

Effects of Different Health Education Models on Self-care Ability, Anxiety and Quality of Life in Patients with Enterostomy: A Mesh Meta-analysis

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Abstract: To explore the intervention effects of different health education models in enterostomy patients by using mesh meta-analysis, so as to provide a reference for enterostomy patients to choose the best health education model. PubMed, Web of Science, Embase, Cochrane Library, MEDLINE, CINAHL, CNKI, CBM, VIP and Wanfang data were searched for randomized controlled trials(RCT) on the efficacy of different health education modes in enterostomy patients from the inception to January 2023. Data were extracted and methodological quality was evaluated. Mesh meta-analysis was performed by Addis1.16.5 software. A total of 12 RCTS were included, involving 1158 patients with enterostomy. The study shows that the TIR education model has certain advantages in improving patients' self-care ability. The KAP education model has the best effect on regulating anxiety, and the PRECEDE-PROCEED education model is the most likely to be the best choice in improving the quality of life. This study can effectively guide clinical nurses to choose the most suitable health education mode according to the purpose of health education, so as to improve the effect of health education.

Keywords: Enterostomy, Health education model, Self-care ability, Anxiety, Quality of life, Mesh meta-analysis

1. Introduction

An enterostomy is a surgical procedure that connects the intestinal cavity to the abdominal wall to create a new intestinal opening in the abdomen to drain waste^[1]. Enterostomy is a very important treatment, but it changes the patient's body structure and physiological function, and has a great impact on the patient's physical and mental, social adaptability and quality of life^[2]. Compared with other diseases, health education for patients with ostomy has higher requirements in terms of theoretical expertise, operational skill complexity, etc. It is necessary to fully take into account the improvement of patients' physical and mental symptoms^[3], improve patients' self-care ability and stomy adaptation level^[4], and ultimately improve patients' quality of life^[5]. Health education for patients with ostomy has received more attention from scholars and experts. In recent years, more and more health education models have been explored and applied to clinical practice, such as PRECEDE-PROCEED model, Knowledge Attitude Belief Practice (KABP), etc. Compared with traditional health education methods, these new health education models have more distinct characteristics and advantages. However, there are no studies on the intervention effects of these different health education models. Therefore, it is of great practical significance to evaluate the effect of different health education models scientifically and objectively. Mesh meta-analysis can obtain the best intervention measures without direct comparison^[6]. In view of this, the mesh meta-analysis method was used in this study to analyze and systematically compare the intervention effects of different health education models on enterostomy patients, aiming to provide the best theoretical basis for the health education mode for clinical enterostomy patients and improve the effect of health education.

2. Materials and methods

2.1 Search Strategy

Computer search of Pubmed, Web of Science, Embase, The Cochrane Library, Medline, CINAHL, CNKI, CBM, VIP and WanFang databases for randomized controlled trials (RCTs) of intervention effects of different health education modes on patients with enterostomy in English only, with a search deadline of April 2023. Chinese search terms include: enterostomy, artificial anus, artificial stomy, health education, health guidance, randomized controlled trial, randomized. English search terms include: Ostomy, Surgical stoma, intestinal stoma, Health education, Health guidance, Education, etc.

2.2 Inclusion and Exclusion Criteria

The inclusion criteria for this mesh meta-analysis were developed in strict accordance with the PICOS principles: ①Population: Patients with age ≥ 18 years old underwent enterostomy, regardless of gender; ②Intervention: Different health education modes were adopted in the experimental group; ③Comparison: traditional health education in the control group ④ Outcome: self-care ability (using the Exercise of Self-Care Agency), anxiety (using the Self-Rating Anxiety Scale), quality of life (using the 36-item Short-Form health survey); ⑤Study design: randomized controlled trial (RCT).

Exclusion criteria: (i) duplicate publications; (ii) the original literature is difficult to obtain or the original data report is incomplete; (iii) only abstracts or conference papers, academic papers, case reports, etc; (v) non-Chinese and English literature.

2.3 Literature Screening and Data Extraction

Literature screening and information extraction were performed independently by two evaluators according to the established inclusion and exclusion criteria, and any disagreement was decided through discussion or by a third researcher. The literature screening was done by first reading the title and abstract, and after excluding obviously irrelevant literature, the full text was further read to determine the final inclusion of information. Data were extracted using Excel. The extracts included: year of publication, first author, sample size, intervention measures, intervention period, outcome indicators, etc.

2.4 Risk of Bias Assessment of Included Studies

Risk of bias was assessed by two evaluators according to the Cochrane systematic reviews manual 5.1.0.

2.5 Statistical Analysis

The data included in this study were continuous variables, and the mean difference (MD) and 95% confidence intervals (CI) were used as effect indicators for the continuous variables. Addis software is used to draw a Bayesian network meta-analysis graph to show the direct and indirect comparative relationships that exist between different health education models. The potential scale reduction factor (PSRF) is used to test the convergence degree of the model. The more its value tends to 1, the better the convergence degree of the model. Markov chain Monte Carlo (MCMC) algorithm is used to get the ranking probability weight chart, and the effect of different health education models is ranked.

3. Results

3.1 Literature Screening Results

Twelve papers were finally included^[7-18], with a total of 1158 patients underwent enterostomy.

3.2 Basic Characteristics of the Included Studies

A total of 12 studies are included in this study, including 9 health education models: Knowledge Attitude Belief Practice model, Snyder's hope theory model, ADOPT nursing model, PRECEDE model,

Transtheoretical model, Collaborative care model, Homogeneous health education model, PRECEDE-PROCEED model, and timing theory education model. Twelve studies were all from China. The basic characteristics of the included literature are shown in Table 1.

Table 1: Basic characteristics of included studies.

Inclusion in the study	Number of samples		Intervention		Time	Outcome
	Experimental group	Control group	Experimental group	Control group		
Xu 2016	52	52	E	J	Hospitalization period	①
Huang 2016	30	30	A	J	Hospitalization period	②
Liu 2017	81	83	B	J	Hospitalization period	②
Zhang 2017	57	57	E	J	6 months after surgery	①③
Chen 2018	30	30	C	J	2 months after surgery	③
Li 2019	37	37	H	J	Hospitalization period	③
Li 2019	42	42	D	J	Hospitalization period	②
Xiao 2020	26	26	G	J	Hospitalization period	①
Peng 2020	36	36	G	J	Hospitalization period	①
Zhang 2020	55	53	I	J	Hospitalization period and follow-up for 6 months after discharge	①
Dai 2019	43	43	F	J	Hospitalization period	②
Cong 2022	33	33	D	J	Hospitalization period	②

Note: A indicate Knowledge Attitude Belief Practice model, B indicate Snyder's hope theory model, C indicate ADOPT nursing model, D indicate PRECEDE model, E indicate Transtheoretical model, F indicate Collaborative care model, G indicate Homogeneous health education model, H indicate PRECEDE-PROCEED model, I indicate timing theory education model, J indicate conventional health education. ① indicate self-care ability, ② indicate anxiety, ③ indicate quality of life.

3.3 Risk of Bias Evaluation of Included Studies

Included studies were assessed for risk of bias according to the Cochrane Handbook of Systematic Reviews 5.1.0 for the twelve included studies (see Figure 1).

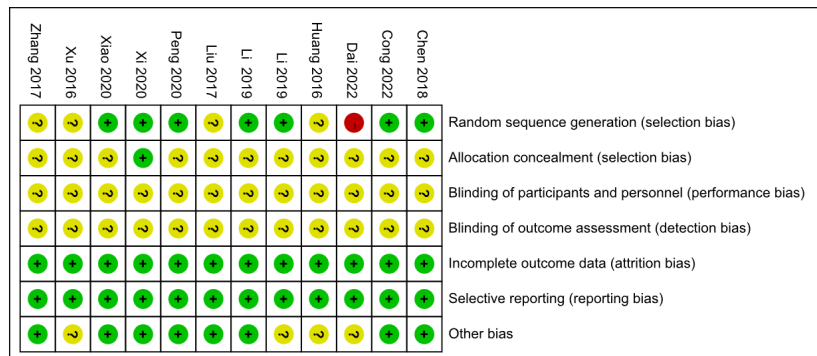
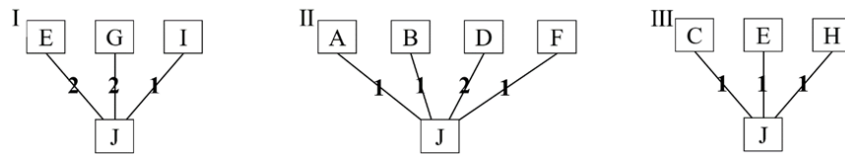


Figure 1: Inclusion of study bias risk assessment.

3.4 Network Meta-Analysis Graph

The network meta-analysis graph of different health education models are shown in Figure 2. Each line represents direct comparative studies between the two interventions, and the numbers on the lines represent the number of included studies. Since there is no closed loop in the network meta-analysis graph drawn by each outcome indicator in this study, no consistency test is required, and the results can be statistically analyzed under the consistency model.



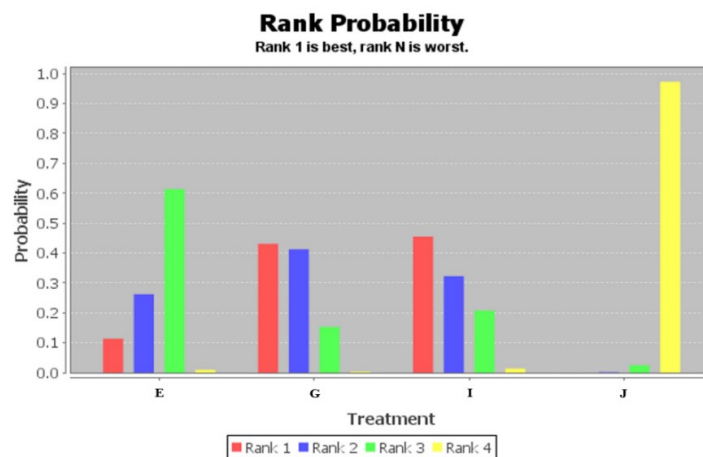
Note: I represent self-care ability results, II represent anxiety results, III indicate quality of life results. A indicate Knowledge Attitude Belief Practice model, B indicate Snyder's hope theory model, C indicate ADOPT nursing model, D indicate PRECEDE model, E indicate Transtheoretical model, F indicate Collaborative care model, G indicate Homogeneous health education model, H indicate PRECEDE-PROCEED model, I indicate timing theory education model, J indicate conventional health education.

Figure 2: Network meta-analysis graph.

3.5 Network Meta-Analysis Results

3.5.1 Self-Care Ability

A total of 5 studies were included, and their network meta-analysis results showed: Compared with traditional health education, cross-theoretical model [MD=20.48, 95%CI=(5.48, 34.45)], homogeneous health education model [MD=25.21, 95%CI=(11.07, 38.64)], timing theory education model [MD=25.40, 95%CI=(5.67,45.55)] were statistically significant in improving the ESCA score of patients; There was no significant difference between different health education models. According to Addis ranking probability results, the priority order of health education mode to improve patients' self-care ability is timing theory education mode > homogeneous health education mode > cross-theoretical model > conventional health education, as shown in Figure 3.

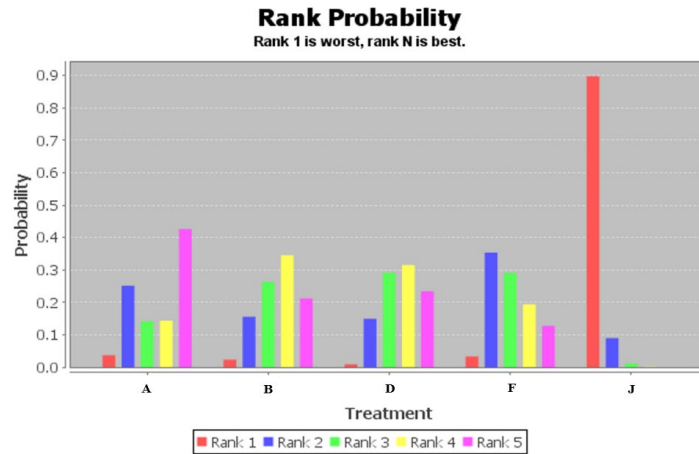


Note: E indicate Transtheoretical model, G indicate Homogeneous health education model, I indicate timing theory education model, J indicate conventional health education.

Figure 3: Ranking probability of the influence of different educational models on self-care ability of enterostomy patients

3.5.2 Anxiety

A total of 5 studies were included, and the network meta-analysis results showed that compared with traditional health education, PRECEDE model [MD=-9.14, 95%CI=(-15.73, -2.20)] had a statistically significant difference in reducing the SAS score of patients, and there was no statistically significant difference in other comparisons. There was no significant difference between different health education models. Addis ranking probability results show that the effect of different health education models on alleviating anxiety is ranked as follows: Knowledge Attitude Belief Practice model > PRECEDE model > Snyder's hope theory model > Collaborative care model > traditional health education, as shown in Figure 4.

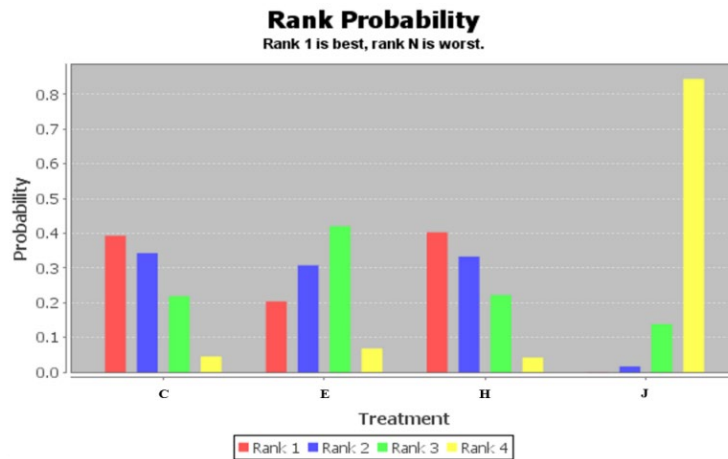


Note: A indicate Knowledge Attitude Belief Practice model, B indicate Snyder's hope theory model, D indicate PRECEDE model, F indicate Collaborative care model, J indicate conventional health education.

Figure 4: Ranking probability of the influence of different educational models on anxiety of enterostomy patients

3.5.3 Quality of Life

A total of 3 studies were included, and the network meta-analysis results showed: Compared with traditional health education, ADOPT nursing model [MD=12.51, 95%CI=(-3.43, 28.76)], Transtheoretical model [MD=10.25, 95%CI=(-5.97, 26.38)], PRECEDE-PROCEED model [MD=12.63, 95%CI=(-3.30,29.71)] had no statistical significance in improving SF-36 score, and there was no significant difference between different health education models. According to Addis ranking probability results, the effect of different health education models on improving patients' quality of life is ranked from excellent to inferior as PRECEDE-PROCEED model > ADOPT nursing model > Transtheoretical model > traditional health education, as shown in Figure 5.



Note: C indicate ADOPT nursing model, E indicate Transtheoretical model, H indicate PRECEDE-PROCEED model, J indicate conventional health education.

Figure 5: Ranking probability of the influence of different educational models on quality of life of enterostomy patients

4. Discussion

4.1 Timing Theory Education Model Has the Best Effect On Improving Self-Care Ability of Enterostomy Patients

The best evidence shows that the emphasis of health education for enterostomy patients at different stages of treatment should be different^[19], which is exactly in line with the timing theory proposed by Cameron et al^[20], who dividing the disease process of patients into diagnosis stage, treatment stage,

discharge preparation stage, adjustment stage and adaptation stage. It is emphasized that caregivers should provide information, emotional and social support according to patients' needs at different stages of care. Wen et al. [21] carried out nursing education based on the timing theory for 33 patients with colostomy, using manuals and pictures to explain, demonstrate and preach according to the different needs of patients at different stages of the disease. The results showed that applying the timing theory to nursing education for patients with enterostomy could effectively improve patients' self-care ability and reduce the occurrence of stoma complications. The results of this study confirmed that compared with other health education models, health education based on timing theory has the best effect in improving the self-care ability of patients with enterostomy. The reason may be that through providing targeted guidance for dynamic assessment of patients' different needs at different stages, patients can continue to acquire systematic and targeted disease treatment knowledge and self-care skills. It can better meet their self-care needs, so as to improve patients' self-care ability[22].

4.2 The KABP Education Model Has More Advantages In Alleviating the Anxiety of Patients With Enterostomy

Physical suffering and psychological trauma have brought a double blow to patients with enterostomy, which is easy to lead to anxiety[23]. Some studies have reported that about 50% of patients have serious anxiety[24]. Therefore, timely improvement of patients' psychological state is an important part of nursing work[25]. Knowledge Attitude Belief Practice model is one of the models to promote human health behavior, which divides human behavior change into three interrelated stages: knowledge acquisition, belief building and behavior improvement. Among them, knowledge acquisition is the basis for behavior improvement, belief building provides the motivation for behavior improvement, and behavior improvement is the goal[26]. Wu et al.[27] implemented nursing intervention based on knowledge and practice mode in 40 patients with permanent enterostomy for 6 months, which can effectively improve patients' cognition of enterostomy related knowledge, reduce adverse emotions, promote patients to adopt healthy behaviors, and improve their quality of life. The results of this study confirmed that the health education based on knowledge and action mode has more significant advantages in relieving the anxiety of patients with enterostomy. KABP education model is a comprehensive education for patients in the three aspects of "knowledge", "belief" and "action", which can gradually improve patients' mastery of disease-related knowledge, strengthen their correct cognition of the disease, and then improve their psychological endurance, help patients establish positive beliefs and attitudes, reduce psychological pressure and enhance treatment confidence, and improve patients' internal motivation for behavior change, ultimately regulating anxiety[28].

4.3 The PRECEDE-PROCEED Model is The Best Health Education Model To Improve The Quality Of Life of Enterostomy Patients.

With the transformation of the medical model, the purpose of medical treatment is no longer simply to extend the life cycle of patients, but to pay more attention to the quality of life[29]. Health education based on PRECEDE-PROCEED model has the best effect in improving the quality of life of patients, and its advantage lies in its unique systematism, comprehensiveness and pertinence. Through the implementation of 9 closely related steps, including social assessment, epidemiological assessment, behavioral environment assessment, educational organization assessment, management policy assessment, implementation, process evaluation, impact evaluation and result evaluation[30], a comprehensive analysis of numerous influencing factors of health from the aspects of psychology, physiology, society and environment is carried out, and a multi-level health education plan is formulated, implemented and evaluated, Finally improving patients' self-care ability and health management knowledge, changing bad behaviors, and improving patients' quality of life[31]. Huang et al.[32] conducted 12 weeks of PRECEDE-PROCEED model health education intervention on 37 patients with preventive enterostomy, and the results showed that PRECEDE-PROCEED model health education could significantly improve patients' self-management ability and quality of life, and effectively reduce the incidence of ostomy-related complications. Therefore, clinical nurses can prioritize the use of PRECEDE-PROCEED model for health education of enterostomy patients.

4.4 Limitations

According to the standards of inclusion and exclusion, as many as 9 health education models were finally included in this study, but there were only 12 literatures, and the included studies were all from China, which may affect the strength of evidence. In addition, among the 12 RCTS included, only 1

study mentioned assign hidden, and the other 11 literatures did not explain the blind method, which may lead to bias in selection, implementation and measurement. Finally, although the included subjects were all enterostomy patients, different types of diseases undergoing enterostomy, different medical levels in hospitals and different implementation of health education models may lead to certain heterogeneity in the study results.

5. Conclusion

In this study, a mesh meta-analysis of 12 RCTS included on the intervention effects of 9 health education models on patients with enterostomy was conducted. The results showed that the Timing theory education model, Knowledge Attitude Belief Practice model, and the PRECEDE-PROCEED model were the most effective in improving patients' self-care ability, improving anxiety and improving quality of life. In clinical practice, the characteristics and actual situation of patients with enterostomy should be fully considered, and the appropriate health education model should be selected to carry out health education. However, due to the limitations of the quantity and quality of the literatures included in this study, and the lack of direct comparison studies between different health education modes, the results need to be demonstrated by future multi-center, large-sample randomized double-blind trials to provide more reliable evidence support for the selection of the best health education model for patients with enterostomy.

References

- [1] Son H, Kang Y. *Coping Processes of Patients with Ostomies in South Korea: A Focus Group Study* [J]. *Healthcare*, 2021, 9(1): 21.
- [2] Chang ZM, Wang JL, Chou J, et al. *Relationship between benefit finding and quality of life among colorectal cancer patients with stoma at early stage*[J]. *J Nurs Sci*, 2022, 37(19): 75-77.
- [3] Harris MS, Kelly K, Parise C. *Does preoperative ostomy education decrease anxiety in the new ostomy patient? A quantitative comparison cohort study*[J]. *J Wound Ostomy Continence Nurs*, 2020, 47(2): 137-139.
- [4] Liu QL, Zhang J, Zhang J, et al. *The influence of mind mapping schema health education on postoperative self-care ability of patients with enterostomy*[J]. *Chinese Journal of General Practice*, 2022, 20(9): 1615-1619, 1630.
- [5] Du X, Yang Y, Wang L, et al. *Effects of microvideo-based health education on stoma self-care ability and quality of life in patients with permanent enterostomy*[J]. *J Nurs Sci*, 2021, 36(16): 47-49.
- [6] Jia MT, Zhu HF, Hou LY, et al. *Method to draw conclusions from a network meta-analysis: a minimally contextualised framework*[J]. *Chinese Journal of Evidence-Based Medicine*, 2021, 21(09): 1102-1109.
- [7] Xu YR, Bian LY, Liu XL, et al. *Application of trans-theoretical model to improve self-care ability of patients with colostomy*[J]. *China Journal of Modern Medicine*, 2016, 26(8): 135-138.
- [8] Huang SX, Chen JJ, Li CM, et al. *KAP education model the impact of colostomy quality of life of patients with mouth*[J]. *Modern Nurse*, 2016, (06): 126-127.
- [9] Liu QY, Xu LX, Shi J. *Application of Snyder's hope theory model in wound stomy management*[J]. *Guangdong Medical Journal*, 2017, 38(18): 2886-2888.
- [10] Zhang LX. *Influence of Health Education Based on Cross Theoretical Model on Self-care Ability and Quality of Life of Elderly Patients with Postoperative Colon Stoma*[J]. *Chinese Primary Health Care*, 2017, 31(4): 46-48.
- [11] Chen CP, Zhou T, Li QY, et al. *Study on the effect of ADOPT nursing on the level of colostomy adaptation, GSES and SF-36 scores in patients with colostomy*[J]. *Modern Medical Journal*, 2018, 46(12): 1419-1422.
- [12] Li HH. *Effects of health education based on PRECEDE-PROCEED model on self-care ability and quality of life in patients with permanent colostomy after rectal cancer surgery*[J]. *Modern Medical Imagelogy*, 2019, 28(06): 1417-1418.
- [13] Li YH, Cao S. *Effects of PRECEDE model-based care in elderly patients undergoing colostomy for colorectal cancer*[J]. *Modern Journal of Integrated Traditional Chinese and Western Medicine*, 2019, 28(10): 1120-1123.
- [14] Xiao LZ. *Effect of homogeneous health education model on postoperative colostomy in patients with rectal cancer*[J]. *Modern Nurse*, 2020, 27(3): 109-111.
- [15] Peng FJ, Qiu S, Zhu SX, et al. *Effects of homogenous medical health education model on disease knowledge and self-care ability of patients with colostomy after rectal cancer operation*[J]. *Chinese*

Clinical Nursing, 2020, 12(2): 149-152.

[16] Xi Z, Gao R, Lin JL, et al. Effects of hospital-family holistic care model on the health outcome of patients with permanent enterostomy based on the theory of 'Timing It Right'[J]. *Journal of Clinical Nursing*, 2020, 29(13-14): 2196-2208.

[17] Dai DQ, Wang XY. The effect of collaborative nursing model on postoperative nursing and self-nursing ability of colorectal cancer patients[J]. *DA JIAN KANG*, 2022, (17): 90-92.

[18] Cong J, Tang H. Practical implications of PRECEDE model-based care in elderly patients undergoing colorectal cancer ostomy surgery[J]. *Zhonghua Yangsheng Baojian*, 2022, 40(11): 107-110.

[19] Si LM, Liu F, Zhang PY, et al. Evidence summary of perioperative health education for patients undergoing ostomy surgery[J]. *Chin J Nurs*, 2021, 56(3): 452-457.

[20] Cameron JI, Gignac MA. "Timing It Right": A conceptual framework for addressing the support needs of family caregivers to stroke survivors from the hospital to the home[J]. *Patient Education and Counseling*, 2008, 70(3): 305-314

[21] Wen F, Chen SM, Ling ZL. Effects of nursing education model based on timing theory education model on psychological burden, quality of life and incidence of colostomy complications in colostomy patients [J]. *Jilin Medical Journal*, 2022, 43(12): 3368-3371.

[22] Ji L, Jin RH, Zheng J. Influence of home nursing on self-care ability of middle-aged and young stroke patients and the care ability of their caregivers based on "Time It Right". *Chinese Nursing Research*, 2018, 32(9): 1393-1397.

[23] Khalilzadeh GM, Tirgari B, Roudi RO, et al. Studying the effect of structured ostomy care training on quality of life and anxiety of patients with permanent ostomy[J]. *International Wound Journal*, 2019, 16(6): 1383-1390.

[24] Koc MA, Akyol C, Gokmen D, et al. Effect of Prehabilitation on Stoma Self-Care, Anxiety, Depression, and Quality of Life in Patients With Stomas: A Randomized Controlled Trial[J]. *Diseases of the Colon & Rectum*, 2023, 66(1): 138-147.

[25] Wu QZ, Gao MY. Research progress of psychological nursing intervention to relieve stigma and anxiety in patients with permanent colorectal cancer postoperatively[J]. *International Journal of Nursing*, 2021, 40(12): 2296-2301.

[26] Wei QF, Xie ZF, Wei DX, et al. Development and psychometric testing of the stoma knowledge-attitude-practice questionnaire among intestinal stoma patients[J]. *Chinese Journal of Nursing Education*, 2017, 14(11):815-819.

[27] Wu YX, Zhang SH, Wang B. The effect of Knowledge Attitude Belief Practice model on quality of life in patients with permanent enterostomy[J]. *Modern Nurse*, 2020, 27(12): 44-46.

[28] Chen CX, Feng XS, Xu X. Application value of knowledge, attitude and practice model in patients before gastrointestinal endoscopy in gastroenterology department[J]. *Chinese Journal of Practical Nursing*, 2021, 37(33): 2589-2593.

[29] Tang YM, Zhang GJ, Ma J. Correlation between symptom groups and quality of life in elderly patients with enterostomy[J]. *Chinese Journal of Gerontology*, 2022, 42(2): 477-480.

[30] Qiao SL, Wang L, Yuan ML, et al. Application and research progress of PRECEDE-PROCEED model in health intervention [J]. *Occupation and Health*, 2021, 37(12):1716-1719.

[31] Du J, Wang BQ, Ning Y, et al. Study on effect of health education based on Green's model on improving the quality of life of patients with sudden deafness[J]. *Chinese Nursing Research*, 2021, 35(5): 916-920.

[32] Huang J. Green Model of Health Education for Prevention Evaluation of the Effect of Enterostomy [D]. *Guangxi University of Chinese Medicine*, 2022.