

Original Article

Application value of self-management manual combined with case management superiority model in postoperative management of nasopharyngeal carcinoma after radiotherapy

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Abstract: Objective: To explore the application value of the self-management manual combined with the case management model in postoperative management of nasopharyngeal carcinoma after radiotherapy. Methods: Eighty-four patients with nasopharyngeal carcinoma admitted to Yingtan People's Hospital from May 2020 to April 2022 were retrospectively included in this study. They were divided into the experimental group (receiving self-management manual combined with case management mode scheme, n=42) and the control group (receiving continuous management after conventional nasopharyngeal carcinoma radiotherapy, n=42) according to mode differences. The cancer-related fatigue [Cancer Fatigue Scale (CFS)], comfort status [General Comfort Questionnaire (GCQ)], self-management efficacy [Chinese Strategies Used by People to Promote Health (C-SUPPH)], self-care ability (self-care ability measurement), pain score [Visual analogue scale (VAS)], and quality of life [European Organization for Research and Treatment of Cancer QLQ-C30 (EORTC QLQ-C30)] were compared between the two groups after 4 weeks of radiotherapy. The adverse reactions of the two groups were recorded. Combined with periodic review and follow-up records, the prognostic factors of the two groups of patients were analyzed. Results: After treatment, the scores of physical fatigue (12.83 ± 1.10), emotional fatigue (9.78 ± 1.32), cognitive fatigue (5.62 ± 1.31), and total score of CFS (28.24 ± 2.26) in the experimental group were 12.83 ± 1.10 . The control group physical fatigue (13.90 ± 1.25) points, emotional fatigue (10.55 ± 1.40) points, cognitive fatigue (6.80 ± 1.75) points, and total CFS (31.33 ± 2.59) points in both groups were lower than before treatment. The experimental group was lower than the control group (ALL $P < 0.05$). The physiological, psychological, spiritual, socio-cultural, and environmental scores of the experimental group were higher than those of the control group (all $P < 0.05$). The scores of health knowledge, self-care skills, self-care responsibility, and self-concept score of patients in the experimental group were higher than the control group (all $P < 0.05$). After intervention, the VAS score of the experimental group was lower than that of the control group ($P < 0.05$). After intervention, the EORTC QLQ-C30 score of both groups increased significantly as compared with pre-intervention. The score in the experimental group was significantly higher than that in the control group [(80.05 ± 10.72) vs (68.11 ± 12.10) , $P < 0.05$]. Postoperative (various) adverse reactions in the experimental group were lower than the control group (all $P < 0.05$). The factors influencing the prognosis of nasopharyngeal carcinoma patients were age, tumor stage, and intervention mode by Cox model analysis (all $P < 0.05$). Conclusion: The self-management manual combined with the case management mode can alleviate cancer fatigue, improve postoperative self-management ability, self-care ability, and quality of life of patients with nasopharyngeal cancer radiotherapy, reduce the occurrence of adverse reactions and improve the prognosis of patients. It is worth promoting in clinical settings.

Keywords: Nasopharyngeal carcinoma, postoperative radiotherapy, self-management, case management, application value

Introduction

Nasopharyngeal carcinoma is one of the most common malignant tumors in China. Its inci-

dence ranks first among head and neck malignant tumors [1, 2]. Radiation therapy is the preferred treatment at this stage. After radiotherapy, patients commonly experience adverse

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reactions in the irradiation field, including neck skin fibrosis and oral mucositis. This causes great pain to patients. Some patients with low tolerance may cease treatment [3]. Postoperative management of radiotherapy for patients with nasopharyngeal carcinoma is particularly important. Studies have found that distributing self-management manuals to patients with cancer pain can effectively improve patients' self-management ability and reduce their pain [4]. The traditional self-management mode emphasizes the one-way indoctrination of knowledge, ignoring the particularity of individuals and the leading role of patients [5]. The case management advantage mode (SMCM) focuses on strengthening the advantages of patients and fully reflects the particularity and uniqueness of patients. This management mode has been successfully applied in patients with diabetes and uremic hemodialysis [6-8]. There is no relevant report on the above-mentioned managements in postoperative management of nasopharyngeal carcinoma. The author believes that the combination of the two methods in the postoperative management of nasopharyngeal carcinoma is better. This study aimed to explore the application value of the self-management manual combined with the case management model in the management of nasopharyngeal carcinoma after radiotherapy.

Materials and methods

Basic information

Eighty-four patients with nasopharyngeal carcinoma admitted to Yingtan People's Hospital from May 2020 to April 2022 were retrospectively included in this study. Inclusion criteria: ① Patients who were pathologically confirmed of nasopharyngeal carcinoma according to the Diagnostic Criteria of Nasopharyngeal Carcinoma [9], and received radiotherapy. All patients were diagnosed with nasopharyngeal carcinoma and received radiotherapy; ② Patients with stable disease and consciousness; ③ Patients with complete clinical data. Exclusion criteria: ① Patients combined with other malignant tumors; ② Patients combined with other serious systemic diseases; ③ Patients with a history of mental illness or unable to communicate with others normally; ④ Patients who could not cooperate with follow-up and were lost to follow-up for various reasons. This study included

patients with nasopharyngeal carcinoma who underwent radiotherapy (84 cases). The patients were split into a test group and a control group according to the different methods (n=42). The Ethics Committee of Yingtan People's Hospital approved the implementation of this study.

Methods

The subjects in the control group were provided with conventional management after radiotherapy for nasopharyngeal carcinoma, including relevant education before and after radiotherapy, dietary structure adjustment, adverse reaction coping strategies, medication precautions, and timely psychological counseling. A follow up with patients reminded them of the treatment cycle and plan implementation. Postoperative telephone follow-up was conducted every 3 weeks after discharge. The experimental group accepted the "Self-management Manual" combined case management model. Both groups were followed up for 1 year.

The "self-management manual" covers the following 4 parts: (1) Postoperative management for nasopharyngeal cancer: A management team composed of department director, deputy director of nursing department, head nurse, community nurse, and a dietitian was established. A "self-management manual" was distributed. It covered information regarding nasopharyngeal disease, radiation mechanism, radiation protection, the treatment outcome, the mechanism of postoperative pain, and postoperative medication knowledge. An explanation was provided to patients clarifying that acute radiation damage is controllable and reversible if proper protection and timely intervention are carried out. It was shared that chronic radiation damage such as mouth opening difficulty, muscle fiber of mastication, and neck stiffness is usually irreversible. An emphasis was placed on the importance of functional exercise. (2) Personalized postoperative care: It was jointly formulated by responsible doctors, responsible nurses, dietitians, and community nurses. It included a personalized self-management plan after discharge, functional exercise guidance after radiotherapy, personal emotional stress management, nutrition and health education after surgery, and a follow-up plan with updated records. It included: ① Inform the patient to keep the local skin of the irradiation

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field clean, and remind the patient to gargle for no less than 3 minutes each time. ② Do not use hard objects such as toothpicks to stimulate the red, swollen, and erythematous areas to avoid damage and bleeding of the mucosa because of the increase of brittleness after radiotherapy. ③ Develop regular head and neck function exercise. ④ Nausea and vomiting, gastrointestinal symptoms, caused by chemoradiotherapy can be stopped by antiemetic drugs in advance. ⑤ Exist for patients at risk can be through the mouth to eat nutrition according to its body mass index, the oral nutritional supplements nutrition score calculated dose, and pay attention to avoid mixing the concentration too high. Considering patient tolerance, patients should be reminded to eat rice soup and noodle soup in the beginning, then oral nutritional preparations and follow the principle of "frequent small meals". ⑥ Community nurses should comprehensively assess the patients, including condition, psychology, physiology, and community (social) information. This strengthens the connection between the community and the patients and helps patients with postoperative management. (3) Warm tips: The tips focus on symptoms of adverse reactions after radiotherapy, coping strategies, and pain assessment methods. For example, compound Huangbai liquid coating can be applied externally on the irradiated areas with sensation of itching, burning, swelling, and pain. For patients with severe oral mucositis or pain, 1%-4% sodium bicarbonate mouthwash with anti-bacterial effect or 1% lidocaine liquid can be used to gargle. Guilin watermelon spray and Shuangshuang Houfeng powder, anti-inflammatory analgesia, can be used according to the doctor's advice to promote healing. The consulting phone number, Wechat group number, two-dimensional code of the project, and the introduction of the follow-up plan were provided. (4) Set up a target plan: Completion and progress were recorded in the form of a simple postoperative self-management diary. Information including adverse reactions after radiotherapy, drug dosage and time, adverse drug reactions, diet, and sleep were recorded.

A case management model scheme covers the following 6 items: (1) A WeChat group was established to answer the questions raised by patients online, with three experienced nurses

as administrators. Group rules were introduced. Knowledges of routine care and precautions after radiotherapy for nasopharyngeal cancer, hospitalization system and environment, and medical staff responsible for each bed and their contact information were announced for easy access. Text, pictures, and videos of nasopharyngeal cancer health education knowledge were posted regularly (usually 09:30~11:00). The content included the knowledge of prevention of radiotherapy complications and rehabilitation exercise plan. This included cleaning and protection measures for the skin of radiotherapy site, video exercise for mouth opening, audio tips on how to prevent oral inflammation, how to control infection in response to inflammation of nasopharyngeal cavity, and how to take care of nasal bleeding. (2) Attention should be paid to the psychological health of patients. Nursing staff should take the initiative to communicate with patients, understand their psychological feelings, and provide psychological guidance to patients with psychological burden. After the morning check-up, nurses should summarize the problem records and send them to the WeChat group to remind patients and their families. (3) Interaction and information feedback. Attention should be paid to collecting information when pushing Wechat, reply to patients' questions in time, and keep records. For important problems, problems that are not easy to understand or practical and operational problems, the nursing staff should visit the ward personally to guide and explain in detail. Encourage and praise patients who do well and share their experience in a timely manner. (4) Attach importance to the comfort of patients. Pain can affect patients' mood and quality of life. Patients were instructed to use distraction and relaxation therapy according to the intensity of pain and take oral or injectable painkillers as necessary. For patients who have difficulty in opening their mouth and speaking, Wechat or hand gestures could be used. Accompanying family members were encouraged to participate. For discomforts caused by radiotherapy, including irradiated skin redness, gum swelling, bleeding, nasal discomfort, and bleeding, corresponding treatment measures should be provided to reduce symptoms and discomfort. In the afternoon, songs, stories, news, cross talk, and nutritious food can be pushed in the Wechat group. The patients were advised of balanced diet. A quiet, clean, com-

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comfortable environment were provided to ensure adequate sleep and rest. (5) Patients learn from and encourage one another as a way to increase awareness and participation, inspire confidence in overcoming the disease, and correct their own behavioral deficiencies and deviations. (6) Discharge rehabilitation guidance. The patients were asked to continue to pay attention to Wechat and were provided with guidance on muscle and joint function exercise and diet.

Observation indicator

(1) Cancer-induced Fatigue: Cancer Fatigue Scale (CFS) [10] was used to evaluate the symptoms of cancer-induced fatigue in cancer patients before and after 4 weeks of intervention. The scale included 15 items in 3 dimensions, including physical fatigue, emotional fatigue, and cognitive fatigue. Each item adopted Likert 5 rating (0-4), from “none” to “very much”, with a total score of 0-60 points. The higher score indicated more serious fatigue.

(2) Comfort: General Comfort Questionnaire (GCQ) [11] was used to analyze the comfort level of patients in the two groups 4 weeks after radiotherapy. The scale included four aspects, including physiology, psychology, spirit, and social culture and environment. The scoring system adopted Likert Scale with 1 point corresponding to strongly disagree and 4 points corresponding to strongly agree. The higher the score was, the higher the patient comfort level.

(3) Self-management effectiveness: Chinese Strategies Used by People to Promote Health (C-SUPPH) [12] was used to evaluate the self-management efficacy of patients before and after 4 weeks of intervention. It contained 28 items in 3 dimensions, including 15 items for positive attitude, 10 items for self-stress reduction, and 3 items for self-decision making. Each item was calculated by 1-5, with a total score of 28-140 points. The higher the score, the stronger the self-care confidence of patients. Dimension score = (actual score of dimension/theoretical highest score of this dimension) × 100%.

(4) Self-care: The self-care ability of patients after 4 weeks of intervention was evaluated by self-care ability measurement scale. The scale included a total of 43 items from 4 dimensions,

including health knowledge level, self-care skills, self-care responsibility, and self-concept. Each item was scored with 0-4 points. The higher the score, the stronger the self-care ability of patients [13].

(5) Pain score: Visual analogue scale (VAS) was used to evaluate the pain of the patients before and after 4 weeks of intervention. 0 corresponded to painless, 1-3 points corresponded to mild pain, 4-6 points corresponded to moderate pain, 7-9 points corresponded to severe pain, and 10 points corresponded to intolerable pain [14].

(6) Quality of life: The quality of life of the two groups before and after 4 weeks of intervention was evaluated using the European Organization for Research and Treatment of Cancer QLQ-C30 (EORTC QLQ-C30) [15]. This included 5 functional areas. The overall health scale was selected, with a total score ranging from 0 to 100 points. The higher the score, the better the quality of life.

(7) Postoperative adverse reactions: The adverse reactions after radiotherapy for nasopharyngeal cancer included skin damage at the irradiation field, difficulty in opening the mouth, oral mucosal reaction, dry mouth, and limited neck movement.

(8) Combined with periodic review and follow-up records, the 1-year prognosis of the patients was evaluated, and the influencing factors were analyzed.

Data processing methods

SPSS24.0 was used for data analysis. Qualitative data were described with n (%) and tested with χ^2 . Quantitative data are represented by ($\bar{x} \pm s$), and a T test was performed. The influencing factors of prognosis were analyzed by Cox regression model. $P < 0.05$ was considered with statistical difference.

Results

Comparison of baseline data between the two groups

The gender, age, course of disease, educational level, pathological type, tumor stage, and general data were compared between the two groups (all $P > 0.05$, **Table 1**).

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Table 1. Comparison of general data between the two groups

Material	Control group (n=42)	Experimental group (n=42)	t/x ²	P
Gender				
Male	24 (57.14)	22 (52.38)	0.192	0.661
Female	18 (42.86)	20 (47.62)		
Age (years)	48.20±10.05	50.80±10.10	1.183	0.240
Course of disease (month)	4.10±1.05	4.40±1.20	1.219	0.226
Level of education				
Primary school	10 (23.81)	11 (26.19)	0.296	0.961
Junior high school	20 (47.62)	18 (42.86)		
High school	9 (21.43)	9 (21.43)		
College or above	3 (7.14)	4 (9.52)		
Tumor types				
Squamous cell carcinomas	28 (66.07)	30 (71.43)	0.223	0.637
Non-squamous cell carcinoma	14 (33.93)	12 (29.57)		
Tumor staging				
I	3 (7.14)	3 (7.14)	0.536	0.911
II	6 (14.29)	4 (9.52)		
III	16 (38.10)	17 (40.48)		
IV	16 (38.10)	18 (42.86)		

Comparison of CFS scores between the two groups before and after intervention

Before the intervention, the scores of physical fatigue, emotional fatigue, cognitive fatigue, and total score of CFS were not statistically different between the two groups (all $P > 0.05$). After the intervention, these scores were all decreased in both groups. The scores of physical fatigue [(12.83±1.10) vs (13.90±1.25)], emotional fatigue [(9.78±1.32) vs (10.55±1.40)], cognitive fatigue [(5.62±1.31) vs (6.80±1.75)], and the total score of CFS [(28.24±2.26) vs (31.33±2.59)] in the experimental group were significantly lower than those of the control group (all $P < 0.05$). As shown in **Figure 1**.

Comparison of GCQ scores in each dimension between the two groups

The scores of physiology, psychology, spirit, and social culture and environment in the experimental group were higher than those in the control group (all $P < 0.05$, **Table 2**).

Comparison of scores of self-management efficacy between the two groups

Compared with the control group, the scores of positive attitude, self-decompression, and self-decision in the experimental group were signifi-

cantly higher than those in the control group (all $P < 0.05$, **Table 3**).

Comparison of self-care ability scores between the two groups

Compared with the control group, the health knowledge level, self-care skills, self-care responsibility, and self-concept scores of the experimental group were significantly higher than those in the control group (all $P < 0.05$, **Table 4**).

Comparison of VAS scores between the two groups before and after intervention

There was no significant difference in VAS scores between the experimental group and the control group before the intervention ($P > 0.05$). After the intervention, the VAS score of the experimental group was significantly lower than that of the control group ($P < 0.05$, **Table 5**).

Comparison of EORTC QLQ-C30 scores between the two groups before and after intervention

Before the intervention, the EORTC QLQ-C30 scores of the experimental group and the control group were (59.35±11.85) points and

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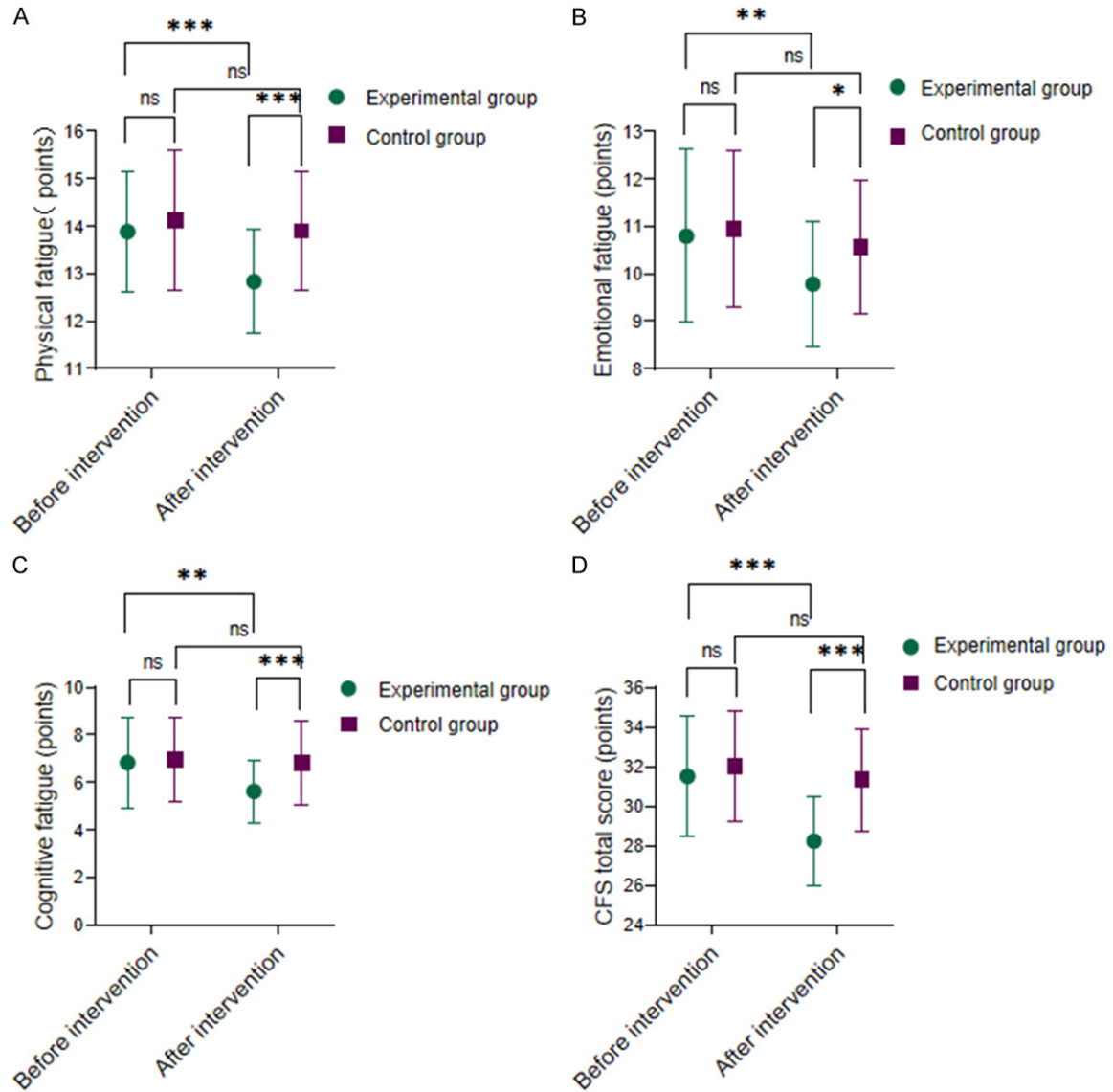


Figure 1. Comparison of CFS scores between the two groups before and after intervention. A: Physical fatigue score chart; B: Emotional fatigue score chart; C: Cognitive fatigue score map; D: CFS total score chart. CFS: Cancer Fatigue Scale; ns>0.05; *<0.05; **<0.01; ***<0.001.

Table 2. Comparison of GCQ scores in each dimension between the two groups

Group	Number of cases	Physiology	Psychology	Spirit	Social culture and environment
Experimental group	42	34.26±3.42	30.74±2.86	24.45±2.73	14.86±3.37
Control group	42	28.64±3.12	25.02±2.43	18.55±1.70	10.12±2.23
t		7.861	9.854	11.888	7.599
P		<0.001	<0.001	<0.001	<0.001

Note: GCQ: General Comfort Questionnaire.

(59.52±12.52) points. There was no statistical difference between the two groups (P>0.05). After the intervention, the EORTC QLQ-C30

scores of the experimental group (80.05±10.72) and the control group (68.11±12.10) were significantly higher than that before intervention.

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Table 3. Comparison of the scores of self-management efficacy between the two groups ($\bar{x} \pm s$)

Group	Number of cases	Positive attitude	Self-decompression	Self-determination
Control group	42	40.55±7.36	9.15±2.10	30.06±7.05
Experimental group	42	47.15±8.30	12.10±2.50	37.10±8.66
t		3.856	5.856	4.086
P		<0.001	<0.001	<0.001

Table 4. Comparison of the self-care ability scores between the two groups ($\bar{x} \pm s$)

Group	Number of cases	Health knowledge	Self-care skills	Self-care responsibility	Self-concept
Control group	42	29.90±9.10	30.80±6.66	26.24±5.50	20.66±4.10
Experimental group	42	40.05±10.34	40.16±8.05	30.02±6.87	24.90±3.68
t		4.776	5.806	2.784	4.988
P		<0.001	<0.001	0.002	<0.001

Table 5. Comparison of VAS scores between the two groups before and after intervention

Group	Number of cases	Before intervention	After intervention
Control group	42	5.38±1.13	2.21±0.84
Experimental group	42	5.45±0.99	4.12±0.71
t		0.309	-11.237
P		0.758	<0.001

Note: VAS: Visual analogue scale.

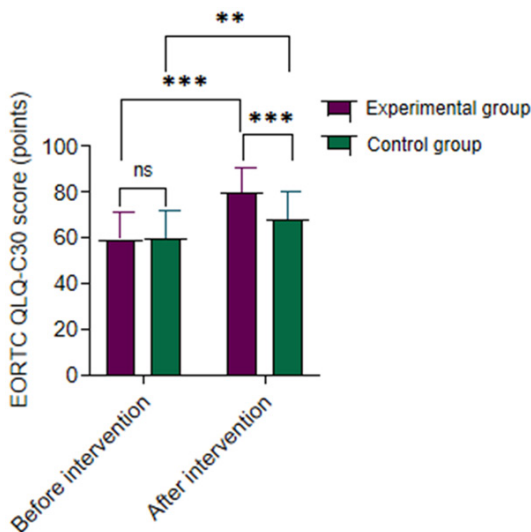


Figure 2. Comparison of EORTC QLQ-C30 scores between the experimental group and the control group before and after intervention. EORTC QLQ-C30: European Organization for Research and Treatment of Cancer QLQ-C30; ns>0.05; **<0.01; ***<0.001.

The score of the experimental group was higher than that of the control group ($P < 0.05$, **Figure 2**).

Comparison of postoperative adverse reactions between the two groups

There were 22 cases of skin damage in the irradiation field, 12 cases of difficulty in opening the mouth, 6 cases of dry mouth, 21 cases of oral mucosal reaction, 11 cases of neck movement limitation, and 10 other cases in the control group. There were 8 cases of skin damage in the irradiation field, 3 cases of difficulty in opening the mouth, 1 case of dry mouth, 7 cases of oral mucosal reaction, 4 cases of restricted neck movement, and 3 other cases in the experimental group. The experimental group exhibited significantly lower incidences in the adverse reactions than those in the control group (all $P < 0.05$, **Table 6**).

Cox analysis of single and multiple factors influencing the prognosis of patients with nasopharyngeal carcinoma

In this study, 84 patients were followed up with for 1 year, and 18 died, with a median survival time of 10 months. Through Cox univariate and multivariate analysis, the independent factors influencing the prognosis of nasopharyngeal carcinoma patients included age, tumor stage, and intervention mode (all $P < 0.05$, **Table 7**).

Discussion

The irradiation sites of nasopharyngeal carcinoma radiotherapy include nasopharynx, base of skull, and neck. The anatomical structure of nasopharynx is complex. These sites are sensitive to radiation. High-energy radiation causes different degrees of damage to cancer cells and normal tissue, nerve, and muscle, leading

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Table 6. Comparison of the incidence of postoperative adverse reactions between the two groups [n (%)]

Group	Number of cases	Irradiated skin damage	Difficulty in opening mouth	Dry mouth	Oral mucosal reaction	Restricted neck movement	Others
Control group	42	22 (52.38)	12 (28.57)	6 (14.29)	21 (50.00)	11 (26.19)	10 (23.81)
Experimental group	42	8 (19.05)	3 (7.14)	1 (2.38)	7 (16.67)	4 (9.52)	3 (7.14)
χ^2		10.163	6.574	3.896	10.500	3.977	4.459
<i>P</i>		0.001	0.010	0.048	0.001	0.046	0.035

Table 7. Cox univariate and multivariate analyses of prognostic factors in patients with nasopharyngeal carcinoma

Index	Group	Single factor		Multi-factor	
		Hazard Ratio (HR) (95% CI)	<i>P</i>	HR (95% CI)	<i>P</i>
Gender	Male vs Female	0.804 (0.319-2.027)	0.644	-	-
Age (years)	≥ 60 vs < 60	9.195 (3.560-23.752)	< 0.001	9.227 (3.459-24.610)	< 0.001
Course of disease (month)	> 3 vs ≤ 3	0.821 (0.478-1.409)	0.474	-	-
Level of education	Primary school vs Junior high school vs High school vs College or above	0.807 (0.467-1.394)	0.442	-	-
Tumor types	Squamous cell carcinomas vs lung squamous cell carcinoma	1.500 (0.580-3.878)	0.403	-	-
Tumor staging	I period vs II period vs III period vs IV period	4.117 (1.527-11.094)	0.005	3.993 (1.461-10.909)	0.007
Intervention model	Continuous management mode vs Self-management Manual with Case Management model	2.883 (1.027-8.091)	0.044	2.886 (1.018-8.183)	0.046

to radiation stomatitis and radiation field skin damage. These are unavoidable complications after radiotherapy for nasopharyngeal carcinoma and can cause soft tissue fibrosis in the face and neck [16, 17]. Postoperative self-management is of great significance for NPV patients after radiotherapy. The situation of postoperative management of NPC patients after radiotherapy is not optimistic. It may be related to the formalization, poor intervention, and lack of depth of postoperative management [18, 19]. In this study, the scores of positive attitude, self-stress reduction, and self-decision making of the experimental group were significantly higher than those of the control group after the intervention. This indicated that the self-management manual and the case management model can improve patients' self-management efficacy. This was like the study results of foreign scholars Badger et al. [20]. The reasons may be as follows: (1) The "Self-Management Handbook" allowed patients to obtain relevant knowledge when needed. It helped them understand the self-management plan after radiotherapy. It provided convenient access to professional assistance and professional knowledge support to facilitate patient's

self-management after radiotherapy. It provided simple management tools to stimulate patients' self-management awareness and subjective ability to enhance their postoperative self-management [21, 22]. (2) The management manual overcomes the insufficiency of routine continuous care where only regular professional support is available, helps patients correctly record problems and correct management plans in a timely manner, and reverses management misunderstandings. The self-management manual has a system-like coercive effect, creating self-monitoring and improving patients' self-management after surgery [23]. (3) Based on the advantages of case management, patient-centered care interventions, making full use of the advantageous resources, encouragement through collaboration, setting goals, enhancing awareness, and positive reinforcement, have a magnifying effect in postoperative management by gradually synergizing with the Self-Management Manual to promote recovery [24].

In this study, the scores of health knowledge, self-care skills, self-care responsibility, and self-concept score of patients in the experi-

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mental group were higher than those in the control group. The reasons may be: (1) The management team was highly targeted and played a direct role in improving patients' health knowledge level. This was the theoretical basis for improving self-care skills. (2) The Self-Management Manual provided guidance on functional exercise after radiotherapy, gargle time, oral disinfection, and analgesia, effectively improving patients' self-care skills from the practical aspect. (3) Due to the late start of nutrition and health education in China and the lack of access to national nutrition and health education knowledge, the majority of family members and patients lack dietary nutrition knowledge and correct nutrition behavior [25, 26]. Studies have shown that high-intensity diet education or supervised nutrition and health education can improve the nutritional status of patients with nasopharyngeal cancer and improve their prognosis [27]. The case management team included dietitians who compiled postoperative nutrition and health education. This improved patients' nutritional knowledge level and nutritional status. This was a reflection of the improvement of personal nursing skills. (4) A personalized self-management plan after discharge was developed, and short-term feasible goals were established. The goals and steps were elaborated to enhance the patient's sense of responsibility and self-awareness through encouragement and implication. The supervision of family members was presented in the form of a written plan to help patients with poor compliance to "complete their tasks" correctly according to the plan [28, 29]. (5) The postoperative management diary designed in this study included descriptions of adverse reactions after radiotherapy, drug dosage and time, adverse drug reactions, diet, and sleep. The daily real-time situation of patients was completely recorded. This drew attention to patient autonomy and provided a reference for medical staff. This allowed dynamic observation data of postoperative management. This diary engaged discussion and problem solving for all who participated in patient recovery. It provided more accurate guidance to doctors and nurses, timely adjustments to the management plan, an increase of patients' trust in the work of doctors and nurses, correct complete self-care work, and improved patients' self-care ability. This related to previous literature [30, 31]. The improvement of patients' postopera-

tive self-care skills helped to reduce the incidence of postoperative adverse reactions. The incidence of postoperative adverse reactions in the experimental group was significantly lower than that in the control group.

Cancer-caused fatigue is one of the common symptoms of nasopharyngeal cancer, seriously affecting the quality of life of patients. Case management mode is conducive to relieving their psychological pressure, helping patients actively participate in disease management, to effectively improve the symptoms of cancer fatigue, and improve the quality of life. The results of this study show that the scores of CFS in all dimensions and total scores of the two groups after the intervention were lower than before the intervention. The experimental group was lower than the control group, suggesting that the combination of the self-management manual and the case management model can effectively alleviate cancer fatigue in patients. The long treatment period with varying complications, including hearing loss, persistent pain, slow recovery of taste, and neck muscle stiffness pose great physiological and psychological burden to the patients. They become prone to cancer-related fatigue and self-efficacy reduction. This seriously affects the quality of life of patients [32]. This study found that the EORTC QLQ-C30 score of the experimental group was higher than that of the control group, indicating that the combination of the self-management manual and the case management mode can help improve the quality of life of patients.

In this study, 84 patients were followed up with for 1 year, and 18 died, with a median survival time of 10 months. Through Cox univariate and multivariate analyses, age, tumor stage, and intervention mode were screened as the independent factors affecting the prognosis of NPC patients. Wu et al. [33] showed that age was an independent prognostic risk factor for NPC patients. Elderly patients are prone to chronic diseases, coupled with the decline in body's immunity and function, and the decline of tolerance to treatment. It has been reported that tumor stage is closely related to radiotherapy prognosis of NPC. With the increase of T stage, the risk of poor prognosis by radiotherapy increased significantly [34]. Surgery and chemoradiotherapy are the main treatment

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methods for NPC. The compliance of patients may be compromised without a proper postoperative management scheme. The quality of life will be decreased, affecting the prognosis of patients. The self-management manual combined with case management mode provides patients with professional and personalized postoperative care. This better reflects the convenience and continuity of nursing measures through the platform as compared to conventional continuous nursing. Patients can better master self-care knowledge and increase their confidence in self-care.

The small sample size of this study, may have resulted as biased. Studies with a larger sample size are needed for confirmation.

Conclusion

The self-management manual combined with the case management mode can improve postoperative self-management ability and self-care ability, reduce the occurrence of adverse reactions, and improve the prognosis of NPC patients after radiotherapy. This is worthy of clinical promotion.

Disclosure of conflict of interest

None.

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