0.452	0.10
		1.2.2 Guidance on sexual activity	4.68	0.478	0.10
		1.2.3 Education on normal stool characteristics (shape, color, and odor)	4.68	0.478	0.10
		1.2.4 Guidance on sleeping posture	4.63	0.496	0.11
2. Psychological needs			4.58	0.507	0.11
	2.1 Strengthening positive psychological states		4.58	0.507	0.11
		2.1.1 Provision of psychological support and counseling services	4.53	0.612	0.14
		2.1.2 Promoting balanced communication between patients and caregivers and participation in support groups and activities	4.42	0.692	0.16
	2.2 Mitigation of negative psychological states		4.47	0.513	0.11
		2.2.1 Provision of coping strategies and emotional regulation techniques	4.53	0.612	0.14
		2.2.2 Regular assessment and adjustment of psychological status	4.58	0.507	0.11
3. Stoma care needs			4.47	0.612	0.14
	3.1 Knowledge of stoma appliances		4.58	0.507	0.11
		3.1.1 Functions and use of stoma accessories	4.58	0.507	0.11
	3.2 Knowledge of stoma bag replacement		4.53	0.612	0.14
		3.2.1 Methods and frequency of stoma bag replacement	4.47	0.612	0.14
		3.2.2 Precautions during stoma bag replacement	4.53	0.697	0.15
	3.3 Knowledge of stoma-related complications		4.47	0.612	0.14
		3.3.1 Risk factors for stoma-related complications	4.53	0.612	0.14
		3.3.2 Prevention and management of stoma-related complications	4.37	0.684	0.16
4. Social support needs			4.32	0.671	0.16
	4.1 Family support needs		4.37	0.684	0.16
		4.1.1 Establishment of family participation unit relationships based on Heider's balance theory after assessment	4.32	0.671	0.16
		4.1.2 Provision of stoma care training and competency assessment for family members	4.37	0.597	0.14
	4.2 Hospital support needs		4.37	0.597	0.14
		4.2.1 Establishment of a continuity of care management team (1) Development of unit relationships based on Heider's balance theory involving stoma specialist nursing teams/caregivers, patients, and stoma care; (2) Formation of a multidisciplinary team consisting of attending physicians, stoma specialist nurses, rehabilitation therapists, dietitians, psychologists, and IT personnel	4.32	0.749	0.17

Table 4. Continued.

First-level indicator	Second-level indicator	Third-level indicator	Mean	Standard deviation	CV
		4.2.2 Regular follow-up and assessment (Weekly telephone follow-up conducted between 18:00 and 20:00, lasting 30–50 minutes)	4.42	0.692	0.16
		4.2.3 Development of an online information delivery platform (e.g., WeChat, QQ) to provide teleconsultation services	4.37	0.761	0.17
	4.3 Community and social support needs		4.53	0.612	0.14
		4.3.1 Establishment of stoma patient associations or support groups	4.42	0.692	0.16
		4.3.2 Implementation of stoma education and public awareness activities	4.42	0.769	0.17

When physical recovery permits, sexual activity may be resumed approximately 3–6 months postoperatively. Before intercourse, the stoma bag should be emptied or replaced, and the seal of the stoma appliance should be checked. A lateral position on the unaffected side may be adopted to avoid pressure on the stoma. If difficulties arise, consultation with a physician or specialized stoma nurse is recommended.

(2) Psychological interventions: Psychological support and counseling should be provided through platforms such as WeChat groups or telephone hotlines to help alleviate anxiety, depression, and other negative emotions, thereby enhancing confidence of patients in managing their condition.

(3) Stoma care: Educational materials on stoma appliances, stoma bag replacement, and potential complications should be delivered via official WeChat accounts and patient communication groups. This approach facilitates independent self-care, reduces the risk of complications, and improves quality of life.

(4) Social support: Family members should receive education on stoma-related knowledge and be encouraged to participate in training and caregiving support, thereby enhancing the patient's sense of emotional support and self-esteem. Regular follow-up, evaluations, and online consultation should be provided to facilitate social reintegration, reduce feelings of inferiority and isolation, promote adaptation to life with a stoma, alleviate physical and psychological burden, and improve overall quality of life.

Practical Considerations and Feasibility

Although the 30–50-minute follow-up session within the continuity of care program requires nursing staff time, it can be completed via telephone or online platforms and incorporated into routine nursing practice. As nurses gain proficiency in standardized health education and psychological support components, the time required for certain elements may decrease. From an implementation perspective, the program primarily relies on existing nursing personnel and does not require additional equipment or substantial financial resources. The principal cost involves time investment, which can be adjusted according to patients' recovery stage and individual needs. Overall, the program appears feasible for clinical application. However, further evaluation in real-world clinical settings remains necessary. By mapping postoperative recovery needs within a balanced theoretical framework, the program provides a structured reference for future feasibility studies, rather than immediate large-scale clinical implementation.

Limitations

Although the construction process is rigorous, several limitations remain. First, the Delphi method inherently involves subjective judgment of experts. Although the authority coefficient was high, the results may still be influenced by individual clinical experience and professional bias of the experts. In addition, the relatively small number of high-level evidence sources reflects the limited availability of structured continuity-of-care guidelines specific to postoperative enterostomy patients. Second, the expert panel was primarily composed of domestic professionals, which may limit the international generalizability of the program. Third, the program was developed through evidence synthesis and expert consensus but lacks empirical validation in clinical practice. The specific impact of the program on patient outcomes (such as complication incidence and quality of life) requires verification through randomized controlled trials or longitudinal intervention studies. Future studies may consider incorporating patient representatives to further enhance the patient-centered perspective of the program. These limitations limit the present study to the development of a preliminary framework for future clinical validation and optimization.

Conclusions

This study developed a continuity of care program for postoperative enterostomy patients with colorectal cancer, based on Heider's balance theory, through a literature review, qualitative interviews, and expert consultation. The program provides a structured framework that integrates life needs, psychological support, stoma care, and social

support, and shows potential applicability for guiding continuity of care in clinical nursing practice.

Availability of Data and Materials

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions

WYZ and JHW designed the research study. WYZ performed the research. WYZ and JHW analyzed the data. JHW drafted the article. Both authors contributed to the critical revision of the manuscript for important intellectual content. Both authors read and approved the final manuscript. Both authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

The study was approved by the Ethics Committee of the First People's Hospital of Foshan (approval number: 2023-172). All procedures followed the principles outlined in the Declaration of Helsinki. All experts who participated in the Delphi consultation were informed of the purpose and procedures of the study, and consent to participate was obtained before questionnaire completion.

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Conflict of Interest

The authors declare no conflict of interest.

References

[1] Han B, Zheng R, Zeng H, Wang S, Sun K, Chen R, *et al*. Cancer incidence and mortality in China, 2022. Journal of the National Cancer Center. 2024; 4: 47–53. https://doi.org/10.1016/j.jncc.2024.01.006.

[2] Sun V, Grant M, McMullen CK, Altschuler A, Mohler MJ, Hornbrook MC, *et al*. Surviving colorectal cancer: long-term, persistent ostomy-specific concerns and adaptations. Journal of Wound, Ostomy, and Continence Nursing. 2013; 40: 61–72. https://doi.org/10.1097/WON.0b013e3182750143.

[3] Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, *et al*. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA: A Cancer Journal for Clinicians. 2021; 71: 209–249. https://doi.org/10.3322/caac.21660.

[4] Rendell VR, Pauli EM. Parastomal Hernia Repair. The Surgical Clinics of North America. 2023; 103: 993–1010. https://doi.org/10.1016/j.suc.2023.04.008.

[5] Hamai A, Harada Y, Sogi M. Modifications visibles des muqueuses dues à une colite pseudomembraneuse chez un patient ayant une colostomie sigmoïdienne. Canadian Medical Association Journal. 2023; 195: E599–E600. https://doi.org/10.1503/cmaj.221084-f.

[6] Krogsgaard M, Watt T, Danielsen AK, Klausen TW, Vinther A, Gögenur I, *et al*. Impact of a Parastomal Bulge on Quality of Life - A Cross-sectional Study of Patients From the Danish Stoma Database. Annals of Surgery. 2021; 274: e1085–e1092. https://doi.org/10.1097/SLA.0000000000003743.

[7] Heydari A, Manzari ZS, Pouresmail Z. Nursing Intervention for Quality of Life in Patients with Ostomy: A Systematic Review. Iranian Journal of Nursing and Midwifery Research. 2023; 28: 371–383. https://doi.org/10.4103/ijnmr.ijnmr_266_22.

[8] Jin Y, Tian X, Li Y, Jiménez-Herrera M, Wang H. Effects of continuous care on health outcomes in patients with stoma: A systematic review and meta-analysis. Asia-Pacific Journal of Oncology Nursing. 2021; 9: 21–31. https://doi.org/10.1016/j.apjon.2021.12.006.

[9] Zhou L, Zhang F, Li H, Wang L. Post-discharge health education for patients with enterostomy: A nationwide interventional study. Journal of Global Health. 2023; 13: 04172. https://doi.org/10.7189/jogh.13.04172.

[10] Tan XQ, Huang XL. Effects of postoperative quantitative assessment strategy-based nursing in patients with colorectal cancer. World Journal of Gastrointestinal Surgery. 2025; 17: 100302. https://doi.org/10.4240/wjgs.v17.i3.100302.

[11] Ding P, Zhou Q, Hu J. Managing psychological distress in patients with colorectal cancer: A narrative review of nursing interventions. Medicine. 2025; 104: e44148. https://doi.org/10.1097/MD.0000000000044148.

[12] Parini D, Bondurri A, Ferrara F, Rizzo G, Pata F, Veltri M, *et al*. Surgical management of ostomy complications: a MISSTO-WSES mapping review. World Journal of Emergency Surgery. 2023; 18: 48. https://doi.org/10.1186/s13017-023-00516-5.

[13] Lang J, Haines K. Clinimetrics: Appraisal of Guidelines, Research and Evaluation II. Journal of Physiotherapy. 2019; 65: 176. https://doi.org/10.1016/j.jphys.2019.05.003.

[14] Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, *et al*. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 2017; 358: j4008. https://doi.org/10.1136/bmj.j4008.

[15] Jordan Z, Lockwood C, Munn Z, Aromataris E. The updated Joanna Briggs Institute Model of Evidence-Based Healthcare. International Journal of Evidence-Based Healthcare. 2019; 17: 58–71. https://doi.org/10.1097/XEB.0000000000000155.

[16] Registered Nurses' Association of Ontario. Supporting Adults Who Anticipate or Live with an Ostomy, Second Edition. Registered Nurses' Association of Ontario: Toronto (ON). 2019.

[17] Johnston CF, Tomlinson G, Temple LK, Baxter NN. The management of patients with T1 adenocarcinoma of the low rectum: a decision analysis. Diseases of the Colon and Rectum. 2013; 56: 400–407. https://doi.org/10.1097/DCR.0b013e3182805eb8.

[18] Wound, Ostomy and Continence Nurses Society Guideline Development Task Force. WOCN Society Clinical Guideline: Management of the Adult Patient With a Fecal or Urinary Ostomy-An Executive Summary. Journal of Wound, Ostomy, and Continence Nursing. 2018; 45: 50–58. https://doi.org/10.1097/WON.0000000000000396.

[19] Ferrara F, Rizzo G, Bondurri A, Parini D, Veltri M, Barbierato M, *et al*. Italian Guidelines for the Management of Enteral and Urinary Stomas. Diseases of the Colon and Rectum. 2019; 62: e3–e4. https://doi.org/10.1097/DCR.0000000000001235.

[20] Han Y, Liu Q, Wang SY. Construction of continuous nursing framework for enterostomy patients. Chinese Nursing Research. 2022; 36: 2677–2681. https://doi.org/10.12102/j.issn.1009-6493.2022.15.009. (In Chinese)

[21] Antoniou SA, Agresta F, Garcia Alamino JM, Berger D, Berrevoet F, Brandsma HT, *et al*. European Hernia Society guidelines on preven-

tion and treatment of parastomal hernias. Hernia. 2018; 22: 183–198. https://doi.org/10.1007/s10029-017-1697-5.

[22] ACPGBI Parastomal Hernia Group. Prevention and treatment of parastomal hernia: a position statement on behalf of the Association of Coloproctology of Great Britain and Ireland. Colorectal Disease. 2018; 20: 5–19. https://doi.org/10.1111/codi.14249.

[23] Hao J, Xu Y, Li H. The Value of Applying a Continuous Nursing Model Based on Virtual Platforms for Patients with Colostomy or Ileostomy. Advances in Skin & Wound Care. 2023; 36: 206–212. https://doi.org/10.1097/01.ASW.0000919960.94295.53.

[24] Han Y, Han Y, Huang W, Liu Y, Wang Z, Zhao W, *et al*. Effects of nurse-led interventions on enhancing patient-related outcomes in colorectal cancer management throughout the cancer care continuum: A systematic review and meta-analysis. International Journal of Nursing Studies. 2025; 168: 105100. https://doi.org/10.1016/j.ijnurstu.2025.105100.

[25] Brandsma HT, Hansson BME, Aufenacker TJ, van Geldere D, van Lammeren FM, Mahabier C, *et al*. Prophylactic mesh placement to prevent parastomal hernia, early results of a prospective multicentre randomized trial. Hernia. 2016; 20: 535–541. https://doi.org/10.1007/s10029-015-1427-9.

[26] Caiado A, Cabral FX, Barroca R. Closure of Transverse Loop Colostomy. Diseases of the Colon and Rectum. 2023; 66: e301. https://doi.org/10.1097/DCR.0000000000002671.

[27] Society for Oncological Nutrition, Chinese Anti-Cancer Association. Expert consensus on the whole-course nutritional management of colorectal cancer patients with enterostomy (version 2025). Chinese Journal of Gastrointestinal Surgery. 2025; 28: 599–608. https://doi.org/10.3760/cma.j.cn441530-20250512-00183. (In Chinese)

[28] Dahouri A, Sahebihagh MH, Gilani N. Comparison of sexual function of people with colorectal cancer with and without colostomy bag in Iran: a comparative cross-sectional study. Scientific Reports. 2023; 13: 12558. https://doi.org/10.1038/s41598-023-39728-9.

[29] Wiltink LM, White K, King MT, Rutherford C. Systematic review of clinical practice guidelines for colorectal and anal cancer: the extent of recommendations for managing long-term symptoms and functional impairments. Supportive Care in Cancer. 2020; 28: 2523–2532. https://doi.org/10.1007/s00520-020-05301-7.

[30] Cheng Y, Chen YX. Effects of high-quality nursing on surgical site wound infections after colostomy in patients with colorectal cancer. World Journal of Gastrointestinal Surgery. 2024; 16: 3835–3842. https://doi.org/10.4240/wjgs.v16.i12.3835.

[31] Onerup A, Angenete E, Bock D, Börjesson M, Fagevik Olsén M, Grybäck Gillheimer E, *et al*. The effect of pre- and post-operative physical activity on recovery after colorectal cancer surgery (PHYSSURG-C): study protocol for a randomised controlled trial. Trials. 2017; 18: 212. https://doi.org/10.1186/s13063-017-1949-9.