

## RESEARCH COMMUNICATION

# Factors Associated with Psychological Characteristics in Patients with Hepatic Malignancy before Interventional Procedures

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### Abstract

**Objective:** To investigate the psychological characteristics of hepatic malignancy patients before interventional procedures and assess associations with related factors. **Methods:** Two hundred and thirteen patients requiring interventional procedure for hepatic malignancy were asked to complete a survey of health knowledge and psychological symptom on health knowledge questionnaire and SCL-90 before interventional procedure. Logistic regression analysis was employed to determine the association of various demographic, clinical and health knowledge factors with the presence of psychological symptoms in patients. **Results:** Eight psychological symptom scores, i.e. somatization, obsessive-compulsive tendencies, depression, anxiety, hostility, phobia, paranoid ideations and psychotic states, were significantly higher than the normal range ( $P < 0.001$ ). Of 213 cases in the study, 49 families (23.00%) concealed the diagnoses of hepatic carcinoma from patients; 135 patients (63.38%) described the prognosis of the disease correctly. It was demonstrated that the correlations between psychological symptoms and related factors, i.e. age, gender, education, interventional procedure times and health knowledge, were statistically significant ( $P < 0.05$ ). **Conclusion:** Psychological distress is severe in hepatic malignancy patients before interventional procedures. Age, gender, education, interventional procedure times and health knowledge are associated with psychological symptoms which are significant different from the normal range in Chinese.

**Keywords:** Liver neoplasms - Chinese patients - interventional radiology - psychological distress

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### Introduction

The liver is one of the most common sites of malignant visceral tumors in adults and also the most frequent site of metastatic disease from extrahepatic primary tumors (Kuvshinoff et al., 2007). For the patients, there are many physical and social factors that that may compound the diagnosis of hepatic carcinoma, making it more difficult to cope and contemplate different treatment options. It is demonstrated a stressful and life-changing event causing significant psychological distress (Jadoon et al., 2010; Pirl et al., 2004).

Surgical resection remains one of the major treatment for hepatic carcinoma, but only 8% -15% of hepatocellular carcinoma (HCC) meet the criteria for it (El-Serag et al., 2006; Sonnenday et al., 2007) and only a small percentage of metastasis patients' survival time is prolonged after surgical resection (Sofocleous et al., 2007). Interventional therapy, as a palliative therapy, is recommended for the treatment of unresectable hepatic neoplasms (primary and metastatic) (Llovet et al., 2003; Miraglia et al., 2007). Owing to lack of the information of interventional

procedures (IVP), most patients can't make the crucial decisions at a time when clear and rational thought is difficult. For some patients, diagnostic and therapeutic procedures performed in the interventional radiology department are anxiety provoking and painful (Martin et al., 2005). The stress of these issues and confronting mortality affects personal psychological stability as well as that of the entire family.

From the literature, previous studies have evaluated the psychological status throughout all phases of cancer and highlight several symptoms, such as anxiety and depression, in patients with cancer (Pirl et al., 2004; Tavoli et al., 2007; Nelson et al., 2009; Jadoon et al., 2010; Dempster et al., 2011; Hulbert-Williams et al., 2011). In past decades, a growing number of studies, looking at cancer patients undergoing interventional procedure, suggest severe psychological distress occurs in patients with cancer (Wang et al., 2008) and some symptoms can inhibit healing and interfere with clinical outcomes (Martin et al., 2005; Schupp et al., 2005; Sims et al., 2006). Nevertheless, there are few studies performed to explore whether the psychological distress

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is associated with health knowledge and whether other factors, such as age, gender, education, and IVP times are more important. We hypothesized that there was a strong correlation between psychological disorders and factors including demographic information, interventional procedure times, and health knowledge, in cancer patients before interventional procedure. Therefore, the aim of this study was to investigate the psychological characteristics of hepatic malignancy patients before interventional procedure and measure the association of psychological symptoms with related factors.

## Materials and Methods

### Setting and Protocol

This study was conducted in the inpatient departments of 3 affiliated hospitals of Medical College, Qingdao University. Three hospitals own more than 6000 beds and serve a population of about 35 million in the eastern part of the Shandong province (China). This protocol was approved by the institutional ethics review board at Qingdao Municipal Hospital, and all subjects provided verbal consent for participation in the study.

### Subjects

All adult patients (age  $\geq 18$  yrs) requiring interventional procedure for hepatic malignancy (primary or metastatic) in the inpatient departments were considered for inclusion in the study. All the diagnoses of hepatic malignancy were confirmed by pathologic and histologic examination or elevated serum tumor markers. Patient exclusion criteria were as follows: (1) refuse interventional procedure; (2) presence of encephalopathy or other significant alterations of mental status or cognitive impairment; (3) treatment with anxiolytic or narcotic analgesics medication; (4) ongoing psychological treatment; (5) language or hearing problem; (6) critical condition; (7) incomplete records.

### Outcome measures

The baseline characteristics, including demographic information (i.e., age, gender and education), interventional procedure times and indication for procedure were obtained from the medical record of the patients.

Health knowledge was assessed using health knowledge questionnaire (HKQ), a self administered questionnaire created for hepatic malignancy patients before interventional procedure in this study. The HKQ consists of 5 questions defining a total score from 0 to 10 (Table 1). Every answer is evaluated and rated on a scale of 0-2: "0" don't know; "1" know but the answer is incomplete; "2" know and the answer is complete.

The Chinese version of symptom checklist-90 (SCL-90), a psychiatric self-report inventory, was used to scale the psychological symptoms of the patients before interventional procedure. All patients were guided to answer 90 items with the uniform advices in 12-20 minutes, and the 90 items in the questionnaire were scored on a five-point scale to reflect the psychological symptom patterns of patients. The items referred to the assessment of index for somatization, obsessive-compulsive tendencies, depression, anxiety, phobia, interpersonal sensitivity,

hostility, paranoid ideations and psychotic states. The data from SCL-90 was calculated and compared with the normal range in chinese reported by Jin et al in 1986 (n=7273). Patients were asked to complete a survey of health knowledge and psychological symptom on HKQ and SCL-90 before interventional procedure.

### Data collection

The study was conducted from June 2003 to April 2006. Several researchers were trained by the research coordinator in guidance and other details related to survey prior to the study. Another two researchers were trained in assigning HKQ and SCL-90 scores related to outcome assessment before data collection. Data collection efforts for all outstanding data forms ceased 8 months after the last required patient file was completed. Baseline characteristics, such as age gender, education, interventional procedure times and indication for procedure, were recorded. HKQ and SCL-90 scores were assigned blindly by two researchers, i.e. they were unaware of any demographic and clinical data of the patients. All data were recorded and entered into SPSS software for analysis.

### Statistical analysis

The values measured as continuous data were divided into binary categorical variables to make the prediction rule clear. The cutoff point between young and elder were set at 44 years for age according to the criteria of the World Health Organization. There are no generally accepted criteria of cutoff points of SCL-90 score, so they were chosen to be (Mean IVP + Mean norm)/2 arbitrarily to provide approximate equal-size groups for statistical analysis.

Measurement data were expressed as the mean, standard deviation (SD) and range and enumeration data were expressed as proportions. Differences for SCL-90 scores were compared using One-sample t-test for continuous variables. Binary logistic regression analysis was employed to determine the association of various demographic, clinical and health knowledge factors with the presence of several psychological symptoms in hepatic malignancy patients. The odds ratios (ORs) and

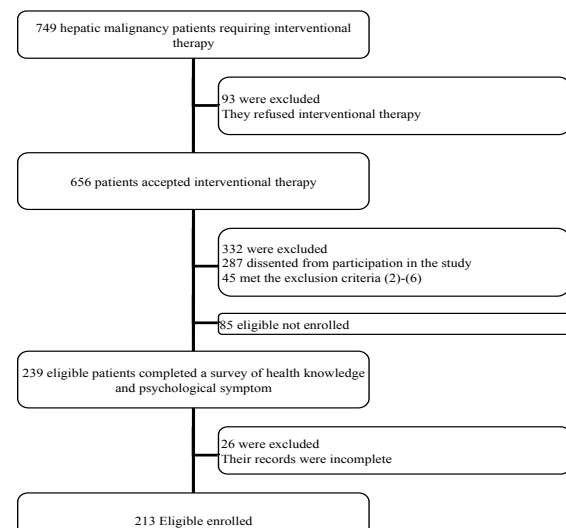


Figure 1. Patient Flow Through the Study

**Table 1. Health Knowledge Questionnaire (HKQ)**

Question	Score
Q1 What disease do you suffer from?	0-2
Q2 What symptom of this disease do you know?	0-2
Q3 How to cure the sickness?	0-2
Q4 How to care yourself after interventional therapy?	0-2
Q5 How about the prognosis of this disease?	0-2
Total	0-10

**Table 2. Patients Characteristics**

Characteristics	n	Total			By category	
		Mean	SD	Range	n	%
Age	213	51	13	26 - 84		
<= 44 yrs					78	36.6
> 44 yrs					135	63.4
Gender	213					
Male					163	76.5
Female					50	23.5
Education	213					
Senior high school or lower					160	75.1
College or higher					53	24.9
IVP times	213	1.7	0.65	1 - 4		
1					82	38.5
>=2					131	61.5
Indication for procedure	213					
hepatocellular carcinoma					117	54.9
Other hepatic malignancy					96	45.1
Psychological symptoms						
Somatization	213					
<1.545					95	44.6
>1.545					118	55.4
Obsessive-compulsive tendencies	213					
<1.595					98	46
>1.595					115	54
Depression	213					
<1.535					92	43.2
>1.535					121	56.8
Anxiety	213					
<1.405					94	44.1
>1.405					119	55.9
Hostility	213					
<1.515					122	57.3
>1.515					91	42.7
Phobia	213					
<1.300					143	67.1
>1.300					70	32.9
Paranoia	213					
<1.430					93	43.7
>1.430					120	56.3
Psychosis	213					
<=1.300					127	59.6
>1.300					86	40.4

their 95% confidence intervals (95%CI) were calculated for psychological symptoms. For all of the statistical tests,  $P < 0.05$  was considered statistically significant. Statistical analysis was performed using Statistical Package for Social Sciences (SPSS 15.0 for Windows, SPSS Inc, Chicago, IL).

## Results

During the study period, 749 hepatic malignancy

**Table 3. Differences in Psychological Symptoms Measured with SCL-90 in Patients of This Study and Normal Chinese (Jin H et al, 1986)**

Psychological symptoms	Intervention group (n = 213)		Norm (n = 7 273)		Significance	
	Mean	SD	Range	Mean	SD	t P value
Somatization	1.69	0.37	1.17-3.17	1.4	0.4	11.3 <0.01
Obsessive-compulsive tendencies	1.7	0.42	1.10-3.00	1.49	0.54	7.47 <0.01
Sensitivity	1.5	0.49	1.00-4.11	1.45	0.52	1.62 0.11
Depression	1.65	0.39	1.00-2.69	1.42	0.49	8.6 <0.01
Anxiety	1.5	0.37	1.00-3.00	1.31	0.42	7.52 <0.01
Hostility	1.66	0.63	1.00-3.67	1.37	0.5	6.67 <0.01
Phobia	1.35	0.35	1.00-3.00	1.25	0.4	4.32 <0.01
Paranoia	1.51	0.38	1.00-2.67	1.35	0.49	6.34 <0.01
Psychosis	1.38	0.33	1.00-2.90	1.22	0.37	7.18 <0.01

**Table 4. Scores of Health Knowledge Questionnaire (HKQ) in 213 Patients of This Study**

Questions	0		1		2		Mean	SD	Range
	n	%	n	%	n	%			
Q1	49	23	0	0	164	77	1.54	0.84	0.00-2.00
Q2	0	0	161	75.6	52	24.4	1.24	0.43	1.00-2.00
Q3	72	33.8	89	41.8	52	24.4	0.91	0.76	0.00-2.00
Q4	42	19.7	74	34.7	97	45.5	1.26	0.77	0.00-2.00
Q5	78	36.6	0	0	135	63.4	1.27	0.97	0.00-2.00
Total score							6	3.02	1.00-10.0

patients required interventional procedure in the inpatient departments, of whom 93 refused interventional procedure, 287 dissented from participation in the study, and 45 met the exclusion criteria (2)-(6). Of 324 eligible patients, 85 were not offered enrollment because the researchers was not on duty or too busy with clinical duties. After excluding incomplete records, only 213 participants were included in final analysis (Figure 1).

### Patients Characteristics

Two hundred and thirteen patients in this study filled out HKQ and SCL-90 forms before intervention therapy and form the basis of this current study. The mean age of patients was 50.97 years (range 26-84 years). Majority of the patients were mid-age and elder (63.38%), male (76.53%), graduated from senior high school or lower (75.12%). 61.50% of the patients had experience of interventional procedure before this survey. The most common diagnoses were hepatocellular carcinoma (54.93%) (Table 2).

### Survey Outcomes

**Psychological symptoms:** The scores of 9 primary symptom dimensions were all higher than the normal in chinese. Among these, 8 psychological symptom scores, i.e. somatization, obsessive-compulsive tendencies, depression, anxiety, hostility, phobia, paranoid ideations and psychotic states, were especially higher than the normal range. The differences were found to be statistically significant ( $P < 0.001$ ) (Table 3).

**Health knowledge:** Table 4 describes the results of health knowledge survey of hepatic malignancy patients before interventional procedure. Of 213 cases in the study,

**Table 5. Binary Logistic Regression Analysis for Psychological Symptoms Before Interventional Therapy in 213 Hepatic Malignancy Patients**

Psychological symptoms	Variables	Age	Gender	Education	IVP times	Total score of HKQ
Somatization	OR	1.09	0.42	1.57	2.85	1.43
	95%CI	1.05-1.13	0.18-0.98	0.73-3.40	0.66-12.39	1.10-1.86
	P value	0	0.04	0.25	0.16	0.01
Obsessive-compulsive tendencies	OR	1.05	0.45	0.28	0.28	1.54
	95%CI	1.01-1.08	0.20-0.99	0.13-0.62	0.07-1.12	1.21-1.97
	P value	0.01	0.05	0	0.07	0
Depression	OR	0.98	4.16	0.42	3.85	1.17
	95%CI	0.95-1.01	1.71-10.1	0.17-1.03	0.95-15.5	0.91-1.49
	P value	0.15	0	0.06	0.06	0.22
Anxiety	OR	0.99	0.48	1.17	1.01	1.45
	95%CI	0.96-1.01	0.21-1.12	0.57-2.40	0.27-3.80	1.14-1.84
	P value	0.27	0.09	0.66	0.98	0
Hostility	OR	1.02	1.82	0.53	0.96	1.48
	95%CI	0.99-1.05	0.79-4.22	0.26-1.08	0.25-3.75	1.16-1.88
	P value	0.17	0.16	0.08	0.95	0
Phobia	OR	0.97	0.05	2.71	0.22	2.18
	95%CI	0.94-1.00	0.01-0.16	1.14-6.43	0.02-2.03	1.47-3.24
	P value	0.04	0	0.02	0.18	0
Paranoia	OR	0.96	5.05	0.5	0.13	1.36
	95%CI	0.94-0.99	2.33-10.95	0.25-1.03	0.03-0.53	1.08-1.72
	P value	0.01	0	0.06	0.01	0.01
Psychosis	OR	1.02	0.63	0.67	0.34	2.03
	95%CI	0.99-1.05	0.26-1.53	0.32-1.39	0.07-1.52	1.53-2.70
	P value	0.2	0.31	0.28	0.16	0

49 families (23.00%) concealed the diagnoses of hepatic carcinoma from patients; 135 patients (63.38%) described the prognosis of the disease correctly. All of the patients realized or learned the symptoms of hepatic malignancy from various approaches, but only 52 (24.41%) grasped completely and correctly. In the study, 141 patients (66.20%) listed one or more treatments for their diseases; 171 patients (80.28%) had learned or had experience of nursing after the interventional procedure.

#### Multivariate Analyses

Considering clinical and statistical significance, the logistic regression analysis was performed for determining the association of age, gender, education, IVP times and health knowledge with 8 psychological symptoms which were significant different from normal range in Chinese. Correlation between psychological symptom and related factors (Table 5): Somatization dimension was significantly correlated with age, gender, and HKQ total score; obsessive-compulsive tendencies, with age, gender, education, and HKQ total score; depression, with gender; anxiety, HKQ total score; hostility, HKQ total score; phobia, age, gender, education, and HKQ total score; paranoid ideations, age, gender, IVP times, and HKQ total score; and psychotic states, with HKQ total score.

## Discussion

Interventional procedures, the minimally invasive, diagnostic and therapeutic procedures performed in the interventional radiology department, increasingly replace open surgery and reduce the distress of cancer patients. Despite technical advantages, it remains involving

repeated hospitalizations, pain (Schupp et al., 2005), and some other side-effects such as nausea, vomiting after transarterial chemotherapy (Carter et al., 2009). Patients often experience pain and anxiety that may exceed their coping mechanisms. Previous studies suggest that several factors, including cancer diagnosis and interventional procedures, contribute to psychological distress of patients (Massie et al., 2004; Martin et al., 2005; Schupp et al., 2005; Sims et al., 2006; Wang et al., 2008; Jadoon et al., 2010; Hulbert-Williams et al., 2011). Minagawa et al. (1996) and Godding et al (Aqarwal et al., 2010) reported that about 30% - 60% cancer patients have psychiatric disorders. Wang et al. (2008) surveyed 262 patients, who required hepatic arterial chemoembolization for hepatic malignancy, and found that all psychological symptomatic scores measured with SCL-90 in patients were higher than the normal range in Chinese. In this study, 8 SCL-90 factor scores, i.e. somatization, obsessive-compulsive tendencies, depression, anxiety, hostility, phobia, paranoid ideations and psychotic states, were also higher in patients than normal range in Chinese. It is consistent with the general idea of our former investigation (Wang et al., 2008) and indicates that the psychological status is abnormal in patients with severe psychiatric disorders.

In current research, several factors, i.e. age, gender, education status, IVP times and total score of HKQ, were clarified associated with psychological disorder of hepatic malignancy patients at one or more symptoms. With the difficulties associated with aging, it may not be surprising that distress is relatively common among the elderly. However, an initial research has shown that younger adults with cancer have a higher risk of reporting psychological distress than older adults with cancer (Blank et al., 2008).

Some other reports suggested that age may serve as a protective factor against psychological distress related to cancer (Carstensen et al., 2006; Blank et al., 2008; Forstmeier et al., 2008; Nelson et al., 2009). Our study demonstrates that age is associated with somatization and obsessive-compulsive tendencies as a risk factor, phobia and paranoia as a protective factor.

Several studies have shown, as compared to men, women had a higher risk of psychological distress (Pratt et al., 2007; Hagman et al., 2008; Kuriyama et al., 2009). They suggested that many factors, such as personality, coping skills, and sociocultural roles, play a direct role in psychiatric disorders (Piccinelli et al., 2000; Afifi et al., 2007). Our study revealed that gender difference, a risk factor, was also significantly associated with depression and paranoia with high ORs of 4.156 and 5.052. However, to somatization, obsessive-compulsive tendencies and phobia symptoms, gender difference played the role of a protective factor.

The association of psychological distress with education and IVP times was relatively attenuated in multivariate analysis. Education, as a protective factor, was significantly associated with obsessive-compulsive tendencies and phobia symptoms. It may be the case that patients with a higher educational attainment are more likely to employ active information seeking strategies, and thus are able to satisfy their psychosocial needs (Mistry et al., 2010) and decrease their psychological distress. IVP times, another protective factor, was only associated with paranoia symptoms (OR=0.127).

In the former studies, some evidence indicates that the benefits of information provision for cancer patients include a positive impact on feelings and attitudes, improved coping ability, and a reduction in anxiety and mood disorder (Sainio et al., 2003; Mistry et al., 2010). Nevertheless, Tavoli et al. (2007) performed a cross sectional study of anxiety and depression in 142 patients with gastrointestinal cancer, and found that psychiatric disorders occurred to lesser extent in patients who did not know their cancer diagnosis. Similarly in another study, it has been demonstrated that patients who are not aware of their cancer diagnosis had a more hopeful outlook to the outcome of treatment (Atesci et al., 2004). In our study, it was demonstrated that total score of HKQ, a risk factor with high ORs, was significantly associated with most positive psychological symptoms of hepatic malignancy patients except depression. It indicated that the knowledge of cancer was risk for psychological status and may increase the psychiatric distress in hepatic malignancy patients before interventional procedure.

A key limitation of the study was the potential for response bias given low response rate and the fact that participants were recruited via convenience sampling. No data were collected on non-responders. Using a convenience sample limits the extent to which the findings of this study can be generalized to all hepatic carcinoma patients, and it is possible that our sample may not adequately represent the target population.

In conclusion, psychological distress is severe in hepatic malignancy patients before interventional procedure. Age, gender, education, interventional

procedure times and health knowledge are associated with psychological symptoms which are significant different from normal range in chinese.

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