

# World Journal of *Clinical Cases*

*World J Clin Cases* 2022 August 16; 10(23): 8057-8431



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**ABOUT COVER**

Editorial Board Member of *World Journal of Clinical Cases*, Peng Liang, MD, Associate Professor, Day Surgery Center, Department of Anesthesiology, West China Hospital of Sichuan University, Chengdu 610041, Sichuan Province, China. 39485572@qq.com

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**RESPONSIBLE EDITORS FOR THIS ISSUE**

Production Editor: *Hua-Ge Yu*; Production Department Director: *Xiang Li*; Editorial Office Director: *Jin-Lei Wang*.

**NAME OF JOURNAL**

*World Journal of Clinical Cases*

**ISSN**

ISSN 2307-8960 (online)

**LAUNCH DATE**

April 16, 2013

**FREQUENCY**

Thrice Monthly

**EDITORS-IN-CHIEF**

Bao-Gan Peng, Jerzy Tadeusz Chudek, George Kontogeorgos, Maurizio Serati, Ja Hyeon Ku

**EDITORIAL BOARD MEMBERS**

<https://www.wjgnet.com/2307-8960/editorialboard.htm>

**PUBLICATION DATE**

August 16, 2022

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**PUBLICATION ETHICS**

<https://www.wjgnet.com/bpg/GerInfo/288>

**PUBLICATION MISCONDUCT**

<https://www.wjgnet.com/bpg/gerinfo/208>

**ARTICLE PROCESSING CHARGE**

<https://www.wjgnet.com/bpg/gerinfo/242>

**STEPS FOR SUBMITTING MANUSCRIPTS**

<https://www.wjgnet.com/bpg/GerInfo/239>

**ONLINE SUBMISSION**

<https://www.f6publishing.com>

## Observational Study

# Three-dimensional psychological guidance combined with evidence-based health intervention in patients with liver abscess treated with ultrasound

Ya-Nan Shan, Ying Yu, Yi-Han Zhao, Lian-Lian Tang, Xiao-Min Chen

**Specialty type:** Nursing**Provenance and peer review:**

Unsolicited article; Externally peer reviewed.

**Peer-review model:** Single blind**Peer-review report's scientific quality classification**

Grade A (Excellent): 0  
Grade B (Very good): B, B  
Grade C (Good): 0  
Grade D (Fair): 0  
Grade E (Poor): 0

**P-Reviewer:** Shimizu T, Japan;  
Wagner-Skacel J, Austria**Received:** April 19, 2022**Peer-review started:** April 19, 2022**First decision:** May 11, 2022**Revised:** May 23, 2022**Accepted:** June 30, 2022**Article in press:** June 30, 2022**Published online:** August 16, 2022**Ya-Nan Shan, Ying Yu, Yi-Han Zhao**, Department of Infectious Diseases, First Hospital of Qinhuangdao, Qinhuangdao 066000, Hebei Province, China**Lian-Lian Tang, Xiao-Min Chen**, Nursing Department, First Hospital of Qinhuangdao, Qinhuangdao 066000, Hebei Province, China**Corresponding author:** Xiao-Min Chen, Master Degree Candidate, Professor, Director, Nursing Department, First Hospital of Qinhuangdao, No. 258 Wenhua Road, Haigang District, Qinhuangdao 066000, Hebei Province, China. [chenxiaomin2021@yeah.net](mailto:chenxiaomin2021@yeah.net)

## Abstract

### BACKGROUND

Liver abscess is a common clinical liver disease mainly caused by suppurative bacteria or amoebae, with early clinical signs of chills, high fever, jaundice, and other symptoms. Establishing its early diagnosis is difficult, which may lead to misdiagnosis.

### AIM

To observe the effects of psychological guidance combined with evidence-based health intervention in patients with liver abscess treated with ultrasound.

### METHODS

A total of 120 patients with bacterial liver abscess admitted to our hospital from May 2018 to February 2021 were selected and divided into groups according to their intervention plan.

### RESULTS

After the intervention, Self-Rating Depression Scale, Self-Rating Anxiety Scale, Self-Perceived Burden Scale (SPBS), and quality of life scores (physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, mental health) were lower than before the intervention in the two groups. The observation group had lower negative sentiment, SPBS, and quality of life scores than the control group. In the observation group, 31 and 24 patients had good and general compliance, respectively, with a compliance rate of 91.67%, which was significantly higher than that in the control group. The observation group had significantly lower total incidence of incision infection, abdominal

abscess, hemorrhage, and severe abdominal pain than the control group.

### CONCLUSION

Three-dimensional psychological guidance combined with evidence-based health intervention in treating liver abscess can reduce patients' burden and negative emotions, improve patient compliance and quality of life, and reduce complications.

**Key Words:** Three-dimensional psychological guidance; Evidence-based health intervention; Ultrasound intervention; Liver abscess; Negative emotions; Compliance

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**Core Tip:** Patients have poor compliance during interventional treatment of liver abscess. This article uses three-dimensional psychological guidance combined with evidence-based health intervention to increase the patient's degree of cooperation in treatment.

**Citation:** Shan YN, Yu Y, Zhao YH, Tang LL, Chen XM. Three-dimensional psychological guidance combined with evidence-based health intervention in patients with liver abscess treated with ultrasound. *World J Clin Cases* 2022; 10(23): 8196-8204

**URL:** <https://www.wjgnet.com/2307-8960/full/v10/i23/8196.htm>

**DOI:** <https://dx.doi.org/10.12998/wjcc.v10.i23.8196>

## INTRODUCTION

Liver abscess is a common clinical disease that often occurs in the elderly, mainly due to the accumulation of pus caused by the destruction of liver cells and matrix mainly caused by amoebic or bacterial infection, and the formation of new granulation tissue and fibrous tissue in the periphery. In recent years, with the aging population and the increasing incidence of diabetes and cholelithiasis, the incidence of liver abscess also shows an increasing trend, with a fatality rate as high as 11%–31%, and the main cause of death is sepsis or septic shock[1]. With the development of medical imaging, ultrasound-guided percutaneous puncture for the treatment of liver abscess has become a routine treatment for liver abscess because of its simplicity, remarkable effect, and good prognosis. However, in recent years, patients' lack of understanding of the disease and treatment plan during interventional therapy has led to evident psychological resistance, and the low degree of cooperation during clinical treatment affects the clinical treatment effect[2]. This study analyzed the effects of three-dimensional (3D) psychological guidance combined with evidence-based health intervention on negative emotions and treatment cooperation of patients with liver abscess treated with ultrasound, to provide guidance and basis for clinical treatment.

## MATERIALS AND METHODS

### Baseline data

A total of 120 patients with bacterial liver abscess admitted to our hospital from May 2018 to February 2021 were selected and divided into groups according to their intervention plan. Sixty (33 men and 27 women) patients in the control group were provided routine health intervention. The participants' age ranged from 42 to 75 (average,  $61.02 \pm 9.65$ ) years. The diameter of the liver abscess was 3–18 (average,  $10.23 \pm 3.01$ ) cm. The average number of years of education was  $13.63 \pm 3.75$  years. Liver abscess was observed in the left and right lobes of the liver in 35 and 25 patients, respectively. Sixty (29 men and 31 women) patients in the observation group were provided 3D psychological guidance combined with evidence-based health intervention. The participants' age ranged from 42 to 75 (average,  $60.85 \pm 10.42$ ) years. The diameter of the liver abscess was 3–18 (average,  $10.17 \pm 3.26$ ) cm. The average number of years of education was  $13.42 \pm 3.88$  years. Liver abscess was observed in the left and right lobes of the liver in 28 and 32 patients, respectively. There was no statistically significant difference in the general data between the two groups ( $P > 0.05$ ).

### Inclusion and exclusion criteria

The inclusion criteria were as follows: patients (1) with bacterial liver abscess diagnosed by imaging and clinical manifestations and treated with ultrasound-guided percutaneous interventional therapy; (2)

aged  $\geq 18$  years and  $\leq 75$  years; (3) with no anesthesia contraindications; (4) with Child-Pugh grading of liver function grades B and C; and (5) with complete clinical data.

The exclusion criteria were as follows: patients (1) contraindicated with hepatic abscess drainage; (2) with liver decompensation; (3) with mental abnormalities; (4) with liver cirrhosis and liver cancer; (5) with diseases of the blood and immune system; (6) with cardiovascular and cerebrovascular diseases; and (7) with a history of suicide or suicidal tendencies.

### Method

The control group received routine health intervention, with regular health guidance and questions answered by the nursing staff before treatment began.

The observation group received 3D psychology guide joint evidence-based health intervention, and 3D psychological guidance was provided by the national psychological consultant qualification personnel in our hospital for 30 min each time. The support therapy was performed by listening to the patient's pathogenesis, explaining disease conditions, guiding and encouraging patients, winning support from the patients' families, and performing relaxation training. The treatment process involved analyzing the recent psychological and emotional changes, and the currently existing mental disorders in patients, especially depression and anxiety, that may have adverse effects on the treatment. The following objectives need to be targeted: improve the prevention awareness on psychological problems of patients, enhance their psychological tolerance, correct wrong ideas, encourage and comfort them, and help them shift their attention to perform relaxation training to reduce or even eliminate depression, anxiety, and other negative emotions. The aspects of symptoms, behavior, emotion, and knowledge were taken as an education focus during the treatment of liver abscess. Using evidence-based medicine, the literature was consulted to compile health education manuals, videos, and publicity materials on WeChat and QQ terminals. During patients' hospitalization, health education was provided in the form of seminars and lectures, and relevant manuals were issued. After the patients were discharged, relevant education and guidance were provided again according to the patients' individual situation by means of telephone supervision, SMS reminders, and WeChat communication.

### Observing indicators and detection methods

Normal temperature time, white blood cell (WBC) recovery time, disappearance time of pus cavity, and length of stay were recorded, and the incidence of complications was counted.

Fasting venous blood (3 mL) was extracted from the patients, and the serum was separated by centrifugation at 2000 r/min for 30 min. Routine blood and liver function indices of the patients were monitored using a Hitachi 7600i automatic biochemical analyzer. The reagents were provided by Nanjing Jicheng Biological Products Co., Ltd.

Self-Rating Depression Scale (SDS)[3] and Self-Rating Anxiety Scale (SAS)[4] were used to evaluate negative emotions. A Self-Perceived Burden Scale (SPBS) score[5] was used to evaluate the sense of burden, and the Brief Form of Health Survey (SF-36)[6] was used to evaluate the participants' quality of life. An SDS score  $\geq 53$  indicates depression, and a SAS score  $\geq 50$  indicates anxiety. The SPBS score includes three dimensions: physical, emotional, and economic factors, with a total of 10 items. Items were rated as 1–5 points using the Likert level 5 scoring method. Among them, score  $< 20$  suggests no burden; 20–29, mild burden; 30–39, moderate burden; and  $\geq 40$ , severe burden. The SF-36 includes eight dimensions: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. Each dimension is scored on a 100-point scale. The higher the score, the better the quality of life.

A scale designed by the hospital was used, including 10 items, with 0–10 points for each item, with a total of 100 points for total compliance. A score  $\geq 90$  indicates good compliance, 75–89 general compliance, and  $< 75$  poor compliance.

### Statistical analysis

The Statistical Package for the Social Sciences version 19.0, expressing measurement data as mean  $\pm$  SD, was used for data analysis. A *t*-test was used for comparison. Enumeration data are expressed as case (percentage).  $\chi^2$  was used for comparison. A *P* value of 0.05 was considered significant.

## RESULTS

### Comparison of postoperative rehabilitation between the two groups

Normal temperature time, WBC recovery time, disappearance time of pus cavity, and length of stay were significantly shorter in the observation group than in the control group ( $P < 0.05$ ) (Table 1).

### Comparison of liver function indexes between the two groups

Before intervention, there was no statistically significant difference in liver function indices between the two groups ( $P > 0.05$ ). After the intervention, aspartate aminotransferase (AST), alanine aminotrans-

**Table 1 Comparison of postoperative rehabilitation between the two groups (mean  $\pm$  SD, d)**

Group	Normal temperature time	WBC recovery time	Disappearance time of pus cavity	Length of stay
Control group ( $n = 60$ )	2.52 $\pm$ 0.52	3.69 $\pm$ 0.64	13.56 $\pm$ 2.11	15.82 $\pm$ 3.06
Observation group ( $n = 60$ )	2.10 $\pm$ 0.41	3.05 $\pm$ 0.51	12.31 $\pm$ 1.58	14.21 $\pm$ 2.29
<i>t</i> value	4.913	6.058	3.673	3.263
<i>P</i> value	0.000	0.000	0.000	0.001

WBC: White blood cell.

ferase (ALT), and total bilirubin (TBIL) levels in the two groups were lower than those before the intervention ( $P < 0.05$ ), and liver function indices in the observation group were lower than those in the control group ( $P < 0.05$ ) (Table 2).

#### **Comparison of neutrophil and WBC counts between the two groups**

Before the intervention, there was no statistically significant difference between neutrophil (NEUT) and WBC counts in both groups ( $P > 0.05$ ). After the intervention, NEUT and WBC counts were lower in both groups than before intervention ( $P < 0.05$ ), whereas NEUT and WBC levels in the observation group were lower than those in the control group ( $P < 0.05$ ) (Table 3).

#### **Comparison of depression, anxiety, and other negative emotion scores and Self-Perceived Burden Scale scores between the two groups**

Before the intervention, there was no statistically significant difference in depression, anxiety, and other negative emotions scores and SPBS scores between the two groups ( $P > 0.05$ ). After the intervention, the SDS, SAS, and SPBS scores of the two groups were lower than those before the intervention ( $P < 0.05$ ), and the negative emotion score of depression and anxiety and SPBS score of the observation group were lower than those of the control group ( $P < 0.05$ ) (Table 4).

#### **Comparison of compliance between the two groups**

In the observation group, 31 and 24 patients had good and general compliance, respectively, with a compliance rate of 91.67%, which was significantly higher than that in the control group ( $P < 0.05$ ) (Table 5).

#### **Comparison of quality of life scores between the two groups**

Before the intervention, there was no statistically significant difference in the quality of life scores between the two groups ( $P > 0.05$ ). After the intervention, physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health in both groups were higher than those before the intervention ( $P < 0.05$ ), and the quality of life score in the observation group was higher than that in the control group ( $P < 0.05$ ) (Table 6).

#### **Comparison of complications between the two groups**

The total incidence of incision infection, abdominal abscess, hemorrhage, and severe abdominal pain was significantly lower in the observation group than in the control group ( $P < 0.05$ ) (Table 7).

## **DISCUSSION**

The liver is an organ that receives double blood supply, in which the portal vein provides three-fourths of the blood flow, and the rest is supplied by the hepatic artery. The liver is also connected to the intestine through the biliary tract. All these factors increase the opportunities and routes for bacteria to enter the liver. However, normal liver blood circulation is significantly rich, with a large number of mononuclear macrophages, which can easily kill bacteria. Thus, it will not lead to liver abscess, and once the body experiences infection or wasting diseases caused by the decline of resistance, liver abscess is more prone to occur[7]. Ultrasound-guided percutaneous puncture and drainage therapy has always been an important method for the treatment of liver abscess, with the advantages of convenience and effectiveness, and has replaced surgery as the preferred treatment option. A previous study found that puncture aspiration through ultrasound interventional therapy was simple and easy to control in operation, with lower requirements for the operator than catheter drainage. Moreover, it is more advantageous for separated abscess cavities or multiple abscesses, which can be separated, punctured, and pumped individually[8]. In addition, this method is less painful for patients and results in patients'

**Table 2 Comparison of liver function indexes between the two groups (mean ± SD)**

Group	AST (U/L)		ALT (U/L)		TBIL (μmol/L)	
	Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention
Control group (n = 60)	98.25 ± 14.63	74.36 ± 8.96 <sup>a</sup>	90.74 ± 9.14	58.36 ± 7.13 <sup>a</sup>	38.45 ± 4.36	24.61 ± 2.18 <sup>a</sup>
Observation group (n = 60)	100.12 ± 15.06	66.32 ± 7.28 <sup>a</sup>	89.65 ± 8.36	45.36 ± 6.21 <sup>a</sup>	37.95 ± 4.58	18.22 ± 2.63 <sup>a</sup>
t value	0.690	5.394	0.682	10.650	0.612	14.490
P value	0.492	0.000	0.497	0.000	0.541	0.000

<sup>a</sup>P < 0.05 vs pre-intervention in this group.

AST: aspartate aminotransferase; ALT: alanine aminotransferase; TBIL: total bilirubin.

**Table 3 Comparison of neutrophil and white blood cell counts between the two groups (mean ± SD)**

Group	NEUT (%)		WBC (× 10 <sup>9</sup> /L)	
	Before intervention	After intervention	Before intervention	After intervention
Control group (n = 60)	65.36 ± 9.25	59.02 ± 7.41 <sup>a</sup>	13.63 ± 1.85	9.89 ± 1.03 <sup>a</sup>
Observation group (n = 60)	63.95 ± 10.12	52.52 ± 5.64 <sup>a</sup>	13.41 ± 1.92	8.07 ± 0.94 <sup>a</sup>
t value	0.797	5.407	0.639	10.110
P value	0.427	0.000	0.524	0.000

<sup>a</sup>P < 0.05 vs pre-intervention in this group.

NEUT: Neutrophil; WBC: White blood cell.

**Table 4 Comparison of depression, anxiety, and other negative emotion scores and Self-Perceived Burden Scale scores between the two groups (mean ± SD, min)**

Group	SDS score		SAS score		SPBS score	
	Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention
Control group (n = 60)	53.03 ± 4.63	48.98 ± 4.13 <sup>a</sup>	50.96 ± 3.96	46.62 ± 3.42 <sup>a</sup>	31.56 ± 4.96	26.26 ± 4.63 <sup>a</sup>
Observation group (n = 60)	52.81 ± 5.06	45.03 ± 3.51 <sup>a</sup>	51.01 ± 4.21	42.05 ± 3.87 <sup>a</sup>	32.02 ± 4.82	20.12 ± 3.24 <sup>a</sup>
t value	0.248	5.645	0.067	6.854	0.515	8.416
P value	0.804	0.000	0.947	0.000	0.607	0.000

<sup>a</sup>P < 0.05 vs pre-intervention in this group.

SDS: Self-Rating Depression Scale; SAS: Self-Rating Anxiety Scale; SPBS: Self-Perceived Burden Scale.

comfort. However, for clinical nursing work, it increases certain difficulties, and patients during the treatment will experience psychological fluctuations, which are often accompanied by complications, possibly leading to bleeding, biliary fistula, and other detrimental situations. Therefore, it is of great significance to implement active and effective interventions for liver abscess. Although national studies have comprehensively assessed the disease and its diagnosis and treatment, in our country, ultrasound treatment for liver abscess remains the sole treatment. Thus, these studies have insufficient scientific rigor and only provide a summary of clinical experiences and realizations. The nursing program lacks scientific demonstration, only nursing problems and interventions, and systematic evaluation[9-12].

This study used a 3D psychology guide combined with evidence-based health intervention ultrasound therapy in patients with liver abscess. This therapy was provided by listening to the patient’s disease pathogenesis, explaining the disease condition, guiding and encouraging patients, winning support from the patient’s family to undergo a variety of biological feedback treatments and

**Table 5 Comparison of compliance between the two groups, *n* (%)**

Group	Good compliance	General compliance	Non-compliant patient	Compliance rate
Control group ( <i>n</i> = 60)	20 (33.33)	27 (45.00)	13 (21.67)	47 (78.33)
Observation group ( <i>n</i> = 60)	31 (51.67)	24 (40.00)	5 (8.33)	55 (91.67)
$\chi^2$				4.183
<i>P</i> value				0.041

**Table 6 Comparison of quality of life scores between the two groups (mean  $\pm$  SD, min)**

Parameter	Time	Control group ( <i>n</i> = 60)	Observation group ( <i>n</i> = 60)	<i>t</i> value	<i>P</i> value
Physiological function	Before intervention	50.23 $\pm$ 5.32	51.02 $\pm$ 5.17	0.825	0.411
	After intervention	58.32 $\pm$ 4.05 <sup>a</sup>	69.98 $\pm$ 5.74 <sup>a</sup>	12.857	0.000
Role physical	Before intervention	65.36 $\pm$ 4.25	66.85 $\pm$ 5.03	1.753	0.082
	After intervention	74.14 $\pm$ 5.96 <sup>a</sup>	82.06 $\pm$ 5.14 <sup>a</sup>	7.795	0.000
Body pain	Before intervention	58.32 $\pm$ 6.32	57.02 $\pm$ 6.96	1.071	0.286
	After intervention	64.71 $\pm$ 5.82 <sup>a</sup>	75.36 $\pm$ 6.03 <sup>a</sup>	9.844	0.000
General health	Before intervention	66.36 $\pm$ 5.96	64.98 $\pm$ 6.03	1.261	0.210
	After intervention	72.33 $\pm$ 4.69 <sup>a</sup>	81.02 $\pm$ 5.74 <sup>a</sup>	9.081	0.000
Vitality	Before intervention	57.25 $\pm$ 6.33	57.02 $\pm$ 6.14	0.202	0.840
	After intervention	65.85 $\pm$ 7.02 <sup>a</sup>	74.12 $\pm$ 6.36 <sup>a</sup>	6.763	0.000
Social function	Before intervention	52.03 $\pm$ 7.12	50.96 $\pm$ 7.84	0.783	0.435
	After intervention	63.98 $\pm$ 6.45 <sup>a</sup>	72.05 $\pm$ 6.95 <sup>a</sup>	6.593	0.000
Affective function	Before intervention	57.36 $\pm$ 6.14	56.82 $\pm$ 7.05	0.447	0.655
	After intervention	66.31 $\pm$ 5.92 <sup>a</sup>	75.01 $\pm$ 6.37 <sup>a</sup>	7.749	0.000
Mental health	Before intervention	63.36 $\pm$ 5.65	65.01 $\pm$ 4.82	1.721	0.088
	After intervention	71.02 $\pm$ 6.32 <sup>a</sup>	77.14 $\pm$ 5.23 <sup>a</sup>	5.779	0.000

<sup>a</sup>*P* < 0.05 vs pre-intervention in this group.

**Table 7 Comparison of complications between the two groups, *n* (%)**

Group	Incision infection	Abdominal abscess	Hemorrhage	Severe abdominal pain	Total
Control group ( <i>n</i> = 60)	1 (1.67)	3 (5.00)	4 (6.67)	2 (3.33)	10 (16.67)
Observation group ( <i>n</i> = 60)	1 (1.67)	1 (1.67)	1 (1.67)	0 (0.00)	3 (5.00)
$\chi^2$					4.227
<i>P</i> value					0.040

various relaxation therapies, and carefully listening to the patient's self-narration; this resulted in understanding the history of the present disease, past history and the psychological problems. Patiently and carefully listening to the patient's narrative results in the patient feeling understood and cared about; thus, a good doctor-patient relationship with the patient is established[13-15]. Subsequently, popular discourse was carefully used to introduce the patient's current condition and provide a reasonable explanation to the relevant problems of the patient, to gain the patient's trust. During the 3D preoperative psychological treatment, the key point was to clarify the influence of good mental state treatment before surgery on patients. Through effective psychological counseling and adjustment, patients were able to build their confidence and were positive and optimistic in the face of disease. In the progress of treatment, by analyzing the mental state of patients in the near future and the change in mood, the current mental disorder existing in patients was identified[16]. In particular, with depression

and anxiety, which may have adverse effects on the treatment, it is important to improve the awareness of prevention and control of psychological problems and enhance patients' psychological capacity. Through psychological counseling, error correcting, encouragement and comfort of patients, helping patients transfer attention, and performing relaxation training, negative emotions, such as depression and anxiety, can be reduced or even eliminated[17]. In addition, evidence-based health interventions in health education, through an investigation and analysis of patients with existing health problems, corresponding health education strategies and measures were proposed. According to the plan implementation and evaluation of the health education effect, which is a type of health education, the blindness and repeatability of nursing work can be avoided in the nursing process, thus gradually promoting health education from the experience to systematic and scientific development[18]. The 3D psychological guide joint evidence-based nursing model conforms to modern medicine, that is, humans are considered as a biological, psychological, and social unity, which focuses not only on the patient's clinical manifestations but also on the quality of life. The patient's health status is considered a process of continuous change. The nursing plan needs to be combined with the health problems and quality of life of patients, and the nursing measures provided need to change with the overall health status of patients[19,20].

Our study showed that the normal temperature time, WBC recovery time, disappearance time of pus cavity, and length of stay in the observation group were all shorter than those in the control group, suggesting that 3D psychological guidance combined with evidence-based health intervention ultrasound (joint therapy) in the treatment of patients with liver abscess shortened the time for clinical signs to return to normal. After the intervention, AST, ALT, and TBIL levels in the two groups were lower than before the intervention, and liver function indices in the observation group were lower than those in the control group, suggesting that the joint therapy was beneficial to liver function recovery. After the intervention, NEUT and WBC counts in the two groups were lower than before the intervention, and NEUT and WBC counts in the observation group were lower than those in the control group, suggesting that the joint therapy in the treatment of patients with liver abscess helped reduce the degree of inflammation *in vivo*.

After the intervention, the negative emotional scores of depression, anxiety, and SPBS of the observation group were lower than those of the control group, and the compliance rate of the observation group was 91.67% higher than that of the control group, suggesting that the joint therapy in the treatment of patients with liver abscess helped reduce the adverse reaction emotions of patients before treatment and improved treatment compliance. The joint therapy to treat patients with liver abscess presented in this study is considered beneficial in improving patients' mood and treatment compliance, which has important clinical significance for the patients. From the perspective of nursing evaluation, the importance of psychological nursing and health education during treatment was proposed, thus reducing the pain of patients and improving their comfort and satisfaction. However, due to a limited time, this study failed to follow up and observe the long-term effects of the intervention. Therefore, the long-term effects of the program need to be evaluated in the future, and the promotion and application of the program in other diseases needs to be further demonstrated and analyzed.

## CONCLUSION

In conclusion, 3D psychological guidance combined with evidence-based health intervention ultrasound in the treatment of liver abscess can reduce patients' burden and negative emotions, improve patient compliance and quality of life, and reduce the incidence of complications.

## ARTICLE HIGHLIGHTS

### Research background

Liver abscess is a common clinical liver disease mainly caused by suppurative bacteria or amoebae, with early clinical signs of chills, high fever, jaundice, and other symptoms.

### Research motivation

Establishing its early diagnosis is difficult, which may lead to misdiagnosis.

### Research objectives

This study aimed to observe the effects of psychological guidance combined with evidence-based health intervention in patients with liver abscess treated with ultrasound.

### Research methods

A total of 120 patients with bacterial liver abscess admitted to our hospital were selected and divided into groups according to their intervention plan.

### Research results

After the intervention, Self-Rating Depression Scale, Self-Rating Anxiety Scale, Self-Perceived Burden Scale, and quality of life scores (physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, mental health) were lower than before the intervention in the two groups.

### Research conclusions

Three-dimensional psychological guidance combined with evidence-based health intervention ultrasound in the treatment of liver abscess can reduce patients' burden.

### Research perspectives

The long-term effects of the program need to be evaluated in the future, and the promotion and application of the program in other diseases needs to be further demonstrated and analyzed.

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## FOOTNOTES

**Author contributions:** Shan YN, Yu Y, and Chen XM designed the research study; Shan YN, Zhao YH and Tang LL performed the research; Yu Y contributed new reagents and analytic tools; Shan YN and Yu Y analyzed the data and wrote the manuscript; and all authors have read and approve the final manuscript.

**Institutional review board statement:** The study was reviewed and approved by the Qinhuangdao First Hospital Institutional Review Board.

**Informed consent statement:** Patients were not required to give informed consent to the study because the analysis used anonymous clinical data that were obtained after each patient agreed to treatment by written consent.

**Conflict-of-interest statement:** All authors have nothing to disclose.

**Data sharing statement:** No additional data are available.

**STROBE statement:** The authors have read the STROBE Statement checklist of items, and the manuscript was prepared and revised according to the STROBE Statement checklist of items.

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**Country/Territory of origin:** China

**ORCID number:** Ya-Nan Shan 0000-0002-3121-5886; Ying Yu 0000-0002-1207-0861; Yi-Han Zhao 0000-0001-6310-9300; Lian-Lian Tang 0000-0002-3396-3802; Xiao-Min Chen 0000-0002-2554-0615.

**S-Editor:** Wang JL

**L-Editor:** A

**P-Editor:** Wang JL

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