

## Observational Study

# Prevalence of depression and anxiety in patients with chronic digestive system diseases: A multicenter epidemiological study

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## Abstract

### AIM

To investigate the prevalence of depression and anxiety in patients with chronic digestive system diseases.

### METHODS

A total of 1736 patients with chronic digestive system

diseases were included in this cross-sectional study, including 871 outpatients and 865 in-patients. A self-designed General Information for Patients of the Department of Gastroenterology of General Hospitals questionnaire was used to collect each patient's general information, which included demographic data (including age, sex, marital status, and education) and disease characteristics (including major diseases, disease duration, principal symptoms, chronic pain, sleep disorder, and limited daily activities).

## RESULTS

The overall detection rate was 31.11% (540/1736) for depression symptoms alone, 27.02% (469/1736) for anxiety symptoms alone, 20.68% (359/1736) for both depression and anxiety symptoms, and 37.44% (650/1736) for either depression or anxiety symptoms. Subjects aged 70 years or above had the highest detection rate of depression (44.06%) and anxiety symptoms (33.33%).  $\chi^2$  trend test showed: the higher the body mass index (BMI), the lower the detection rate of depression and anxiety symptoms ( $\chi^2_{\text{trend}} = 13.697$ ,  $P < 0.001$ ;  $\chi^2_{\text{trend}} = 9.082$ ,  $P = 0.003$ ); the more severe the limited daily activities, the higher the detection rate of depression and anxiety symptoms ( $\chi^2_{\text{trend}} = 130.455$ ,  $P < 0.001$ ,  $\chi^2_{\text{trend}} = 108.528$ ,  $P < 0.001$ ); and the poorer the sleep quality, the higher the detection rate of depression and anxiety symptoms ( $\chi^2_{\text{trend}} = 85.759$ ,  $P < 0.001$ ;  $\chi^2_{\text{trend}} = 51.969$ ,  $P < 0.001$ ). Patients with digestive system tumors had the highest detection rate of depression (57.55%) and anxiety (55.19%), followed by patients with liver cirrhosis (41.35% and 48.08%). Depression and anxiety symptoms were also high in subjects with comorbid hypertension and coronary heart disease.

## CONCLUSION

Depression and anxiety occur in patients with tumors, liver cirrhosis, functional dyspepsia, and chronic viral hepatitis. Elderly, divorced/widowed, poor sleep quality, and lower BMI are associated with higher risk of depression and anxiety.

**Key words:** Depression; Anxiety; Chronic digestive system diseases; Psychiatric illnesses

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**Core tip:** Depressive and anxiety disorders are common psychiatric illnesses. Depression and anxiety can not only lower the quality of life but also affect the therapeutic effects on somatic diseases. Research has shown that detection rates of depression and anxiety symptoms are high in patients with chronic digestive system diseases, especially in patients with digestive system tumors, liver cirrhosis, functional dyspepsia, and chronic viral hepatitis. Elderly patients, divorced/widowed patients, patients with a low degree of education, limited daily activities, poor sleep quality, or a lower body mass index are at higher risk for

depression and anxiety symptoms.

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## INTRODUCTION

Depressive and anxiety disorders are common psychiatric illnesses. According to statistics from the World Health Organization, there were more than 350 million people suffering from depressive disorders worldwide in 2012, suggesting that depressive disorders have become an important source of the global burden of diseases<sup>[1]</sup>. The digestive system is vulnerable to the influence of emotional factors, because its function is regulated mainly by the vegetative nervous system and the endocrine system, and the center of both systems has the same anatomical location as the subcortical integration center of the emotional center<sup>[2]</sup>.

Previous studies have shown that depression and anxiety are risk factors for diseases of the digestive system<sup>[3-5]</sup>. Digestive system disease patients with depressive and anxiety disorders often have more serious somatic symptoms, longer time to disease recovery and worse prognosis, and therefore tend to consume more medical resources<sup>[6-8]</sup>. On the other hand, several studies have shown that the prevalence of depressive and anxiety disorders in patients with digestive system diseases is often high<sup>[9-11]</sup>, and these patients tend to visit the gastroenterology department of general hospitals because of more prominent digestive system symptoms, mild depressive or anxiety symptoms, or the concern of being labelled as "mentally ill patients"<sup>[12]</sup>.

Although digestive system diseases are closely related to anxiety, depressive and other mood disorders, studies have shown that the symptoms of mood disorders, such as depression and anxiety, in the vast majority of patients with digestive system diseases cannot be identified by gastroenterologists. As a result, 40%-90% of patients with depressive and anxiety disorders cannot acquire corresponding medical and health services and treatment<sup>[13-15]</sup>.

In view of the above, understanding and evaluating the prevalence of depressive and anxiety disorders in patients with digestive system diseases is of great significance. Although such studies have been previously conducted in China, many of them are confined to a kind of disease, or the subjects are either outpatients or in-patients. Therefore, the results obtained cannot fully reflect the overall prevalence

of depressive and anxiety disorders in patients with digestive system diseases.

The present study included both outpatients and in-patients with chronic diseases treated at the departments of gastroenterology in eight general hospitals in Shandong Province and evaluated the prevalence of depressive and anxiety disorders in these patients. The results obtained will provide a basis for identifying patients with chronic digestive system diseases at higher risk of anxiety and depression, and this will help determine targeted interventions and improve the prognosis and quality of life of these patients.

## MATERIALS AND METHODS

### Subjects

Both outpatients and in-patients with chronic diseases treated at the departments of gastroenterology of eight general hospitals in Shandong Province were included. Inclusion criteria were: (1) patients with clearly diagnosed chronic digestive system diseases, aged 18 years or above; (2) patients who were willing to participate in the study; and (3) patients who were conscious, had no mental retardation, and can complete the questionnaire independently. Exclusion criterion was patients who cannot complete the study due to severe mental or somatic disorders. Patients who could not complete all the 14 items of the Hospital Anxiety and Depression (HAD) scale were also excluded from the study. Based on these criteria, a total of 1736 patients were finally included in the study, including 871 outpatients and 865 in-patients.

### Methods

This was a cross-sectional study. A self-designed General Information for Patients of the Department of Gastroenterology of General Hospitals questionnaire was used to collect each patient's general information. The questionnaire was completed by well-trained physicians using face-to-face interview after informed consent was obtained from patients. General information included demographic data (including age, sex, marital status, and education) and disease characteristics (including major diseases, disease duration, principal symptoms, chronic pain, sleep disorder, and limited daily activities). Chronic pain was defined as pain that had lasted 3 mo or longer<sup>[16]</sup>. The symptoms of depression and anxiety were identified using the HAD scale, and the scale was completed by the subjects themselves. The degree of symptoms of depression and anxiety was assessed using the Rating Scale for Mental Health (revised version), and a score of  $\geq 9$  was considered to indicate positive symptoms.

### Statistical analysis

After checking the completed questionnaires, Epidata3.0 was used to establish a database. SPSS17.0 software

was used to perform statistical analyses. The detection rates of depression and anxiety symptoms between different populations were compared using the  $\chi^2$  test at a significance level of 0.05.

## RESULTS

### General information

A total of 1736 subjects were included, of whom 937 (53.97%) were male and 799 (46.03%) were female, with a median age of 52.00 years (range, 18-90 years). Among them, 87.73% (1523/1736) were married and 26.15% (454/1736) had attended college or earned a bachelor's degree (Table 1).

The diseases diagnosed in subjects mainly included chronic gastritis (807; 46.49%), functional dyspepsia (227; 13.08%), digestive system tumors (212; 12.21%), chronic peptic ulcer (187; 10.77%), inflammatory bowel disease (181; 10.43%), gastroesophageal reflux disease (141; 8.12%), liver cirrhosis (104; 5.99%), irritable bowel syndrome (96; 5.53%), and chronic viral hepatitis (59; 3.40%) (Table 2). The median duration of diseases was 8.71 years (range, 1.20-44.00 years).

### Overall detection rates of depression and anxiety symptoms

As shown in Table 3, the overall detection rate was 31.11% (540/1736) for depression symptoms alone, 27.02% (469/1736) for anxiety symptoms alone, 20.68% (359/1736) for both depression and anxiety symptoms, and 37.44% (650/1736) for either depression or anxiety symptoms. In outpatients, the detection rate was 28.01% (244/871) for depression symptoms alone, 22.96% (200/871) for anxiety symptoms alone, 18.48% (161/871) for both depression and anxiety symptoms, and 32.49% (283/871) for either depression or anxiety symptoms. In in-patients, the detection rate was 34.22% (296/865) for depression symptoms alone, 31.10% (269/865) for anxiety symptoms alone, 22.89% (198/865) for both depression and anxiety symptoms, and 42.23% (367/865) for either depression or anxiety symptoms.

### Detection rates of depression and anxiety symptoms in subjects with different demographic characteristics

As shown in Table 1, the detection rate of depression symptoms did not differ significantly between men and women ( $\chi^2 = 1.681$ ,  $P = 0.195$ ). Subjects aged 70 years or above had the highest detection rate of depression symptoms (44.06%), followed by subjects aged 50-59.99 years (36.00%). With regard to marital status, the detection rate of depression symptoms was highest in divorced/widowed subjects (41.35%) and lowest in unmarried subjects (17.43%). With regard to education level, the detection rate of depression symptoms was highest in subjects with primary school education or below (45.60%) and lowest in subjects

**Table 1** Detection rates of depression and anxiety symptoms in subjects with different demographic characteristics

Variable	n (%)	Depression symptoms			Anxiety symptoms		
		n (%)	$\chi^2$	P value	n (%)	$\chi^2$	P value
Sex			1.681	0.195		0.779	0.377
Male	937 (53.97)	279 (29.78)			245 (26.15)		
Female	799 (46.03)	332 (32.67)			224 (28.04)		
Age, yr			48.522	< 0.001		24.254	< 0.001
18-30	164 (9.45)	38 (23.17)			31 (18.90)		
30-40	234 (13.48)	57 (24.36)			50 (21.37)		
40-50	363 (20.91)	81 (22.31)			83 (22.87)		
50-60	375 (21.60)	135 (36.00)			123 (32.80)		
60-70	339 (19.53)	114 (33.63)			95 (28.02)		
> 70	261 (15.03)	115 (44.06)			87 (33.33)		
Marital status			14.656	0.001		8.490	0.014
Married	1523 (87.73)	478 (31.39)			416 (27.31)		
Divorced/widowed	104 (5.99)	43 (41.35)			35 (33.65)		
Unmarried	109 (6.28)	19 (17.43)			18 (16.51)		
Education			55.293	< 0.001		13.184	0.010
Primary school or below	386 (22.24)	176 (45.60)			128 (33.16)		
Junior high school	440 (25.35)	137 (31.14)			120 (27.27)		
Senior high school or polytechnic school	424 (24.42)	108 (25.47)			105 (24.76)		
College or bachelor's degree	454 (26.15)	114 (25.11)			112 (24.67)		
Master's degree or above	32 (1.84)	5 (15.63)			4 (12.50)		
Body mass index, kg/m <sup>2</sup>			16.273	< 0.001		9.092	0.011
< 18.5	88 (5.07)	42 (47.19)			31 (34.83)		
18.5-23.99	947 (54.55)	307 (32.42)			274 (28.93)		
≥ 24	697 (40.15)	191 (27.29)			164 (23.43)		
Chronic pain			6.426	0.011		1.540	0.215
Yes	262 (15.09)	99 (37.79)			79 (30.15)		
No	1474 (84.91)	441 (29.92)			390 (26.46)		
Daily activities			132.199	< 0.001		108.699	< 0.001
Non-limited	1457 (83.93)	373 (25.60)			325 (22.31)		
Limited but independent	253 (14.57)	147 (58.10)			125 (49.41)		
Limited but dependent	26 (1.50)	20 (76.92)			19 (73.08)		
Sleep quality			87.741	< 0.001		53.651	< 0.001
Good	539 (31.05)	104 (19.29)			99 (18.37)		
Fair	898 (51.73)	285 (31.74)			245 (27.28)		
Poor or very poor	299 (17.23)	151 (50.50)			125 (41.81)		

**Table 2** Detection rates of depression and anxiety symptoms in subjects with different diseases n (%)

Disease	Total	Depression symptoms	Anxiety symptoms
Peptic ulcer	187 (10.77)	50 (26.74)	42 (22.50)
Digestive system tumors	212 (12.21)	122 (57.55)	117 (55.19)
Chronic gastritis	807 (46.49)	221 (27.39)	177 (21.93)
Functional dyspepsia	227 (13.08)	78 (34.36)	58 (25.55)
Inflammatory bowel disease	181 (10.43)	58 (32.04)	46 (25.41)
Irritable bowel syndrome	96 (5.53)	28 (29.17)	24 (25.00)
Chronic viral hepatitis	59 (3.40)	20 (33.90)	16 (27.12)
Liver cirrhosis	104 (5.99)	43 (41.35)	50 (48.08)
Gastroesophageal reflux disease	141 (8.12)	34 (24.11)	29 (20.57)

with graduate level or above (15.63%). The detection rate of depression symptoms was higher in patients with chronic pain than in those without ( $\chi^2 = 6.426$ ,  $P = 0.011$ ).  $\chi^2$  trend test showed: the higher the body mass index (BMI), the lower the detection rate of depression symptoms ( $\chi^2_{\text{trend}} = 13.697$ ,  $P < 0.001$ ); the more severe the limited daily activities, the higher the detection rate of depression symptoms ( $\chi^2_{\text{trend}} = 130.455$ ,  $P < 0.001$ ); and the poorer the sleep quality, the higher the detection rate of depression symptoms

( $\chi^2_{\text{trend}} = 85.759$ ,  $P < 0.001$ ).

The detection rate of anxiety symptoms did not differ significantly between men and women ( $\chi^2 = 0.779$ ,  $P = 0.377$ ). Subjects aged 70 years or above had the highest detection rate of anxiety symptoms (33.33%), followed by subjects aged 50-59.99 years (32.80%). With regard to marital status, the detection rate of anxiety symptoms was highest in divorced/widowed subjects (33.65%) and lowest in unmarried subjects (16.51%). With regard to education level,



**Table 3 Overall detection rates of depression and anxiety symptoms *n* (%)**

Patients	<i>n</i>	Depression symptoms	Anxiety symptoms	Depression and anxiety symptoms	Depression or anxiety symptoms
Outpatients	871	244 (28.01)	200 (22.96)	161 (18.48)	283 (32.49)
In-patients	865	296 (34.22)	269 (31.10)	198 (22.89)	367 (42.43)
Overall	1736	540 (31.11)	469 (27.02)	359 (20.68)	650 (37.44)

**Table 4 Detection rates of depression and anxiety symptoms in subjects with different comorbidities**

Comorbidity	<i>n</i> (%)	Depression symptoms			Anxiety symptoms		
		<i>n</i> (%)	$\chi^2$	<i>P</i> value	<i>n</i> (%)	$\chi^2$	<i>P</i> value
Hypertension			6.402	0.011		5.734	0.017
No	1342 (77.30)	397 (29.58)			344 (25.63)		
Yes	394 (22.70)	143 (36.29)			125 (31.73)		
Diabetes			7.646	0.006		7.424	0.006
No	1585/91.30	478/30.16			414/26.12		
Yes	151/8.70	62/41.06			55/36.42		
Coronary heart disease			6.060	0.014		3.396	0.065
No	1603/92.34	486/30.32			424/26.45		
Yes	133/7.66	54/40.60			45/33.83		
Cerebrovascular disease			0.766	0.382		0.120	0.729
No	1627/93.72	502/30.85			438/26.92		
Yes	109/6.28	38/34.86			31/28.44		

the detection rate of anxiety symptoms was highest in subjects with primary school education or below (33.16%) and lowest in subjects with graduate level or above (12.50%) (Table 1). The detection rate of anxiety symptoms did not differ significantly between patients with chronic pain and those without ( $\chi^2 = 1.540$ ,  $P = 0.215$ ).  $\chi^2$  trend test showed that: the higher the BMI, the lower the detection rate of anxiety symptoms ( $\chi^2_{\text{trend}} = 9.082$ ,  $P = 0.003$ ); the more severe the limited daily activities, the higher the detection rate of depression symptoms ( $\chi^2_{\text{trend}} = 108.528$ ,  $P < 0.001$ ); and the poorer the sleep quality, the higher the detection rate of depression symptoms ( $\chi^2_{\text{trend}} = 51.969$ ,  $P < 0.001$ ).

#### **Detection rates of depression and anxiety symptoms in subjects with different diseases**

Patients with digestive system tumors had the highest detection rate of depression (57.55%), followed by patients with liver cirrhosis (41.35%), patients with functional dyspepsia (34.36%), and patients with chronic viral hepatitis (33.90%). Patients with digestive system tumors had the highest detection rate of anxiety (55.19%), followed by patients with liver cirrhosis (48.08%), patients with chronic viral hepatitis (27.12%), and patients with functional dyspepsia (25.55%) (Table 2).

#### **Detection rates of depression and anxiety symptoms in subjects with different comorbidities**

The detection rates of depression and anxiety symptoms were significantly higher in subjects with comorbid hypertension than in those without (36.29% vs 29.58%, 31.73% vs 25.63%,  $P < 0.05$ ) and in

subjects with comorbid diabetes than in those without (41.06% vs 30.16%, 36.42% vs 26.12%,  $P < 0.05$ ). The detection rate of depression symptoms was significantly higher in subjects with comorbid coronary heart disease than in those without (40.60% vs 30.32%,  $P = 0.014$ ) but the detection rate of anxiety symptoms did not differ significantly between subjects with comorbid coronary heart disease and those without ( $P > 0.05$ ) (Table 4).

## **DISCUSSION**

This cross-sectional study investigated the prevalence of symptoms of depression and anxiety in both outpatients and in-patients with chronic diseases treated at the departments of gastroenterology of general hospitals. Given that the sample size was large, the subjects were collected from eight general hospitals in Shandong Province, and multiple common digestive system diseases were involved, the results obtained are of great clinical value.

#### **Detection rates of depression and anxiety symptoms in patients with chronic diseases treated at the departments of gastroenterology of general hospitals**

This study showed that the detection rate of depression or anxiety symptoms in patients with chronic diseases treated at the departments of gastroenterology of general hospitals was 37.44% of all subjects (42.43% of in-patients and 32.49% of outpatients), which was lower than that (53.1%) reported by Li *et al*<sup>[11]</sup> who investigated 1995 outpatients at the departments of gastroenterology of 15 general hospitals in five regions, and that (58.3%) reported by Jiang *et al*<sup>[17]</sup>

who investigated 517 outpatients at the departments of gastroenterology of three general hospitals in Beijing. This difference may be caused by the fact that the cutoff value for HAD score used in the previous two studies was  $\geq 8$  (as opposed to  $\geq 9$  used in the present study).

The detection rate of depression symptoms in patients with chronic diseases treated at the departments of gastroenterology of general hospitals was 31.11%, which was lower than that (37%) reported by a previous study (the LIDO study<sup>[18]</sup>) that included 18489 patients in primary care in six countries. Such discrepancy may be due to different subjects and screening tools used. The detection rate of depression symptoms in outpatients was 28.01%, which was lower than that (35.1%) reported by Mei *et al.*<sup>[19]</sup> who investigated 1428 outpatients at the department of gastroenterology, and the detection rate of depression symptoms of in-patients was 34.22%, which was lower than that (40.8%) reported by Li *et al.*<sup>[20]</sup> who investigated 133 in-patients at the department of gastroenterology. These differences may be due to different screening criteria used between studies.

The detection rate of anxiety symptoms in patients with chronic diseases treated at the departments of gastroenterology of general hospitals was 27.02% in all subjects and 22.96% in outpatients, which were higher than those (5.8% and 31.10%) reported by Mei *et al.*<sup>[19]</sup> who investigated 1428 outpatients at the department of gastroenterology, but lower than that (50.4%) reported by Li *et al.*<sup>[21]</sup> who investigated 133 in-patients at the department of gastroenterology.

The differences in these findings suggest that the differences in evaluation tools and endpoints may cause different results. Since the present study utilized the HAD scale, which is the most widely used tool worldwide, and included 1736 patients from eight tertiary hospitals located in different regions of Shandong Province, it can well reflect the actual situation of patients at departments of gastroenterology in Shandong Province.

#### **Distribution of chronic digestive system disease patients with depression and anxiety symptoms**

With regard to the type of diseases, patients with digestive system tumors had the highest detection rates of depression and anxiety symptoms, followed by patients with liver cirrhosis. This may be because these two types of diseases are more severe and cause greater psychological and economic burden for patients.

The detection rates of depression and anxiety symptoms in patients with functional dyspepsia were 34.36% and 25.55%, respectively, which were comparable to those reported by Li *et al.*<sup>[21]</sup>. Our results also showed that the detection rates of depression and anxiety symptoms were higher in patients with hypertension or diabetes than in those

without. Lloyd *et al.*<sup>[22]</sup> found that diabetes, especially diabetes with multiple complications, can increase the incidence of depression. Sun *et al.*<sup>[23]</sup> discovered that BMI, glycosylated hemoglobin level, and use of insulin can affect the mood of diabetes patients and result in higher levels of depression and anxiety in diabetes patients than in normal people. Jiang *et al.*<sup>[24]</sup> found that the incidence and severity of depression were higher in patients with hypertension than in those without.

Although many previous studies indicated that women were more likely to develop depressive and anxiety disorders than men<sup>[25-27]</sup>, the present study revealed no significant differences in the detection rates of depression and anxiety symptoms between men and women, which is consistent with the finding of Zhang *et al.*<sup>[28]</sup> who investigated 2877 outpatients from 50 general hospitals in Beijing.

The present study also showed that the detection rates of depression and anxiety symptoms were higher in patients aged 50 years or above than in younger patients, suggesting that patients aged > 50 years may be a high risk population for depression and anxiety, which is consistent with the findings of many previous studies that elderly patients have a higher prevalence of depressive and anxiety disorders than younger patients<sup>[24,29]</sup>. Compared to unmarried or married subjects, divorced/widowed subjects had higher detection rates of depression and anxiety symptoms. This may be because divorced/widowed subjects received less family and social support. With regard to education level, patients with a low level of education had higher detection rates of depression and anxiety symptoms, which is consistent with the finding of previous studies<sup>[19]</sup>. This may be because patients with a high level of education have better awareness of disease status and self-adjustment.

This study also showed that higher severity of limited daily activities was associated with higher detection rates of depression and anxiety symptoms, which is consistent with the findings of Ji *et al.*<sup>[30]</sup>. The underlying reasons are that patients with limited daily activities have a lower degree of independence, are often reliant on their families, and tend to develop feelings of guilt, self-abasement, self-blame and frustration, which can result in the occurrence of depression and anxiety.

We also found that patients with a lower BMI had higher detection rates of depression and anxiety symptoms. Janssen *et al.*<sup>[31]</sup> also discovered that depression and anxiety symptoms were more common in patients with a lower BMI. Since patients with a lower BMI tend to have poorer digestion and absorption, the related somatic symptoms may be more serious. In addition, patients with poor sleep quality had higher detection rates of depression and anxiety symptoms, which is consistent with the finding of Hong *et al.*<sup>[32]</sup> that sleep disorders are significantly associated with depression and anxiety.

In summary, the detection rates of depression and

anxiety symptoms are high in patients with chronic digestive system diseases, especially in patients with digestive system tumors, liver cirrhosis, functional dyspepsia, and chronic viral hepatitis. Elderly patients, divorced/widowed patients, patients with a low degree of education, limited daily activities, poor sleep quality, or a lower BMI are at higher risk for depression and anxiety symptoms. Depression and anxiety can not only lower the quality of life but also affect the therapeutic effects on somatic diseases. Comprehensive measures, including psychological counseling, healthy eating and sleeping habits, active exercise, and anti-depressive therapy, can improve quality of life and therapeutic efficacy, and are safe.

However, there is an ongoing clinical problem: although many studies have found that the incidence of depression and anxiety is high in patients of departments of gastroenterology, the diagnosis and treatment rates are low. The extent of the impact of these factors requires further study. Gastroenterologists are encouraged to pay more attention to the psychological status of patients in their daily clinical activities, and hospitals should strengthen the training of non-psychiatric physicians to improve their diagnostic and therapeutic skills for depression and anxiety in order to promote early recognition of these psychological conditions. In addition, there remains a need for further study on how to develop more effective comprehensive treatments, such as psychological counseling, life style guidance, and drug intervention, in gastroenterology departments in order to improve therapeutic efficacy, shorten therapeutic duration, and reduce therapeutic costs.

## COMMENTS

### Background

Depressive and anxiety disorders are common psychiatric illnesses. Digestive system disease patients with depressive and anxiety disorders often have more serious somatic symptoms, longer time to disease recovery and worse prognosis, and therefore tend to consume more medical resources. Understanding and evaluating the prevalence of depressive and anxiety disorders in patients with digestive system diseases is of great significance.

### Research frontiers

In China, depressive and anxiety disorders are common psychiatric illnesses. However, there are very few English language studies in the literature concerning the diagnosis of depressive and anxiety disorders. This research was conducted to investigate the overall prevalence of depressive and anxiety disorders in patients with digestive system diseases in China.

### Innovations and breakthrough

This cross-sectional study investigated the prevalence of symptoms of depression and anxiety in both outpatients and in-patients with chronic diseases treated at departments of gastroenterology of general hospitals.

### Applications

The research provides a basis for identifying patients with chronic digestive system diseases at higher risk of anxiety and depression, and this will help determine targeted interventions and improve the prognosis and quality of life

of these patients.

## Peer-review

In this manuscript, the authors investigated the prevalence of depression and anxiety in patients with chronic digestive system diseases. They provide a basis for identifying patients with chronic digestive system diseases at higher risk of anxiety and depression, and this will help determine targeted interventions and improve the prognosis and quality of life of these patients.

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