

Original Article

The effects of the transitional care model combined with the parent adult child model (PAC) on liver cancer surgery patients

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Abstract: Objective: To explore the effects of the online, platform-based Transitional Care Model (TCM) combined with the Parent Adult Child Model (PAC) on liver cancer patients after their surgery. Methods: 78 liver cancer patients who underwent surgical treatment in our hospital were enrolled and divided into a study group (n=39) and a control group (n=39). The patients in the control group received online platform-based TCM after surgery, while the patients in the study group were cared for using the PAC in addition to the online, platform-based TCM. The changes in their adverse emotions, quality of life, immune function, liver function, 1-year survival rate, and self-care abilities before and after the intervention were observed and recorded in the two groups. Results: After the intervention, the study group had lower SAS and SDS scores and higher FACT-Hep scores than the control group ($P<0.05$). The study group also exhibited higher CD3+, CD4+, and CD4+/CD8+ levels, and lower aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels than the control group ($P<0.05$). There was no significant difference in the 1-year survival rate between the two groups ($P>0.05$). Conclusion: TCM combined with PAC can significantly improve the bad moods, liver function, quality of life, immune function, and self-care abilities in liver cancer patients after surgery.

Keywords: PAC, online platform, transitional care model, liver cancer, FACT-Hep

Introduction

Liver cancer is generally classified as primary or secondary. Primary liver cancer mostly originates from the epithelial or mesenchymal tissue of the liver, while secondary liver cancer develops when the cancer cells spread from other organs to the liver. Studies have found that liver cancer is a clinically common malignant tumor. According to a 2014 survey conducted by the World Health Organization, liver cancer is the leading cause of new cancer cases and cancer-related death, accounting for about 50.5% of all cancers. With the changes in lifestyles and dietary habits, the incidence of liver cancer has shown an upward trend [1-3].

Although there are many treatments for liver cancer, surgical treatment is still the first choice and has the longest long-term survival rate. The progress of the surgical techniques has greatly

improved the prognosis of liver cancer surgery, and the survival rate of patients has been increased significantly [4, 5]. With a high recurrence rate and long treatment cycles, out-of-hospital care is still needed to improve the survival rate and liver function. However, most patients with liver cancer have poor treatment compliance. A survey of 132 patients with liver cancer after their surgeries found that 24.24% of the patients believed that the surgery had solved the problem and that there was no need for out-of-hospital care, 22.72% of the patients said that their family members had a history of liver cancer, and they were ready to die, and 65.91% of the patients had significant anxiety and depression [6, 7]. The above findings suggest that it is extremely necessary to carry out appropriate continuous care for patients with liver cancer. In recent years, the Transitional Care Model (TCM) using internet-based platforms has gained popularity. However, some

patients may over-rely on or question the intervention of the medical staff, which has hindered the model's development [8-10]. The parent Adult Child Model (PAC), also known as transactional analysis theory and personality structure analysis theory, is a systematic psychological treatment for personal growth and personality development. This intervention method has a broad application basis in clinical practice, and has been shown to improve the patients' quality of life, improve their negative emotions, and improve their self-efficacy and other abilities with a variety of chronic diseases. This study aimed to evaluate the effects of PAC combined with TCM for patients with liver cancer after surgery, so as to provide theoretical support for improving liver cancer patients' quality of life.

Materials and methods

Baseline data

A total of 78 patients with liver cancer who underwent surgical treatment in our hospital from January 2019 to December 2019 were enrolled and randomly divided into the study group (n=39) and the control group (n=39). The patients in the control group received online, platform-based TCM after surgery, and the patients in the study group were cared for using PAC in addition to the online, platform-based TCM.

Inclusion criteria: (1) patients who were diagnosed with liver cancer through pathology and imaging and who underwent surgery, (2) patients who were able to cooperate with the care procedures, (3) patients who were over 18 years old, (4) and patients who had complete medical records. This study was conducted with the approval of the Hospital Ethics Committee. The patients or their families signed an informed written consent.

Exclusion criteria: (1) patients with mental illnesses, (2) patients with severe organic diseases, (3) patients with communication problems, (4) patients with a recurrence of liver cancer or with distant metastasis, (5) patients unable to access online tools, (6) patients with an estimated survival time ≤ 6 months, (7) patients who voluntarily requested to withdraw from the study, (8) patients unable to continue the study due a recurrence of the cancer, and (9) patients who died during the study.

Intervention method

The control group was given the following postoperative care: (1) Routine care. The patients fasted for periods of time, gastric decompression was performed, their drainage fluid characteristics and vital signs were monitored, and their water-electrolyte balance was maintained. (2) Psychological care. Psychological counseling was provided for the patients after the surgery, the patients were promptly informed of the changes in their condition and were encouraged to express their inner feelings to enhance their confidence in the treatment. (3) Dietary guidance. Nutrition was supplemented by intravenous fluids in the early postoperative period. (4) Online platforms were set up for communication among the physicians, nurses, and patients, such as WeChat public accounts, WeChat groups, QQ groups, etc., through which positive postoperative guidance were shared with the patients to ensure that they can still receive health guidance after their discharge.

The patients in the study group were given the PAC in addition to the TCM. The specific measures were as follows: (1) First, the medical staff was trained on the PAC theory to the experience ego states of the doctors and patients under the PAC theory, and the cognitive ability of the medical staff to recognize the PAC statuses of the patients so they can be strengthened through theoretical teaching, short film analysis, role-playing, etc.; (2) The medical staff tries to position itself in different roles, thus recognizing that the adult-to-adult model is best for both the nurses and the patients. The nurses provide care to the patients in an adult-to-adult model; (3) Authoritative tone, or impulsive conversations should be avoided in communication. The medical staff should carefully listen to the needs of the patients and give reasonable answers, but the patients should also avoid being overdependent, avoiding such attitudes as "I listen to you for everything", "I insist", and "I will not forgive you if you cannot cure me", which only undermine the doctor-patient relationship and affect the patient's mental state. The two groups of patients received care for six months.

Observation indicators

Changes in anxiety and depression: The SAS and SDS scales were used to evaluate the anxi-

The effects of online platform-based TCM combined with PAC

ety and depression before and after and at 1, 3, and 6 months during the intervention. The SAS scale contains 20 items rated on a four point Likert scale and classified the severity of the anxiety as none (a score ≤ 49), mild (a score from 50-59), moderate (a score from 60-69) and severe (a score ≥ 70). The SDS scale also contains a total of 20 items using a 1-4 grading scale. The severity of the depression was defined as no depression (a score ≤ 52), mild (a score from 53-62), moderate (a score from 63-72), and severe (a score ≥ 73) [11].

Changes in the quality of life scores: The FACT-Hep scale was used to assess the quality of life before and after and at 1, 3, and 6 months during the intervention. The FACT-Hep scale included a total of 27 items which assesses generic HRQL concerns, and an additional 18-item Hepatobiliary Subscale (HS), covering the physical aspects (6 items), social aspects (6 items), psychological aspects (6 items), and functional aspects (7 items), with each item scaled from 0-4 points. A higher score indicates a higher quality of life [12].

Changes in immune function indices: 5 ml of fasting venous blood was collected before and at 6 months after the intervention to determine the CD3+, CD4+, and CD4+/CD8+ levels using immunofluorescence staining.

Changes in the liver function indices: Before and at 6 months after intervention, the AST and ALT levels in the venous blood samples were determined using an automatic biochemical analyzer.

Comparison of the 1-year survival rates: The patients in the two groups were followed up for one year. The 1-year survival rate was recorded, and the difference between the two groups was compared.

Comparison of self-care abilities: The 43-item ESCA scale was used to evaluate the patients' self-care abilities before and at 6 months of intervention. The ESCA scale involves self-care skills (12 items), self-responsibility (8 items), self-concept (9 items), and health knowledge level (14 items). Higher scores in each category indicates stronger self-care abilities.

Statistical analysis

SPSS 20.0 was used for the statistical analysis. The measurement data were expressed as ($\bar{x} \pm$

s), and the differences between groups were tested using Student's t tests. The enumeration data were represented as [n (%)] and examined using chi-square tests. $P < 0.05$ indicated a significant difference [13].

Results

Comparison of the baseline data between the two groups

There were no significant differences in terms of the baseline data such as gender, age, weight, marital status, education level, operation time, or room temperature, etc. between the two groups ($P > 0.05$) (Table 1).

Changes in anxiety and depression

Both groups had a significant decrease in their SAS and SDS scores after the intervention ($P < 0.05$). The SAS and SDS scores of the study group at multiple time points were lower than those of the control group ($P < 0.05$) (Figure 1).

Changes in the quality of life scores

The FACT-Hep scores in the study group showed a significant increasing trend, and they were higher than those in the control group after 1, 3 and 6 months of the intervention ($P < 0.05$) (Figure 2).

Changes in the immune function indices

The CD3+, CD4+, and CD4+/CD8+ levels were increased in both groups after the intervention ($P < 0.05$) and were higher in the study group than they were in the control group ($P < 0.05$) (Figure 3).

Changes in liver function indices

There were no significant differences in the AST and ALT levels between the two groups before the intervention ($P > 0.05$). After 6 months of intervention, the study group showed lower AST and ALT levels than the control group ($P < 0.05$), suggesting that the liver function of the patients in the study group recovered better (Table 2).

Comparison of the 1-year survival rates

The follow-up showed that the 1-year survival rate was 82.05% (32/39) in the study group and 76.92% (30/39) in the control group, indicating little difference between the two groups ($\chi^2 = 0.315$, $P = 0.575$).

The effects of online platform-based TCM combined with PAC

Table 1. Comparison of the baseline data in the two groups ($\bar{x} \pm s$)/[N (%)]

Baseline		Study group (n=39)	Control group (n=39)	t/X ²	P
Gender	Male	23	24	0.054	0.817
	Female	16	15		
Average age (years)		56.19±3.21	56.21±2.98	0.029	0.977
Average weight (kg)		62.18±3.22	62.22±3.31	0.054	0.957
Average BMI (kg/m ²)		22.39±2.19	22.41±2.21	0.04	0.968
Occupation	Farmer	9	9	0.311	0.811
	Worker	14	15		
	Others	16	15		
Education level	Illiterate	5	4	0.361	0.801
	Primary school	11	12		
	Junior high school	14	13		
	High school and above	9	10		
Marital status	Married	35	34	0.126	0.723
	Unmarried	4	5		
Family history of liver cancer	Yes	6	5	0.106	0.745
	No	33	34		
Smoking history	Yes	19	18	0.051	0.821
	No	20	21		
Drinking history	Yes	16	17	0.053	0.819
	No	23	22		

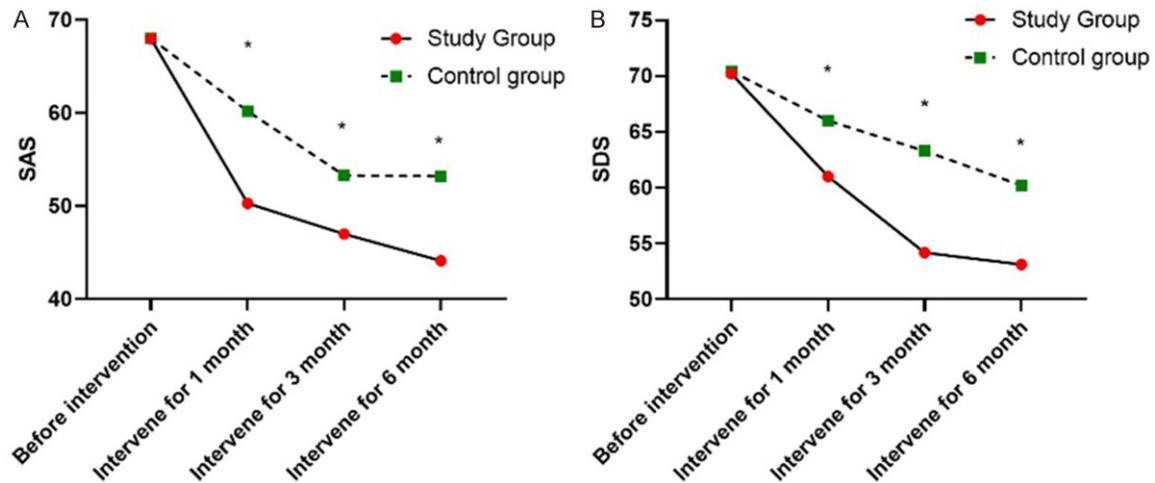


Figure 1. Comparison of the changes in anxiety and depression between the two groups before and after the intervention. The SAS scale scores of the two groups were not significantly different before the intervention, but the SAS scores of the study group at 1, 3, and 6 months of the intervention were lower than those of the control group (A); The SDS scores of the two groups were not significantly different before the intervention, and the SDS scores of the study group at 1, 3, and 6 months of intervention were lower than those of the control group (B); * $P < 0.05$.

Comparison of the self-care ability

After the intervention, the ESCA scores were improved in both groups, and they were significantly higher in the study group than they were in the control group ($P < 0.05$) (Figure 4).

Discussion

Unhealthy lifestyles and unhealthy dietary patterns have contributed to the prevalence of cancer, namely malignant tumors originating in the epithelial tissue, and liver cancer is a malig-

The effects of online platform-based TCM combined with PAC

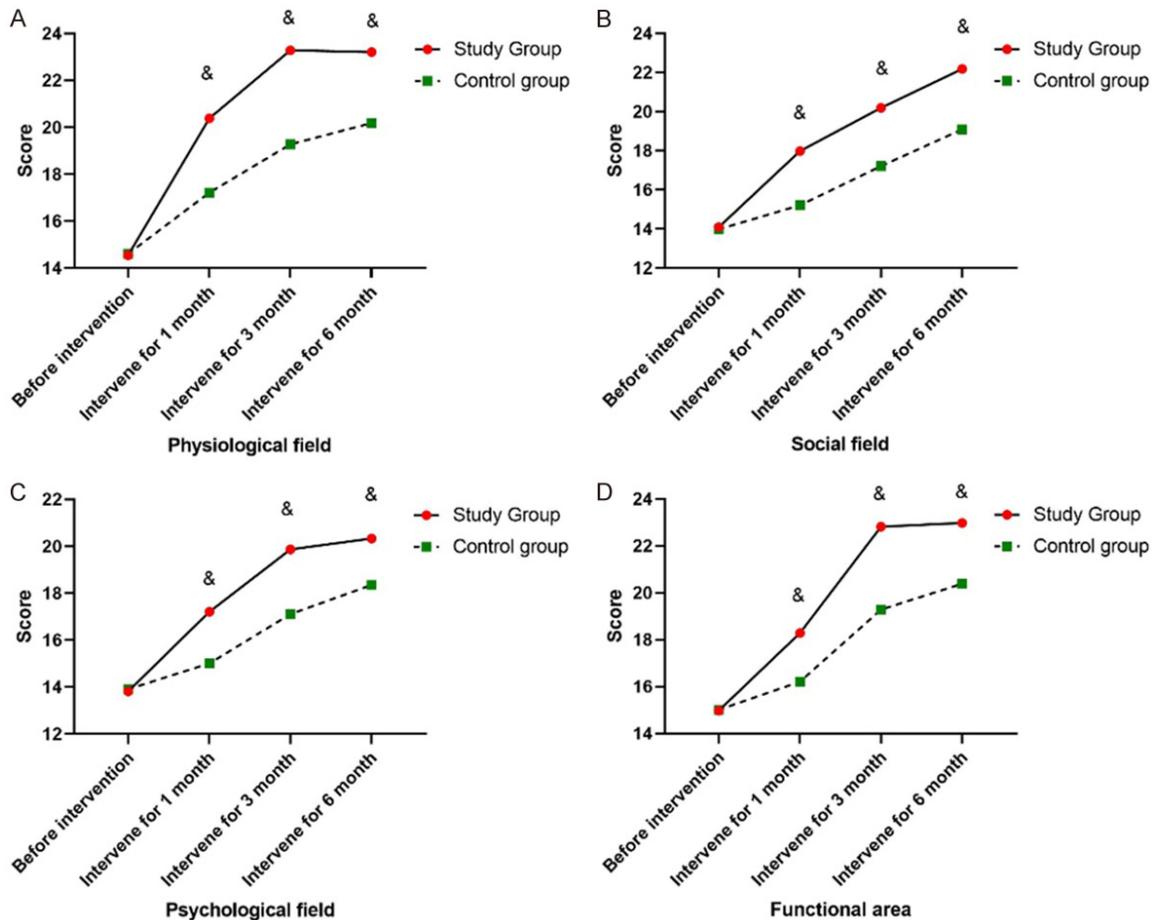


Figure 2. Comparison of the changes in the quality of life scores between the two groups before and after the intervention. The FACT-Hep scores indicated no significant differences between the two groups before the intervention ($P>0.05$). After the intervention, the scores were higher in the study group than they were in the control group ($P<0.05$) in the physiological field (A), social field (B), psychological field (C), and functional field (D).

nant liver tumor. Data show that the incidence of liver cancer ranks fifth among malignant tumors, and the number of liver cancer-related deaths ranks third. More than 600,000 new cases of liver cancer occur worldwide each year, accounting for 5.6% of all new cancer cases. A survey indicates that there are about 350,000 cases of liver cancer in China each year, accounting for about 11.6% of new cancer cases in the same period. The molecular mechanism of liver cancer is still unclear, but most studies have found that viral infections, drinking water pollution, alcohol, cirrhosis, etc. are closely related to the occurrence and development of liver cancer [14, 15].

The treatment options for liver cancer may include surgery, hepatic artery ligation, and radiofrequency, microwave, chemotherapy, and

radiation therapy, among which surgery is currently the most effective method, and it plays an irreplaceable role in prolonging the survival time of patients [16]. Clinical studies have found that patients experience a high recurrence and a low quality of life after undergoing liver cancer surgery, leading to poor treatment compliance. Some studies have showed that about 50% of liver cancer patients desired out-of-hospital care. More than 70% of patients showed obvious anxiety after surgery [17, 18]. In recent years, social networks and multimedia technology have been integrated into the transitional care of liver cancer patients, such as WeChat public accounts, online video, video-phone, etc., which of course ensures the continuity of care, but also restricts the cultivation of patients' self-care abilities [19, 20]. Some surveys have shown that patients receiving TCM

The effects of online platform-based TCM combined with PAC

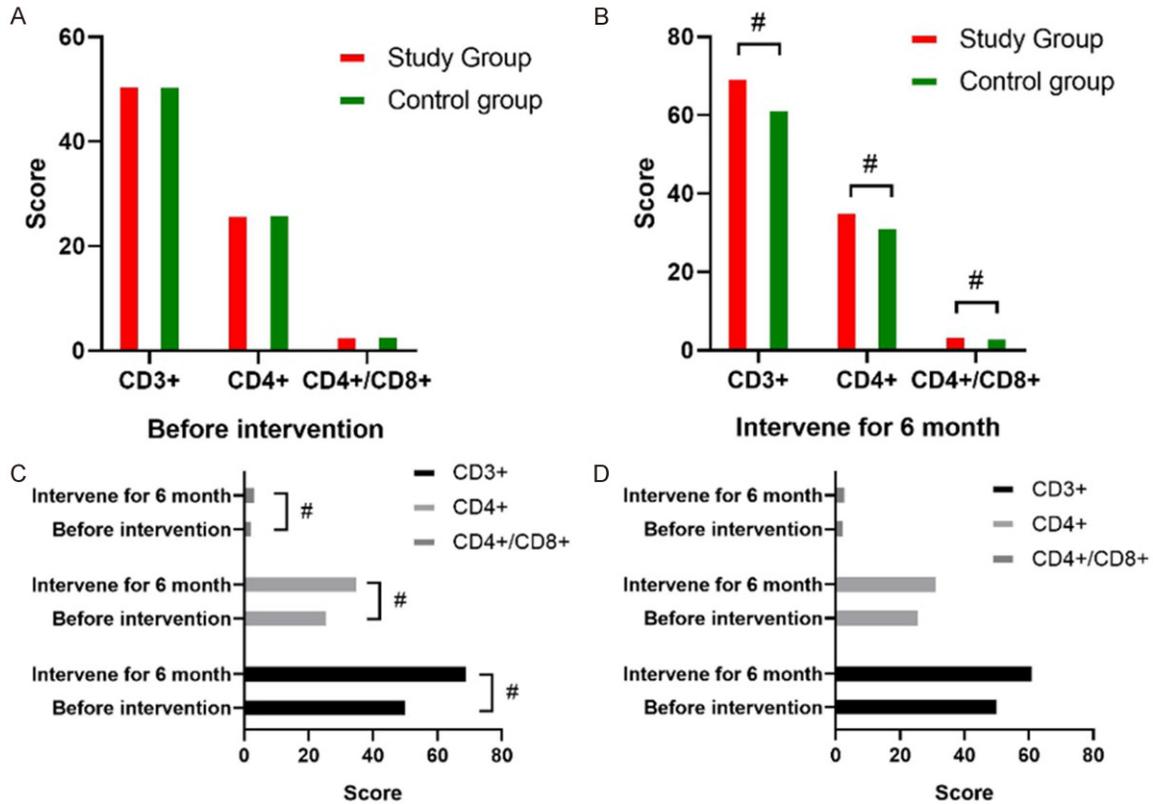


Figure 3. Comparison of the changes in the immune function indices between the two groups before and after the intervention. There was no significant difference in the CD3+, CD4+, and CD4+/CD8+ levels before the intervention ($P>0.05$) (A). The CD4+, and CD4+/CD8+ levels in the study group were significantly higher than they were in the control group ($P<0.05$) (B). The changes in the CD3+, CD4+, and CD4+/CD8+ levels before and after the intervention in the study group were significantly higher than they were in the control group (C, D); # $P<0.05$.

Table 2. Changes in the liver function indices before and after the intervention ($\bar{x} \pm s$)

Group	Number of cases	AST (U/L)		ALT (U/L)	
		Before intervention	After intervention	Before intervention	After intervention
Study group	39	79.28±3.55	41.28±3.43	87.29±3.44	35.18±4.33
Control group	39	79.31±3.41	51.29±2.98	87.19±3.81	40.19±3.21
<i>t</i>	-	0.038	13.758	0.122	5.805
<i>P</i>	-	0.97	<0.001	0.903	<0.001

via the Internet are overly dependent on medical staff. Frequent communication wastes the medical staff's time and reduces the efficiency of TCM. In addition, some patients with blind self-confidence even stopped their treatment on their own, resulting in dangerous events [21]. Therefore, it is necessary to find a way to cultivate the patients' self-care abilities while implementing TCM.

In this study, the patients in the study group had significantly higher quality of life scores

and lower anxiety and depression scores at multiple time points after the intervention. Some studies have demonstrated that patients with liver cancer often have a high incidence of negative emotions after surgery due to difficulties encountered in the treatment, which directly affects the normal life of patients and makes them prone to be self-violent and self-abandoning [22]. PAC theory, developed by Dr Eric Berne in the 1950s, provides a simple and common sense approach for analyzing the structure of the personality. The theory holds that when an

The effects of online platform-based TCM combined with PAC

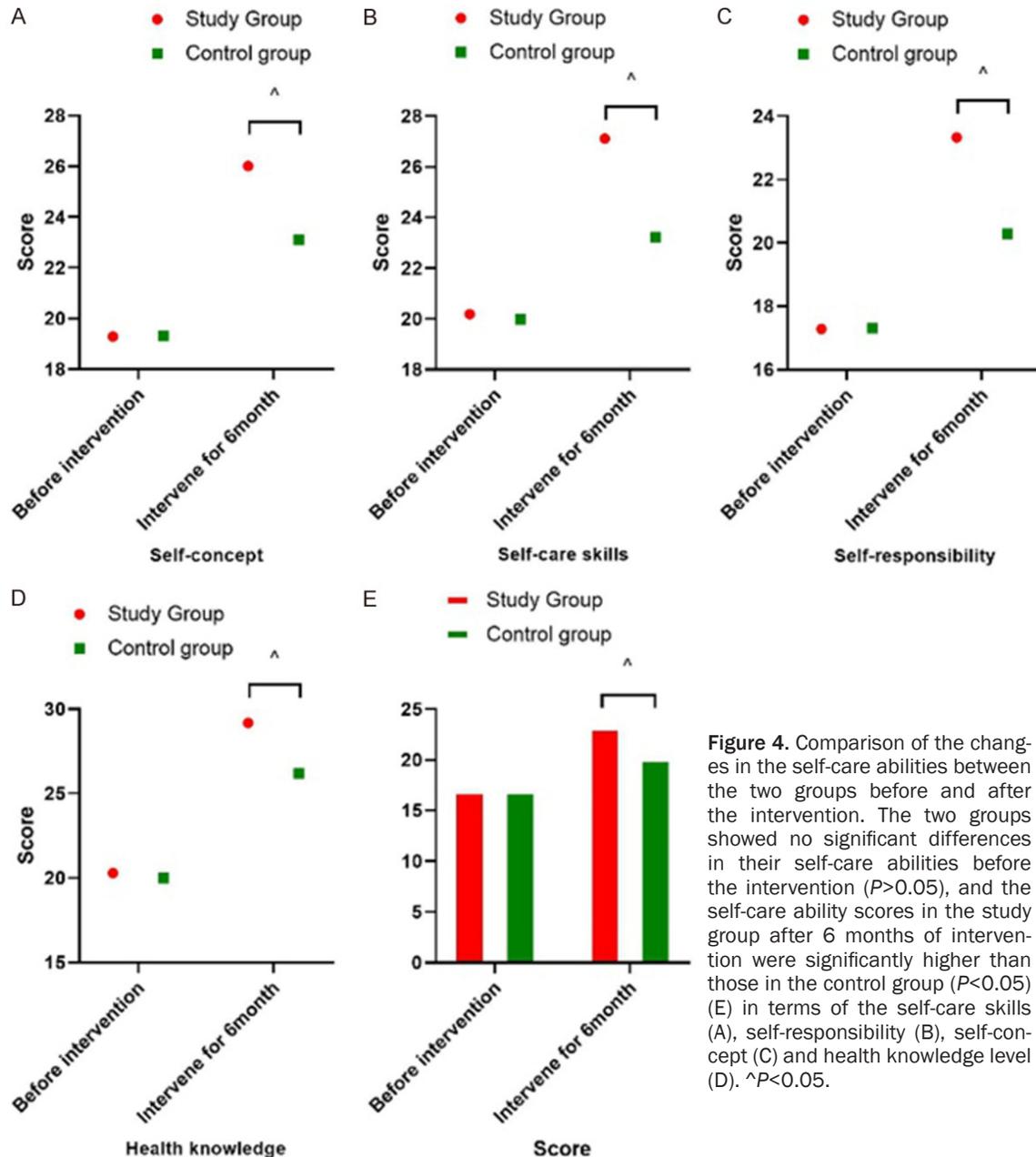


Figure 4. Comparison of the changes in the self-care abilities between the two groups before and after the intervention. The two groups showed no significant differences in their self-care abilities before the intervention ($P>0.05$), and the self-care ability scores in the study group after 6 months of intervention were significantly higher than those in the control group ($P<0.05$) (E) in terms of the self-care skills (A), self-responsibility (B), self-concept (C) and health knowledge level (D). $^{\wedge}P<0.05$.

individual responds to another individual, there will be a social interaction in three 'ego states' known as the "parent" state, which shows the tendency of authority, control, protection, guidance, etc., the "adult" state, which operates dispassionately and without emotion, and the "child" state, which is more likely to show behavioral tendencies such as dependence on others, helplessness, willfulness, and impulsivity [23]. These three ego states will manifest themselves in turn or interactively on the individual, and with alter with changes in location,

situation, and time, guiding the individual to show different behavior patterns. Due to the influence of the disease, liver cancer patients often show a clear "child" or "parent" state, which is not conducive to the implementation of the nursing interventions. Through early health education, the patients can understand the importance of involvement and form an "adult-to-adult" relationship with the medical staff, and actively participate in the nursing, which also improves their negative moods and their quality of life [24]. PAC combined with TCM

can also help improve a patient's immunity and liver function after surgery, which is also related the improvements in moods. A survey of 80 patients with lung cancer after surgery showed that early nursing intervention based on PAC theory is helpful for the postoperative rehabilitation of patients. The questionnaire survey found that patients receiving PAC intervention showed more active self-care enthusiasm and a higher degree of mastery of self-care function than in conventional nursing patients, a finding similar to the results of this study [25]. The authors of this study analyzed and believe that PAC theory mostly emphasizes cultivating the subjective initiative of patients and deliberately avoids the habit of over-dependence or over-arbitrary patients, thus achieving the optimal combination of compliance + self-care, so the prognosis of patients is better. This study also found that PAC helps to cultivate the self-care abilities of patients. The reason may be that PAC emphasizes the equal roles/status of patients and caregivers in the intervention, which is beneficial for tapping the potential of patients. Continuous participation in the care process also improves their self-care abilities.

In summary, TCM combined with the online-platform PAC can significantly improve a patient's adverse emotions, liver function, quality of life, and immunity, and is also beneficial in cultivating patient self-care abilities, so it is worthy of clinical promotion. There are several shortcomings to this study: (1) The small sample size led to a lack of representativeness, and (2) The short follow-up time could not predict the long-term effects. A larger sample size study with a longer follow-up will be performed in the future.

Disclosure of conflict of interest

None.

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The effects of online platform-based TCM combined with PAC

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