

Research Progress of the Application of “Internet+” Nursing in Patients with Liver Cancer

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Abstract: *Objective:* To explore the application effect of “Internet+” nursing in patients discharged from hospital after liver cancer operation. *Methods:* A total of 90 patients who underwent hepatocellular carcinoma resection in Shaanxi Provincial People’s Hospital from November 2019 to August 2020 were divided into an observation group ($n = 45$) and a control group ($n = 45$) randomly by drawing lots. The control group received routine discharge health guidance while the observation group underwent an “Internet+” nursing through hospital Internet information platforms, online consultation, and so on. Patients of both groups returned to the hospital one month after discharge and filled in the questionnaire. The incidence of adverse reactions, quality of life, and level of hope were compared between the two groups 1 month after discharge. *Results:* The incidence of adverse reactions in the observation group was significantly lower than that of the control group, and the difference was statistically significant ($P < 0.05$). The quality of life and level of hope of patients in the observation group were significantly higher than those in control group and the difference was statistically significant ($P < 0.05$). *Conclusion:* “Internet+” nursing service plays a positive role in improving the patients’ about their disease and their quality of life after discharge from hospital after liver cancer operation, which is worthy of popularization in clinical practice.

Keywords: Internet+; Continuous care service; Liver cancer operation

Online publication: March 30, 2023

1. Introduction

Global cancer statistics show that in recent years, there are 840,000 new cases of liver cancer and 780,000 deaths, ranking the 6th and 4th among all cancers in terms of morbidity and mortality^[1]. Surgical resection is the first choice and the most effective means to treat liver cancer. Most patients with liver cancer can be discharged from hospital in 7–9 days after surgery. Postoperative rehabilitation is mostly carried out outside the hospital. Because most patients lack understanding of their own disease and lack self-management, their recovery will be affected, or their conditions may even be aggravated. Therefore, nursing after discharge is particularly important. In foreign countries, Facebook and other social media platforms^[2] are often used for education and self-management of discharged patients, while WeChat groups are mostly used in China^[3]. This study uses a platform for hospital Internet information, Xinyitong and WeChat group to conduct online health education and discussions, provide patients with full nursing support from inside to outside the hospital^[4], so as to meet the needs of patients and achieve satisfactory results.

2. Research subjects and methodology

2.1. Research subjects

Grouping A total of 90 patients who underwent hepatoma resection in Shaanxi Provincial People's Hospital from November 2019 to August 2020 were selected as research objects and divided into an observation group and a control group by drawing lots, with 45 cases in each group. There were 25 males and 20 females in the observation group, with an average age of 58.24 ± 2.31 years old; and there were 28 males and 17 females in the control group, with an average age of 60.15 ± 1.76 years old. And there was no significant difference in general data between the two groups ($P > 0.05$), indicating comparability.

2.2. Inclusion and exclusion criteria

Inclusion criteria: (1) patients diagnosed with liver cancer after pathological diagnosis, have undergone liver cancer resection and discharged after recovery; (2) patients who voluntarily participated in this study, with normal understanding and communication ability; (3) patients or their family members can use WeChat, QQ, relevant mobile apps, and other basic software; (4) patients who actively complied with treatment and paid attention to their disease. Exclusion criteria: (1) patients with communication disorders or mental illnesses; (2) patients who died during the study; (3) patients with severe cardiopulmonary dysfunction; (4) patients who have withdrawn for some reason during the experiment.

2.3. Methods

2.3.1. Control group

The control group was given routine discharge health education. On the day of discharge, a nurse was assigned to give health education to the patients and their families which includes disease-related knowledge, guidance on medication and diet, psychological nursing, rehabilitation exercises, and follow-up guidance. The patients were followed up by telephone after discharge, and follow-up was done 1 week, half a month, and 1 month after discharge.

2.3.2. Observation group

"Internet+" nursing was implemented on the observation group. An "Internet+" nursing team was established, which consisted of the following staff: a head nurse who was mainly responsible for the work arrangement and health care data review; a deputy chief physician who was responsible for the formulation of the diagnosis and treatment plan after discharge; a resident physician who was responsible for assisting nurses in diagnosis and symptomatic medication; 4 nurses, among which a nurse was responsible for the organization of electronic files after discharge and the collation and collection of data, 2 nurses were responsible for editing images, texts, videos, and other content and uploading them, and a nurse is responsible for answering online questions and collecting feedback; a network engineer who was responsible for platform design and dynamic update, platform application and feedback. One of the doctors in the team was a postgraduate and the rest were bachelor's degree holders who were doctors and nurses with more than 5 years of experience in liver cancer treatment or nursing, with good communication skills and teamwork spirit.

2.3.2.1 Electronic records of patient information

Electronic records were established for patients upon their discharge, including basic clinical data such as name, gender, age, vital signs, operation time and method, time and test results of discharge, and many more. Patients and their families were informed of the method, content, and purpose of "Internet+" nursing.

2.3.2.2. Online postoperative support through WeChat group or other mobile applications

(1) A follow-up group was created after liver cancer surgery where the patients can be added in through scanning a code. Illustrated pictures and a short text that is easy to understand were uploaded into the group every two days, including how to cough effectively, factors affecting wound-healing, postoperative self-care knowledge, and many more. Studies have shown that receiving health education and information on diseases using Xinyitong significantly improves patients' participation in self-care after discharge^[5]. An online consultation was conducted by a doctor and a nurse on Xinyitong every day from 2:30–3:30 p.m. in the form of text reply and video consultation, to answer questions for patients and interpret examination reports, follow-up visits, and other related questions. The combination of the two forms not only allowed patients to better express their condition, but also enabled medical staff to understand their patient's mental state and condition of wound-healing. In this way, individualized nursing measures and suggestions can be provided, the privacy of patients can be protected through one-to-one consultations.

2.3.2.3. Hospital Internet information platform

Internet technology is the mainstream form of mobile medical treatment at present, featuring high degree of informatization, high speed, low cost, and personalized needs^[6]. "Chang'an Nursing" is a public account created by the nursing department of our hospital, with the purpose of paying attention to the patients' health, giving full play to professional expertise, and spreading health knowledge. Upon approval of the nursing department, Chang'an Nursing was applied in the continuity of care services for patients. Patient could scan the code to enter Chang'an Nursing and follow it. The department regularly uploaded health education content such as lectures on liver cancer, videos on postoperative functional exercises, prevention, and treatment of postoperative complications, and many more. Patients who follow Chang'an Nursing were invited to join a WeChat group where knowledge about nutrition, diet, medicine, first aid, and so on from Chang'an Nursing would be uploaded.

2.3.3. Data collection

Patients of the two groups came to our hospital for follow-up one month after discharge, and filled out the questionnaire. 90 questionnaires were sent and 90 were recovered, with a recovery rate of 100%, and the data were compiled.

2.4. Evaluation index

2.4.1. Incidence of adverse reactions

Adverse reactions of discharged patients after liver cancer surgery mainly include pain at the wound, loss of appetite, sleep disorders, stress, lack of knowledge, poor compliance, and so on.

2.4.2. Quality of life

The Chinese version of EORTCQLQ-C30 for cancer patients^[7] was used to evaluate the quality of life of patients in the two groups. The content of EORTCQLQ-C30 contained 15 levels and 30 items, and the score of each level was linearly converted into 0–100 points according to the questionnaire manual. A higher score in both the functional area and the overall quality of life area indicates a better quality of life, while a higher score in the other symptoms indicates more symptoms or problems and a worse quality of life.

2.4.3. Level of hope

Hope level is evaluated by the Herth Hope Scale, which includes three dimensions: positive attitude towards reality and the future, taking positive actions, and maintaining a close relationship with others, and there

are 12 items in total. Each item was scored from the scale of 1–4, ranging from “strongly disagree” (score: 1) to “strongly agree,” (score: 4). The total score was 12–48 points. The higher the score, the higher the level of hope. The Cronbach’s alpha and content validity index (CVI) were 0.971 and 0.861, respectively, indicating good reliability and validity.

2.5. Statistical methods

SPSS 20.0 statistical analysis software was used to analyze the data, and the measurement data was expressed as mean \pm standard deviation (mean \pm s). A *t* test was performed, and Wilcoxon rank sum test was used to compare rank data. The statistical data were expressed as percentage (%), a χ^2 test was performed, and $P < 0.05$ was considered to be statistically significant.

3. Results

3.1. Comparison of the incidence of adverse reactions between the two groups

The rate of wound pain, loss of appetite, sleep disorders, stress, lack of knowledge, and poor compliance in the observation group were 4.44%, 2.22%, 2.22%, 2.22%, 0%, 2.22%, respectively, which were significantly lower than the control group, with statistical significance ($P < 0.05$), as shown in **Table 1**.

Table 1. Incidence of adverse reactions in the two groups ($n = 45, n \%$)

Group	Wound pain and healing	Loss of appetite	Sleep disorders	Psychological pressure	Lack of knowledge	Poor compliance	Incidence rate
Observation group	2 (4.44)	1 (2.22)	1 (2.22)	1 (2.22)	0 (0.00)	1 (2.22)	6 (13.33)
Control group	4 (8.89)	3 (6.67)	3 (6.67)	2 (4.45)	2 (4.45)	3 (6.67)	17 (37.78)
χ^2							11.536
<i>P</i>	0.679	0.616	0.616	1.000	0.485	0.616	0.001

3.2. Comparison of quality-of-life scores between the two groups

The average scores of physical function, emotional function, cognitive function, social function, and role function in the observation group were 75.2 ± 6.4 , 74.2 ± 5.1 , 74.4 ± 6.2 , 73.8 ± 4.3 , 72.0 ± 5.2 , respectively, which were significantly higher than those in the control group ($P < 0.05$), as shown in **Table 2**.

Table 2. Comparison of life quality scores between the two groups (mean \pm SD)

Group	Number of patients	Physical function	Emotional function	Cognitive function	Social function	Role function
Observation group	45	75.2 ± 6.4	74.2 ± 5.1	74.4 ± 6.2	73.8 ± 4.3	72.0 ± 5.2
Control group	45	56.1 ± 4.1	58.6 ± 5.3	56.2 ± 5.4	57.7 ± 6.3	57.9 ± 4.6
χ^2	-	4.95	5.87	4.95	4.56	4.75
<i>P</i>	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

3.3. Comparison of level of hope between the two groups

The scores of positive attitude towards reality and future, taking positive actions and maintaining close relationship with others in the observation group were 12.34 ± 2.76 , 11.67 ± 2.58 , and 11.66 ± 2.29 ,

respectively, which were significantly higher than those in the control group ($P < 0.05$), as shown in **Table 3**.

Table 3. Comparison of hope level changes between the two groups (points, mean \pm SD)

Group	Having a positive attitude towards reality and the future	Taking positive actions	Maintaining a close relationship with others	Total scores
Observation group ($n = 45$)	12.34 \pm 2.76	11.67 \pm 2.58	11.66 \pm 2.29	35.68 \pm 7.85
Control group ($n = 45$)	9.58 \pm 2.59	9.96 \pm 2.35	9.79 \pm 2.19	29.33 \pm 7.23
<i>t</i>	3.574	2.512	2.680	7.147
<i>P</i>	0.031	0.037	0.034	0.024

4. Discussion

Most patients often fail follow the nurse's notes, self-care and cognition often appear deviation due to a variety of reasons. The routine care provided is relatively general and cannot fully meet the actual needs of patients, which affects the prognosis of patients. Therefore, continuous care can reduce the incidence of postoperative complications, improve the quality of life of patients, and is conducive to the recovery of the patients [8]. Studies have shown that more than 60% of patients expect medical staff to continue to give professional guidance and help after discharge [9]. Therefore, patients have high requirements for continuous care [10], especially for patients who had malignant tumors [11]. With the continuous development of Internet technology, "Internet+" not only provides traditional medical services, but also nursing services, "Internet+" nursing acts as a bridge for communication between nurses and patients. With the development of intelligent systems, online health education has been accepted by the public. Online health education eliminates the time and space restriction between patients and medical staff and has a high transmission speed, diversified forms, and high acceptance rate of patients. It enables patients to achieve family medical treatment and reduces the economic burden of the patients' families. In addition, this study also showed that the incidence of adverse reactions after discharge of patients with liver cancer after surgery in the observation group was significantly lower than that in the control group, and the quality of life, level of hope, and nursing service satisfaction in the observation group was significantly higher than that in the control group. In conclusion, "Internet+" nursing can effectively reduce the incidence of adverse reactions in patients with liver cancer, improve the quality of life, level of hope, nursing service satisfaction, and promote physical and mental rehabilitation of patients with liver cancer.

Disclosure statement

The authors declare no conflict of interest.

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