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Construction and Application of a Patient Journey Map-Based Comprehensive Care Model for Individuals Undergoing Hepatic Carcinoma Interventional Therapy

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Abstract: *Objective*: To establish a full-process management model for liver cancer patients undergoing interventional therapy based on the Patient Journey Map (PJM), and to evaluate its application effect. *Methods*: A non-synchronous controlled trial design was adopted. 120 liver cancer patients who underwent transcatheter arterial chemoembolization (TACE) in the Department of Infection of our hospital from January 2025 to December 2025 were selected. The control group included 60 patients (1–6 months) who received routine care, while the experimental group included 60 patients (7–12 months) who received the full-process management based on the Patient Journey Map. Through semi-structured interviews, the key touchpoints and needs of patients were clarified, and the Patient Journey Map was drawn. A three-stage full-process management plan of "hospitalization period - discharge preparation period - home rehabilitation period" was constructed. The satisfaction of patients, the incidence of postoperative complications, self-management ability, quality of life, and readmission rate were compared between the two groups. *Results*: The satisfaction rate of patients in the experimental group (96.67%) and the total score of self-management ability (86.35 ± 5.21) and the total score of quality of life (78.56 ± 6.42) were all higher than those in the control group (81.67%, 72.48 ± 6.35, 65.32 ± 7.18), respectively; the incidence of complications (13.33%) and the 30-day readmission rate (6.67%) were lower than those in the control group (30.00%, 18.33%), and the differences were statistically significant ($P < 0.05$). *Conclusion*: The full-process management model based on the Patient Journey Map can improve the satisfaction of liver cancer patients undergoing interventional therapy, reduce the incidence of complications and readmission rate, and improve self-management ability and quality of life, and has clinical application value.

Keywords: Hepatic artery chemotherapy embolization; Patient journey map; Whole-process management; Self-management ability; Quality of life

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1. Introduction

Hepatocellular carcinoma (HCC) is a common malignant tumor worldwide, with particularly high disease burden in Asian regions [1–3]. The early symptoms of HCC are not typical, and approximately 80% of patients are diagnosed at an advanced stage, with only about 30% having the opportunity for radical resection, and the postoperative recurrence risk is relatively high [4]. Transarterial chemoembolization (TACE), as the core interventional treatment method for inoperable advanced HCC, has the advantages of minimally invasive, effectiveness, and repeatable operation, and is recommended as the preferred treatment option by domestic and international guidelines [5]. Patients after liver cancer interventional surgery face multiple challenges: physiological discomfort caused by embolization syndrome, anxiety and fear regarding disease prognosis, complex self-management tasks, and the connection issues during the transition from hospital to home care [6]. All these factors affect their recovery. The traditional nursing model is disease-centered, with fragmented and passive services, and is difficult to meet the diverse and personalized needs of patients [7]. The patient journey map (PJM) is a service design tool centered on patients, visualizing the entire experience of patients, by systematically depicting the experiences, needs, and service contact points of patients at each stage, helping medical staff identify pain points, optimize processes, and improve experiences [8,9]. In recent years, PJM has demonstrated unique value in chronic disease management and comprehensive cancer care [10,11]. Currently, there are few studies on the application of PJM in the entire management of patients undergoing liver cancer interventional surgery. This research aims to construct a patient journey map-based management model for patients undergoing liver cancer interventional surgery and evaluate its application effect, providing evidence-based support for clinical practice.

2. Basic information

2.1. General information

A non-synchronous control trial design was adopted. 120 patients with liver cancer who underwent TACE in the Infectious Diseases Department of our hospital from January to December 2025 were selected. Among them, 60 patients admitted from January to June 2025 were the control group and received routine care; 60 patients admitted from July to December 2025 were the experimental group and received the full-process management model based on the patient journey map.

2.2. Inclusion criteria

(1) Age 18 to 80 years old;
(2) Met the diagnostic criteria of the original liver cancer treatment guidelines (2024 edition), and underwent TACE treatment;
(3) Clear consciousness, without communication disorders;
(4) Expected survival period ≥ 6 months;
(5) Voluntarily participated and signed the informed consent form.

2.3. Exclusion criteria

(1) Complicated with other malignant tumors;
(2) Severe heart, liver, or kidney dysfunction;

(3) Mental illness or cognitive impairment;
(4) Serious complications occurred during the operation and were transferred to the ICU;
(5) Died within 3 months after the operation.

3. Test method

3.1. Control group

The control group received routine nursing management. The contents included:

(1) Before the operation
Routine education on the purpose, method, and precautions of the surgery;
(2) After the operation
Closely observe vital signs and bleeding at the puncture site, and handle postoperative pain, fever, etc.;
(3) Discharge guidance
Orally inform and distribute discharge guidance sheets, instructing regular follow-ups;
(4) Follow-up
Conduct a telephone follow-up once a month after discharge to understand the recovery situation.

3.2. Observation group

The observation group implemented the full-process management model for liver cancer interventional surgery based on the patient journey map.

3.2.1. Forming the research team

A research team consisting of the head nurse of the infection department, infection specialist nurses, interventional doctors, psychological counselors, and nutritionists was formed. The specialist nurses served as the core coordinator, responsible for drawing the patient journey map, formulating and implementing the management plan, and collecting and quality controlling the data.

3.2.2. Drawing the patient journey map

Through literature review, semi-structured interviews, clinical observation, and expert consultation, the patient journey map for liver cancer interventional surgery was drawn. The specific steps are as follows:

(1) Determine the research population
Select 20 patients undergoing liver cancer interventional surgery at different disease stages for semi-structured interviews to understand their entire experience from admission to post-discharge recovery.
(2) Draw journey stages
Divide the patient's entire process into the pre-surgery plan determination period (from admission to before the surgery), the surgical operation period (2–3 hours on the surgery day), the hospital recovery period (1–3 days after the surgery), the discharge preparation period (2–3 days before discharge), and the home rehabilitation period (1 month after discharge).
(3) Identify key contact points
Determine the key contact points in each stage, including admission reception, pre-surgery education, post-surgery care, discharge guidance, and home follow-up.
(4) Explore patient experiences

Through interviews, understand the feelings, emotional changes, needs, and difficulties of patients in each stage.

(5) Identify service pain points

Analyze the problem points in patient experiences, such as information asymmetry, poor nursing coordination, insufficient psychological support, and lack of home rehabilitation guidance.

(6) Draw a visual map

Integrate the information and draw a visual patient journey map, clearly showing the service contents, patient experiences, key pain points, and improvement opportunities. See **Figure 1** for details.

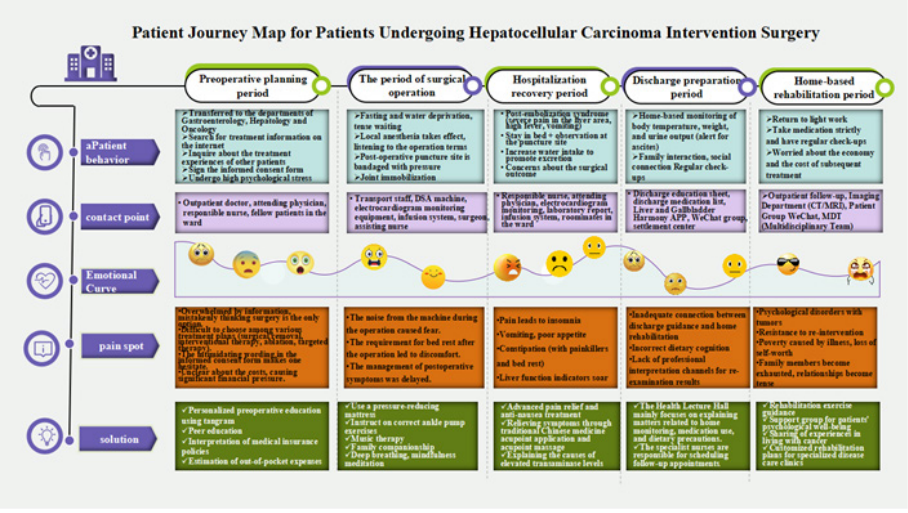

Figure 1. Patient journey map for patients undergoing hepatocellular carcinoma intervention surgery.

3.2.3. Establishing a full-process management model

Based on the key nodes and pain points identified through the patient journey map, a three-stage full-process management plan for "hospitalization period–discharge preparation period–home rehabilitation period" was constructed. Please refer to **Table 1** for details.

Table 1. Three stage full process management plan

Stage	Management focus	Service content	Duty of a specialist nurse
Period of hospitalization	Information support and symptom management	1. Personalized preoperative education (combining videos, graphics and explanations) 2. Postoperative symptom management (pain, fever, nausea, vomiting) 3. Psychological support and emotional counseling 4.Establish a "patient-nurse communication book" to record patient needs	1.Daily bedside visits are conducted to assess the physical and mental condition of the patients, build a trusting relationship, and identify their potential needs.
Discharge preparation period	Capacity building and transition integration	1. Pre-hospital comprehensive assessment (condition, self-management ability, family support) 2. Individualized discharge guidance (medication, diet, activity, follow-up) 3. Distribute the "Home Rehabilitation Manual for Liver Cancer Intervention Surgery" 4. Establish electronic follow-up files Guide patients to use home monitoring tools (such as symptom diaries, blood pressure monitors, etc.)	1. Conduct a multidisciplinary assessment before discharge. 2. Provide training on home rehabilitation skills. 3. Work with the patient to develop a discharge plan.

Stage	Management focus	Service content	Duty of a specialist nurse
Home-based rehabilitation period	Continuous support and early warning	1. Conduct telephone follow-ups on the 3rd, 7th, 14th and 30th days after discharge. 2. Daily push health knowledge and answer questions through WeChat groups and the "Liver and Gallbladder Sympathy" APP. 3. Identify warning symptoms (such as fever, abdominal pain, bleeding) and promptly guide patients to seek medical treatment. 4.Organize online patient communication meetings.	1. Conduct regular follow-ups to assess the control of symptoms and patient compliance. 2. Provide psychological support. 3.Remind patients to undergo regular re-examinations on time.

3.2.4. Quality control and continuous improvement

The specialist nurses hold a quality analysis meeting once a month to summarize problems, analyze causes, and propose improvement measures. Every quarter, the management plan is revised and improved to ensure continuous optimization.

3.3. Observation indicators

(1) Patient satisfaction

The self-made "Inpatient Satisfaction Survey Form" is used to evaluate the satisfaction with the nursing services at discharge. There are 10 items, using Likert 5-level scoring, and "satisfied" and "very satisfied" are combined into the satisfied group.

(2) Postoperative complication rate

The complications occurred within one week after surgery in both groups are recorded, including fever, nausea and vomiting, abdominal pain, puncture site bleeding, etc.

(3) Self-management ability

The "Self-management Behavior Scale for Chronic Disease Patients" is used to assess the self-management ability of patients one month after discharge. The scale includes 5 dimensions: medication compliance, symptom monitoring, lifestyle adjustment, emotion management, and doctor-patient communication, with a total score of 100 points. The higher the score, the stronger the self-management ability. The Cronbach's α coefficient is 0.83 [12].

(4) Quality of life

The "Quality of Life Scale for Liver Cancer Patients (QOL-LC)" is used to evaluate the quality of life of patients one month after discharge. There are 4 dimensions: physical function, psychological state, social function, and symptom control. The total score is 100 points. The higher the score, the better the quality of life. The Cronbach's α coefficient is 0.79 [13].

(5) Readmission rate

The proportion of patients readmitted due to changes in condition within 30 days after surgery is recorded in both groups.

3.4. Statistical methods

Data analysis was conducted using SPSS 26.0 statistical software. Measurement data were expressed as ($\overline{x} \pm s$), and independent sample t-tests were used for comparisons between groups; count data were expressed as frequencies and percentages, and χ^2 tests were used for comparisons between groups. A difference was considered statistically significant if $p < 0.05$.

4. Results

4.1. Comparison of general data of the two groups of patients

There were no statistically significant differences in gender, age, disease duration, tumor stage, liver function classification between the two groups ($p > 0.05$), and they were comparable. See **Table 2** for details.

Table 2. Comparison of general data of two group of patients

Index	Control group(n = 60)	Experimental group(n = 60)	t/χ^2 value	*p*-value
Gender (Male/Female)	42/18	44/16	0.156	0.693
Age (years)	57.32 ± 9.65	58.15 ± 8.92	0.491	0.624
Course of the disease (months)	7.85 ± 3.21	8.12 ± 3.05	0.476	0.635
Tumor stage (I/II/III)	12/32/16	10/34/16	0.238	0.888
Child-Pugh（A/B/C）	28/24/8	30/22/8	0.150	0.928

4.2. Comparison of patient satisfaction between the two groups

The satisfaction rate of patients in the experimental group at discharge (96.67%) was significantly higher than that of the control group (81.67%), and the difference was statistically significant ($p < 0.05$). See **Table 3** for details.

Table 3. Feedback data on the satisfaction between two groups

Group	Number of cases	Satisfaction (n, %)	Not satisfied (n, %)	χ^2 value	*p*-value
Control group	60	49 (81.67)	11 (18.33)	6.988	0.008
Experimental group	60	58 (96.67)	2 (3.33)		

4.3. Comparison of complication rates between the two groups of patients

The total incidence of postoperative complications in the experimental group (13.33%) was significantly lower than that in the control group (30.00%), and the difference was statistically significant ($p < 0.05$). See **Table 4** for details.

Table 4. Complication rates between two groups of patients

Group	Number of cases	Fever	Nausea and vomiting	Stomac hache	Bleeding at the puncture site	Total incidence rate(%)	χ^2 value	*p*-value
Control group	60	6	5	4	3	30.00	4.910	0.027
Experimental group	60	3	2	2	1	13.33		

4.4. Comparison of self-management abilities between the two groups of patients

The total score of self-management ability and the scores of each dimension in the experimental group at one month after discharge were significantly higher than those in the control group, and the difference was statistically significant ($p < 0.001$). See **Table 5** for details.

Table 5. Self-management abilities between two groups of patients

Dimensionality	Control group(n = 60)	The experimental group(n = 60)	*t*-value	*p*-value
Compliance	14.25 ± 2.36	17.86 ± 1.95	9.163	< 0.001
Syndromic surveillance	15.32 ± 2.18	18.24 ± 1.76	8.168	< 0.001
Lifestyle adjustment	13.86 ± 2.45	17.12 ± 2.03	7.996	< 0.001
Emotion management	14.58 ± 2.52	17.35 ± 2.18	6.484	< 0.001
Doctor-patient communication	14.47 ± 2.28	17.78 ± 1.82	8.835	< 0.001
Total points	72.48 ± 6.35	86.35 ± 5.21	13.127	< 0.001

4.5. Comparison of quality of life between the two groups of patients

The total score of quality of life and the scores of each dimension in the experimental group at one month after discharge were significantly higher than those in the control group, and the difference was statistically significant ($p < 0.001$). See **Table 6**.

Table 6. Comparison of quality of life between two groups of patients

Dimensionality	Control group(n = 60)	Experimental group(n = 60)	*t*-value	*p*-value
Body function	16.35 ± 2.68	19.86 ± 2.35	7.639	< 0.001
Psychological states	15.28 ± 2.54	19.12 ± 2.18	8.846	< 0.001
Social function	16.42 ± 2.71	19.35 ± 2.42	6.289	< 0.001
Symptom control	17.27 ± 2.46	20.23 ± 2.15	7.098	< 0.001
Total points	65.32 ± 7.18	78.56 ± 6.42	10.726	< 0.001

4.6. Comparison of readmission rates between the two groups of patients

The re-admission rate of the experimental group 30 days after surgery (6.67%) was significantly lower than that of the control group (18.33%), and the difference was statistically significant ($p < 0.05$). See **Table 7** for details.

Table 7. Comparison of readmission rates between two groups of patients

Group	Number of cases	Readmission(n, %)	Not readmitted(n, %)	Chi-square value	*p*-value
Control group	60	11 (18.33)	49 (81.67)	3.928	0.047
Experimental group	60	4 (6.67)	56 (93.33)		

5. Discussion

5.1. The full-process management model can effectively enhance patient satisfaction

The results of this study show that the satisfaction of patients in the experimental group was significantly higher than that in the control group ($p < 0.05$). The patient journey map is centered on the patients, exploring their real needs at each stage, identifying the pain points in traditional care, such as excessive preoperative education information, lagging postoperative symptom management, and poor connection between discharge guidance and home rehabilitation [14]. The experimental group implemented phased and personalized management: during the hospitalization period, emphasis was placed on information support and symptom management; during the preparation for discharge, capacity building and transition connection were

strengthened; during the home rehabilitation period, continuous support and early warning were provided. This full-process, proactive service model made patients feel valued and cared for, effectively enhancing satisfaction [15].

5.2. The full-process management model can reduce postoperative complications and readmission rates

In this study, the postoperative complication rate (13.33%) and readmission rate (6.67%) of the experimental group were significantly lower than those of the control group ($p < 0.05$). The reasons are as follows:

(1) The full-process management based on the patient journey map achieved dynamic monitoring and early intervention of symptoms. During hospitalization, specialized nurses conducted bedside visits daily, promptly handling embolism syndrome; during the home period, through the "Liver and Gallbladder Sibling" APP, telephone follow-up, and WeChat group guidance, patients were helped to identify warning symptoms and seek medical attention in time.

(2) During the preparation for discharge, a comprehensive assessment and capacity building were carried out, enabling patients to master key self-management skills such as pain assessment, diet adjustment, and puncture point observation, effectively preventing complications.

(3) The close collaboration of a multidisciplinary team provided comprehensive and continuous professional support for patients [16].

5.3. The full-process management model can improve patients' self-management ability and quality of life

In this study, the self-management ability and quality of life scores of the experimental group were significantly higher than those of the control group ($p < 0.001$). The reasons are as follows:

(1) Through the patient journey map, the self-management needs and difficulties of patients at each stage were deeply understood, and targeted intervention measures were formulated.

(2) During the home rehabilitation period, continuous support was provided, through WeChat group, "Liver and Gallbladder Sibling" APP, daily health knowledge dissemination and answering questions, to consolidate patients' self-management skills.

(3) Specialized nurses conducted regular follow-ups and gave positive feedback, enhancing patients' self-efficacy, and improving their self-management confidence [17].

(4) Online patient exchange meetings were organized to help patients establish a social support network, improving their psychological state and social function [18].

6. Conclusion

This study, based on the patient journey map, constructed a three-stage full-process management model of "hospitalization period–preparation for discharge period–home rehabilitation period". This model is centered on the patients, relying on visual tools, achieving systematic, continuous, and personalized nursing services, effectively enhancing patient satisfaction, reducing the incidence of postoperative complications and readmission rates, improving patients' self-management ability and quality of life, and has significant clinical application value, which is worthy of promotion.

Disclosure statement

The authors declare no conflict of interest.

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