ChinaRxiv

AI translation · View original & related papers at
chinarxiv.org/items/chinaxiv-202311.00141

Applied Research on Multidisciplinary Collaborative Intervention Based on Chronic Disease Trajectory Model in Maintenance Hemodialysis Patients

Authors: Zhang Caifeng, Wang Lu, Bojie, Zhang Caifeng

Date: 2023-11-16T00:00:00+00:00

Abstract

Objective This study employed both subjective and objective indicators from two dimensions to investigate the effects of multidisciplinary collaborative intervention based on the chronic disease trajectory model on personal life mastery, negative emotions, and complications in maintenance hemodialysis (MHD) patients. Methods A total of 200 MHD patients were enrolled as study subjects and randomly divided into an experimental group and a control group, with 100 cases in each group. The control group received general nursing intervention, while the experimental group received multidisciplinary collaborative intervention based on the chronic disease trajectory model. Subjective indicators including the Personal Mastery Scale (PMS) and Hospital Anxiety and Depression Scale (HADS), as well as the objective indicator of complications, were used to evaluate the intervention effects in both groups before and after the intervention. Results Ultimately, 98 and 99 MHD patients were included in the experimental group and control group, respectively. After the intervention, PMS scores in both groups were higher than before the intervention, with the experimental group showing significantly higher scores than the control group, and the difference was statistically significant ($P<0.05$). After the intervention, HADS scores in both groups decreased compared with before the intervention, and the reduction was greater in the experimental group than in the control group, with a statistically significant difference ($P<0.05$). During the 5-month intervention period, the complication rate in the control group was 35.35%, which was 2.474 times that of the experimental group, and the difference was statistically significant ($P<0.05$). Conclusion Multidisciplinary collaborative intervention based on the chronic disease trajectory model can enhance personal life mastery, reduce negative emotions, and decrease the occurrence of medium-

and long-term complications in MHD patients, thereby facilitating disease recovery and improving quality of life.

Full Text

Preamble

Application of Multidisciplinary Collaborative Intervention Based on the Chronic Disease Trajectory Model in Maintenance Hemodialysis Patients

Cai-Feng Zhang[1], Lu Wang[2], Jie Bo[3]
Corresponding Author: Cai-Feng Zhang, Charge Nurse
Cangzhou People's Hospital, Cangzhou, Hebei 060001, China

Abstract

Objective: This study employed both subjective and objective indicators to investigate the effects of multidisciplinary collaborative intervention based on the chronic disease trajectory model on personal mastery, negative emotions, and complications in maintenance hemodialysis (MHD) patients. **Methods:** A total of 200 MHD patients were enrolled and randomly divided into an experimental group and a control group (100 patients each). The control group received routine nursing care, while the experimental group received multidisciplinary collaborative intervention based on the chronic disease trajectory model. Subjective indicators (Personal Mastery Scale [PMS], Hospital Anxiety and Depression Scale [HADS]) and objective indicators (complications) were used to evaluate intervention outcomes before and after the intervention. **Results:** Ultimately, 98 and 99 MHD patients were included in the experimental and control groups, respectively. Post-intervention PMS scores increased significantly in both groups, with the experimental group showing markedly higher scores than the control group ($P < 0.05$). HADS scores decreased in both groups after intervention, with a greater reduction observed in the experimental group ($P < 0.05$). During the 5-month intervention period, the complication rate in the control group was 35.35%, which was 2.474 times higher than that in the experimental group ($P < 0.05$). **Conclusion:** Multidisciplinary collaborative intervention based on the chronic disease trajectory model can enhance personal mastery, reduce negative emotions, and decrease medium- to long-term complications in MHD patients, thereby facilitating disease recovery and improving quality of life.

Keywords: chronic disease trajectory model; maintenance hemodialysis; mental health status

Introduction

End-stage renal disease (ESRD) represents the final stage of various chronic kidney diseases, characterized by a decline in renal function lasting more than three months, necessitating long-term renal replacement therapy (RRT) [1]. With accelerating global aging, increased life expectancy, and changing lifestyle habits, the incidence of ESRD is rising annually [2,3]. In the United States, the incidence of ESRD ranges from 2.2% to 8.5% [4], while in China, the prevalence is 5.79% with an annual mortality rate of 6.4% [5], constituting a significant public health challenge. Due to limited donor availability, hemodialysis (HD) has become the most common renal replacement therapy for ESRD [6]. Maintenance hemodialysis (MHD) demonstrates favorable therapeutic outcomes for renal failure patients; however, long-term dialysis is associated with various complications, most notably cardiovascular disease, which carries high mortality [7], as well as vascular access infections [8]. Moreover, patients at this stage face heavy psychological burdens, vulnerable circumstances, and existential conflicts due to high mortality rates, complex etiologies, and multiple comorbidities [9]. Optimizing psychological management and improving mental health status have thus become critical clinical research priorities.

The chronic disease trajectory model, proposed by Corbin and Strauss in 1991, advocates for stage-specific nursing interventions tailored to disease progression, aiming to improve psychological status and reduce complications [10,11]. This model has demonstrated efficacy in interventions for malignant tumors, chronic renal failure, COPD, and other conditions [12-14]. MHD patients with ESRD experience anxiety, depression, sleep disturbances, and loss of life control as their disease progresses, severely impacting self-management capacity and treatment confidence. Conventional nursing interventions lack specificity and yield suboptimal outcomes. Therefore, this study administered chronic disease trajectory model-based nursing interventions to 200 MHD patients treated in our hospital's dialysis unit from January 2020 to January 2022, investigating its impact on personal mastery, psychological resilience, and negative emotions including anxiety and depression.

Methods

1.1 General Information

This study complied with the 2013 revision of the Declaration of Helsinki and adhered strictly to medical ethics principles. Using convenience sampling, 200 MHD patients treated in our hospital between August 2022 and January 2023 who met inclusion criteria were enrolled. Inclusion criteria: (1) confirmed ESRD diagnosis per guidelines [15]; (2) undergoing MHD treatment for $ $3 months with frequency $ $3 sessions/week; (3) age $ $18 years; (4) normal language expression, vision, hearing, and literacy; (5) informed consent and voluntary participation. Exclusion criteria: (1) severe infection, other systemic diseases, or malignancy; (2) recent history of infection, fever, or surgery; (3) severe in-

tellectual, hearing, vision, or communication impairments. Exclusion during study: patients developing fatal conditions, death, or lost to follow-up due to force majeure.

A total of 200 eligible patients were randomly assigned using a random number table (100 per group). Two patients in the experimental group died during month 2 of intervention; one control group patient received a kidney transplant during month 3. Ultimately, 197 patients completed the study with complete data (98.5% completion rate). The experimental group comprised 58 males and 40 females, aged 63.21 $\pm$ 3.64 years (range: 35-78), with disease duration of 6.36 $\pm$ 3.46 years. The control group included 59 males and 40 females, aged 62.25 $\pm$ 2.94 years (range: 32-78), with disease duration of 7.36 $\pm$ 0.23 years. Baseline characteristics showed no significant differences between groups ($P > 0.05$), ensuring comparability.

1.2 Intervention Methods

1.2.1 Control Group The control group received routine nursing care, including admission education, verbal instructions, and weekly centralized health education sessions. Specific measures: (1) Introduction to the ward environment during first admission to reduce culture shock and alleviate unfamiliarity and anxiety, given high patient turnover and frequent repeat visits; (2) Education for patients and caregivers on HD-related knowledge, precautions before, during, and after dialysis, and potential complications; (3) Weekly Friday afternoon video and PowerPoint presentations by the dialysis management team on HD concepts, importance, and key self-management points at home (weight, diet, vascular access management).

1.2.2 Experimental Group The experimental group received multidisciplinary collaborative nursing intervention based on the chronic disease trajectory model, in addition to routine care. The 6-month intervention comprised four phases: pre-dialysis, intra-dialysis, post-dialysis, and post-discharge home management. The first three phases were conducted in-hospital, while home management utilized WeChat platform education and telephone follow-up. The multidisciplinary team included: chief nephrologist, nephrology specialist nurse, cardiologist, hemodialysis specialist nurse, nutritionist, and psychiatrist—all with $ $5 years of chronic kidney disease experience. All team members received systematic training on study protocols before participation. Targeted interventions were implemented during each phase:

Pre-dialysis: (1) Psychological care: Conversational assessment with intervention for anxiety or fear; psychotherapy instructors and charge nurses taught breathing meditation (counting breaths) in a comfortable position, focusing attention on the nasal tip while silently counting 20-50 breaths until calm; (2) Nutritional assessment: Nutritionists evaluated patients based on weight, albumin, subcutaneous fat thickness, and co-developed dietary management plans with charge nurses; (3) Mobile screen-based HD education: Interactive discus-

sions using mobile screens to assess disease knowledge comprehension, covering renal replacement therapy importance, HD principles, pre-dialysis precautions, potential discomfort during HD, and post-treatment home care points.

Intra-dialysis: (1) Patients were instructed to promptly report symptoms including nausea, vomiting, dizziness, headache, cramps, chest tightness, chest pain, diaphoresis, pruritus, abdominal pain, or back pain for immediate management; (2) Disease knowledge manuals were provided during lengthy dialysis sessions to distract attention.

Post-dialysis: (1) Weight measurement: Post-dialysis weighing required identical clothing to pre-dialysis; (2) Pre-discharge education: Instruction on vascular access care (puncture site compression time, no bathing on dialysis day, dressing removal after 24 hours), diet management, blood pressure management, and medication management.

Post-discharge home management: Online interventions were conducted weekly (30 minutes/session) for 5 months. The schedule comprised intervention during weeks 1-2 of each month, evaluation in week 3, and reinforcement of identified problems in week 4. Intervention content is detailed in Table 1.

Table 1: Home-Based Multidisciplinary Care Measures for Experimental Group

Period (Weeks)	Intervention Focus	Specific Measures
13-16	Weight management between dialyses ($ $5% of dry weight), nutrition, exercise (>3 sessions/week, 0.5h/session), AV fistula complication prevention	• PPT presentations on weight management targets: $ $5% of dry weight between dialyses; specific limits: 0.5kg/day (once-weekly dialysis), 1kg/day (twice-weekly), 1.5kg/day (thrice-weekly); for age $ $65 years, ~2.5% of dry weight • Strict fluid restriction, avoidance of salty foods, ice chips or chewing gum to stimulate saliva and reduce fluid intake • Warning about complications of excessive interdialytic weight gain: edema, hypertension, heart failure, pericardial effusion; immediate medical attention required for chest tightness, dyspnea, cough, hemoptysis, or orthopnea • Exercise guidance: aerobic exercise, assisted resistance training, breathing exercises; progressive principle to avoid excessive exertion; blood pressure and pulse monitoring before/after exercise; symptom-based exercise cessation • Age-specific recommendations: <50 years—walking, swimming, cycling; $ $50 years—gentle qigong, tai chi, regular walking • AV fistula care: prohibition of injections, blood pressure measurement, or blood draws on fistula arm; no sleeping on arm or wearing accessories; daily inspection for infection signs; post-dialysis compression (10-15 min); ice

Period (Weeks)	Intervention Focus	Specific Measures
17-20	Comprehensive management: weight, diet, exercise all meeting standards; no AV fistula complications	• Patient discussion groups to express difficulties in implementing interventions • Researcher summary of 4-month intervention records identifying persistent problems • Patient narratives of benefits to serve as representation and motivation • Focused education on dietary types using video demonstrations, PPT interpretation, and electronic manuals for 2 weeks, followed by effectiveness evaluation

1.3 Observation Indicators

Primary outcomes assessed at baseline and 5 months post-intervention included personal mastery, anxiety/depression, and complication rates. (1) **Personal Mastery:** Measured using the Personal Mastery Scale (PMS) developed by Pearlin et al. [16] in 1978, assessing perceived control over life events. The 7-item Chinese version [17] demonstrated good reliability (Cronbach's $\alpha = 0.810$). (2) **Anxiety and Depression:** Evaluated using the Hospital Anxiety and Depression Scale (HADS) [18,19], comprising 14 items across two subscales. The Chinese version showed excellent reliability (Cronbach's $\alpha = 0.879$) [20]. (3) **Complication Rate:** Comparison of complications including hematoma, thrombosis, catheter displacement, fistula stenosis, pruritus, and malnutrition.

1.4 Statistical Methods

Data were analyzed using SPSS 25.0. Normally distributed continuous data were expressed as mean ± standard deviation ($\bar{x} \pm s$) and compared between groups using independent samples t-tests. Ordinal data were expressed as rates and compared using rank-sum tests. Pre-post comparisons employed paired t-tests or paired rank-sum tests. Categorical data were expressed as rates or percentages and compared using ^{2} tests. Statistical significance was set at $P < 0.05$.

1.5 Data Collection

Questionnaires were administered by two trained researchers to MHD patients at baseline and 5 months post-intervention. Informed consent was obtained from all participants prior to data collection. Data entry was performed by two individuals independently with cross-verification to ensure accuracy.

Results

2.1 Comparison of PMS Scores Between Groups

Post-intervention PMS scores increased significantly in both groups compared to baseline, with the chronic disease trajectory model-based multidisciplinary intervention group showing substantially higher scores than the routine care group ($P < 0.05$). See Table 1.

Table 1: Comparison of Personal Mastery Scores Between Groups

Group	Pre-intervention	Post-intervention	P-value
Experimental (n=98)	22.08 ± 5.36	29.38 ± 2.45	<0.01
Control (n=99)	21.93 ± 3.24	24.02 ± 5.65	

2.2 Comparison of HADS Scores Between Groups

Post-intervention anxiety and depression scores decreased significantly in both groups, with a greater reduction observed in the chronic disease trajectory model multidisciplinary intervention group compared to the routine care group ($P < 0.05$). See Table 2.

Table 2: Comparison of Anxiety and Depression Levels (HADS) Between Groups

Group	Pre-intervention	Post-intervention	t-value	P-value
Experimental (n=98)	12.36 ± 6.02	8.22 ± 2.66	10.52 ± 4.63	<0.001
Control (n=99)	12.57 ± 5.28	10.04 ± 3.2	12.03 ± 1.08	

2.3 Complication Rates in MHD Patients

The complication rate during the intervention period was 23.53% in the chronic disease trajectory model multidisciplinary intervention group, significantly lower than the 76.47% observed in the routine care group ($P < 0.05$). See Table 3.

Table 3: Comparison of Complication Rates Between Groups

Group	Complication Rate	P-value
Experimental (n=98)	14 (14.29%)	<0.001
Control (n=99)	35 (35.35%)	

Discussion

3.1 Advantages of Multidisciplinary Collaborative Nursing Based on the Chronic Disease Trajectory Model

MHD patients experience prolonged disease courses, complex conditions, heavy economic burdens, and death threats, resulting in significant psychological vulnerability. With 1-3 dialysis sessions weekly, effective nursing care is crucial for prognosis. Current MHD nursing suffers from monotonous approaches and limited research scope, primarily focusing on health education without stage-specific interventions. The chronic disease trajectory model emphasizes tailored measures for different disease phases. This study innovatively applied nurse-led multidisciplinary collaborative care addressing four distinct MHD phases (pre-dialysis, intra-dialysis, post-dialysis, and home management).

Multidisciplinary team (MDT) care is an internationally recognized model comprising comprehensive professional groups (nursing, medical, nutrition, rehabilitation) that collaboratively determine patient management [21]. MDT has proven effective in reducing diagnosis-treatment intervals, optimizing therapeutic regimens, decreasing consultation time, and improving efficiency. Widely applied in oncology, diabetes, and geriatric multimorbidity, MDT significantly enhances treatment outcomes and prognosis [21-23]. In this study, nurses served as core MDT members—the primary implementers and supervisors of MHD care, playing a vital role in treatment and rehabilitation. The MDT team conducted pre-treatment psychological assessments and comprehensive nutritional guidance, resulting in improved personal mastery, reduced anxiety/depression, and significantly lower complication rates compared to the control group.

3.2 Impact on Personal Mastery in MHD Patients

Personal mastery reflects an important indicator of psychological stress regulation, representing an individual's perceived control over their life and environment. Higher mastery correlates with stronger personal beliefs and agency, enhancing self-management behaviors, subjective initiative, positive coping mechanisms, and improving negative emotions to facilitate disease recovery and social reintegration [24-27]. Zhou et al. [27] demonstrated that sense of mastery influences compliance with fluid management in peritoneal dialysis patients. In this study, baseline PMS scores were 22.08 $\pm$ 5.36 and 21.93 $\pm$ 3.24 in the experimental and control groups, respectively—lower than the 25.15 $\pm$ 5.02 reported in kidney transplant recipients by Zhao et al. [28]. This likely reflects that while MHD sustains life, patients face ongoing complications and existential

conflicts, whereas transplantation offers improved survival and thus higher mastery. Post-intervention, the experimental group's PMS score increased to 29.38 ± 2.45, attributable to the 5-month multidisciplinary intervention and tracking that enhanced MHD knowledge, taught access care, nutritional support, exercise, and weight management skills, thereby strengthening patient agency, self-care capacity, and treatment confidence.

3.3 Impact on Negative Emotions and Complications in MHD Patients

Anxiety and depression are the most common psychological issues in MHD patients, associated with treatment chronicity, dialysis knowledge deficits, physical activity limitations, financial stress, lack of family support, and complications [29]. Effective interventions can significantly improve negative emotions and mental health. Li et al. [30] demonstrated that cognitive behavioral therapy markedly improved negative emotions in MHD patients. Bouya et al. [31] showed aromatherapy significantly alleviated anxiety and depression. While chronic disease trajectory model-based nursing has proven effective for anxiety and depression in postoperative glioblastoma [32], post-stroke hemiplegia [33], geriatric coronary disease [34], and post-gastric cancer patients [35], no studies have applied it to MHD patients. This study confirms its efficacy in reducing negative emotions in this population, likely due to pre-treatment MDT assessment, integration of disease education with psychological adjustment techniques, and multidimensional evaluation after each intervention session.

The control group's complication rate of 35.35% was 2.474 times higher than the experimental group's rate, consistent with Zhong et al. [36]. This reflects the chronic disease trajectory model's stage-specific, continuous interventions spanning pre-treatment, treatment, post-treatment, and home care phases. The approach included diverse educational formats, complication prevention and management, and—distinct from previous studies—continuous documentation and assessment with focused discussion of identified problems until resolution. This provided both supervision and intervention reinforcement, effectively reducing preventable complications (hematoma, thrombosis, catheter displacement, malnutrition).

Multidisciplinary collaborative nursing based on the chronic disease trajectory model addresses MHD patients' stage-specific needs while optimizing healthcare resource integration through multidisciplinary teamwork. This approach overcomes single-discipline limitations, involves team members in shared decision-making, enhances scientific rigor, improves diagnostic and treatment efficiency, and optimizes therapeutic regimens. The intervention significantly improves personal mastery, alleviates anxiety and depression, enhances mental health, and reduces medium- to long-term complications. This model holds important implications for improving MHD patients' subjective initiative, treatment adherence, autonomous participation, and end-of-life quality, warranting clinical application and promotion.

References

[1] Stevens Paul E, Levin Adeera, Kidney Disease: Improving Global Outcomes Chronic Kidney Disease Guideline Development Work Group Members,Evaluation and management of chronic kidney disease: synopsis of the kidney disease: improving global outcomes 2012 clinical practice guideline. Ann Intern Med, 2013, 158:

[2] Zhang L, Tang F, Wang F,et al. The prevalence of constipation in end-stage kidney disease patients: A cross-sectional observation study. Medicine (Baltimore). 2022 Oct 28;101(43):e31552.

[3] Kshirsagar AV, Bang H, Bomback AS, et al. A simple algorithm to predict incident kidney disease. Arch Intern Med 2008;168:2466–73.

[4] Grams ME, Chow EK, Segev DL,et al. Lifetime incidence of CKD stages 3-5 in the United States. Am J Kidney Dis. 2013 Aug;62(2):245-52.

[5] Gan L, Zuo L. Current ESRD burden and its future trend in Beijing, China. Clin Nephrol. 2015;83(7 Suppl 1):17-20.

[6] Chazot C, Jean G. The advantages and challenges of increasing the duration and sessions. Nat Clin Pract Nephrol. 2005 frequency of maintenance dialysis Jan;5(1):34-44.

[7] Fujiwara Y, Endo S, Higashida M, et al.The prognostic significance of preoperative nutritional/inflammatory markers and clinicopathological features in resectable esophagectomy patients: possibility of nutritional intervention. Esophagus. 2022 Nov 3.

[8] Marticorena RM, Dacouris N, Donnelly SM. Randomized pilot study to compare metal needles versus plastic cannulae in the development of complications in hemodialysis access. J Vasc Access 2018;19:272–82.

[9] Foote C,Kotwal S,Gallagher M,et al. Survival outcomes of supportive care versus dialysis therapies for elderly patients with end-stage kidney disease: A systematic review and meta-analysis. Nephrology (Carlton), 2016, 21: 241-53.

[10] Li J, Zhou L. Research progress on the chronic disease trajectory model and its application in stroke patient care. J Nurs Sci, 2018,35(08):35-38.

[11] Laigle-Donadey F,Greffard S,Management of glioblastomas in the elderly population. Rev Neurol (Paris), 2020, 176: 724-732.

[12] Wang X, Hu J, Zhao J. Application of nursing intervention based on the chronic disease trajectory model in gynecological malignant tumor patients. Chin J Mod Nurs, 2022,28(18):2481-2485.

[13] Cheng X. Study on the effect of nursing intervention based on the chronic disease trajectory model in non-dialysis chronic renal failure patients. Shanxi Med Univ, 2022.

[14] Bai Y, Zhang J, Zhang L, et al. Application of chronic disease trajectory model nursing in out-of-hospital COPD patient management. Chin J Mod Nurs, 2021,27(25):3467-3471.

[15] Yang C, Huang C, Liu L, et al. Systematic analysis of the current status of Chinese clinical practice guidelines for kidney diseases—application of the Chinese Clinical Practice Guideline Evaluation System. Chin J Nephrol, 2019(12):929-933.

[16] Lee JEC, Silins S, Frank C. Factor structure of a coping measure in the 2013 Canadian Forces Mental Health Survey. Health Rep. 2019 May 15;30(5):26-32.

[17] Yu Y, Zou H. Study on developmental characteristics of positive psychological qualities in migrant children. Chin J Special Educ, 2008(04):78-83.

[18] Hill KE, Kim S, Crail S, et al. A comparison of self-reported quality of life for an Australian haemodialysis and hemodiafiltration cohort. Nephrology (Carlton), 2017, 22(8):624-630.

[19] Luo D, Lin Z, Bian Q, et al. Current status of perceived stigma in inflammatory bowel disease patients and its impact on quality of life, medication adherence, and psychological status. Chin J Nurs, 2018,53(09):1078-1083.

[20] Sun Z, Liu H, Jiao L, et al. Study on reliability and validity of the Hospital Anxiety and Depression Scale. Chin J Clinicians (Electronic Edition), 2017,11(02):198-201.

[21] Kowalczyk A, Jassem J. Multidisciplinary team care in advanced lung cancer. Transl Lung Cancer Res. 2020 Aug;9(4):1690-1698.

[22] Ellis G, Sevdalis N. Understanding and improving multidisciplinary team working in geriatric medicine. Age Ageing. 2019 Jul 1;48(4):498-505.

[23] Chen Y. Analysis of the application value of MDT multidisciplinary collaborative intervention in improving postoperative quality of life in colon cancer patients. J Contemp Clin Med, 2022,35(03):58-59.

[24] Zou M, Wen X, Zhu S, et al. Multidisciplinary collaboration improves quality of life in stroke patients. Chin Health Qual Manage, 2022,29(04):13-17.

[25] Xu N, Chen X, Yang T, et al. Research progress on mastery in breast cancer patients. J Nurs Sci, 2019,34(02):105-108.

[26] Zhou Y, Shan Y, Li Y, et al. Impact of sense of mastery on fluid management behavior compliance in peritoneal dialysis patients. Nurs Res, 2020,34(16):2827-2832.

[27] Bennetter KE, Clench-Aas J, Raanaas RK. Sense of mastery as mediator buffering psychological distress among people with diabetes. J Diabetes Complications. 2016 Jul;30(5):839-44.

[28] Zhao J, Fang X, Meng Q, et al. Current status and influencing factors of personal mastery in kidney transplant recipients. Chin J Nurs, 2022,57(10):1213-1218.

[29] Jiang T, Xiong J. Research progress on negative emotions and pain in maintenance hemodialysis patients. Dialysis Artif Organs, 2020,31(03):58-61.

[30] Li H, Wang L, Zhao L, et al. Systematic review of cognitive behavioral therapy effects on depression, anxiety, and quality of life in maintenance hemodialysis patients. Chin J Evid Based Med, 2017,17(02):152-161.

[31] Bouya S, Ahmadidarehsima S, Badakhsh M, et al. Effect of aromatherapy interventions on hemodialysis complications: A systematic review. Complement Ther Clin Pract. 2018 Aug;32:130-138.

[32] Chen M. Application of nursing intervention based on the chronic disease trajectory model in postoperative radiotherapy glioblastoma patients. Chin J Mod Nurs, 2019(35):4610-4614.

[33] Zhao Y, Li X, Li X. Application observation of chronic disease trajectory model nursing in post-cerebral infarction hemiplegia patients. Heilongjiang Med J, 2021,45(12):1271-1273.

[34] Zhang Y, Zheng M, Wang H. Application of nursing intervention based on the chronic disease trajectory model in improving negative emotions in elderly coronary heart disease patients. J Pract Clin Nurs Sci (Electronic Edition), 2019,4(20):112+121.

[35] Hu X. Changes in negative emotions, quality of life, and cancer-related fatigue scores in post-gastric cancer patients receiving chronic disease trajectory model-based intervention. In: 2019 Zhejiang Provincial Surgery Conference Proceedings. 2019:37.

[36] Zhong L, Zeng Y, Tang X, et al. Effect of Green model intervention on compliance behavior, health cognition, and complications in maintenance hemodialysis patients. Chin J Health Care Med, 2022,24(02):128-131.

Note: Figure translations are in progress. See original paper for figures.

Source: ChinaXiv — Machine translation. Verify with original.