Prevalence of depressive and anxiety disorders in Chinese gastroenterological outpatients

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AIM: To investigate the prevalence and physicians’ detection rate of depressive and anxiety disorders in gastrointestinal (GI) outpatients across China.

METHODS: A hospital-based cross-sectional survey was conducted in the GI outpatient departments of 13 general hospitals. A total of 1995 GI outpatients were recruited and screened with the Hospital Anxiety and Depression Scale (HADS). The physicians of the GI departments performed routine clinical diagnosis and management without knowing the HADS score results. Subjects with HADS scores ≥ 8 were subsequently interviewed by psychiatrists using the Mini International Neuropsychiatric Interview (MINI) to make further diagnoses.

RESULTS: There were 1059 patients with HADS score ≥ 8 and 674 (63.64%) of them undertook the MINI interview by psychiatrists. Based on the criteria of Diagnostic and Statistical Manual of Mental Disorders (4th edition), the adjusted current prevalence for depressive disorders, anxiety disorders, and comorbidity of both disorders in the GI outpatients was 14.39%, 9.42% and 4.66%, respectively. Prevalence of depressive disorders with suicidal problems [suicide attempt or suicide-related ideation prior or current; module C (suicide) of MINI score ≥ 1] was 5.84% in women and 1.64% in men. The GI physicians’ detection rate of depressive and anxiety disorders accounted for 4.14%.

CONCLUSION: While the prevalence of depressive and anxiety disorders is high in Chinese GI outpatients, the detection rate of depressive and anxiety disorders by physicians is low.
frequently affects a patient’s physical and emotional wellbeing as well as being heavily affected by stress[7-10]. Meanwhile depression and anxiety have been identified as risk factors for some GI diseases[11,12].

Various studies using a variety of assessment methods have demonstrated that high levels of depression and anxiety exist in patients with GI symptoms[7-9]. It has also been shown that patients with comorbid anxiety and depressive disorders tend towards more severe symptoms, longer recovery times, poorer outcomes, and greater use of healthcare resources[10-12]. Despite the likelihood of GI patients to suffer from emotional distress, it has been reported that physicians in the GI department often fail to identify most cases of depression and/or anxiety, leading to under-treatment in 40%-90% of patients[13-15].

Patients with depressive and anxiety disorders often have one or more somatic symptoms (e.g., cardiopulmonary or gastrointestinal), which may be partly induced by emotional disorders[17-19]. On the other hand, many patients with depression or anxiety visit non-psychiatric departments, especially the GI department, for their physical complaints[20-22]. All these facts contribute to the low detection rate of emotional disorders among GI patients.

It is necessary to determine prevalence estimates of emotional disorders in GI patients to facilitate reasonable medical resources allocation. These have been assessed in a number of studies throughout America, Europe, and China, including the Hong Kong and Taiwan regions[23-25]. However, the economic status and cultural traditions of mainland China are unique, and likely to make the situation of mainland Chinese GI patients distinctive.

This is the first large-sample, multicenter study based on a mainland Chinese population to estimate the prevalence of depression and anxiety in adult GI outpatients. This cross-sectional study was carried out with GI outpatients from 13 tertiary general hospitals in Beijing, Shanghai, Guangzhou, Changsha and Chengdu. The purpose of this study was to characterize the prevalence of depressive and/or anxiety disorders among GI outpatients and to determine the non-psychiatric physician identification rate of these disorders in GI outpatients.

MATERIALS AND METHODS

Ethics

This survey was approved by the Shanghai Mental Health Center Ethics Committee. All patients provided informed written consent.

Subjects

A multi-center, cross-sectional study was carried out in the outpatient departments of 15 tertiary general hospitals in Beijing, Shanghai, Guangzhou, Changsha, and Chengdu to estimate the prevalence of depressive and anxiety disorders in adult outpatients from gastroenterology, gynecology, cardiovascular and neurology departments. However, only 13 hospitals provided complete data for the GI department (one lacked a GI department, and the other incomplete patient data). Consecutive patients visiting outpatient departments were recruited for the study. Patients were included if they were over 18 years, consented to study participation, and were able to complete the questionnaires. Exclusion criteria included being previously screened, serious physical or mental condition, language or hearing problem, incomplete records, or ongoing psychological treatment. About 140 consecutive GI outpatients were investigated in each hospital during 4-5 consecutive working days randomly selected from the 22 normal workdays in a month by using SAS (v9.0) software.

Research instruments

The somatic symptoms, as well as depression/anxiety, were assessed with the Patient Health Questionnaire 15-Item (PHQ-15)[27], Hospital Anxiety and Depression Scale (HADS)[27,28], and Mini International Neuropsychiatric Interview (MINI)[29]. PHQ-15 is a self-report questionnaire used to screen and assess somatic symptoms. It consists of 15 physical symptoms, scaled 0-2 points for each. The higher the score, the more severe the symptom. The 14-item HADS[27-28] questionnaire evaluates severity of anxiety and depression using 7 items for each affliction, and is widely used in general hospitals. Each item’s severity is rated from 0 (none) to 3 (severe). Scores ≥ 8 indicate probable anxiety or depression with great reliability and validity[30], and were regarded as positive in the preliminary screening of this study. MINI[29], a structured diagnostic instrument, is used to make diagnoses according to the Diagnostic and Statistical Manual of Mental Health Disorders (4th edition, DSM-IV) and the International Statistical Classification of Disease-10. The MINI Chinese version has good reliability and validity[31-33].

Study design

This multi-center, cross-sectional study was carried out in five cities: Beijing, Shanghai, Guangzhou, Chengdu, and Changsha (representing north, east, south, west and central China, respectively). In the first stage, outpatients were screened with PHQ-15 and HADS scales, and then visited GI physicians for their original complaints. The coordinators calculated scores of both scales, kept physicians blind to results, and recorded physicians’ diagnosis and treatment. In the second stage, subjects with HADS scores ≥ 8 were assessed and diagnosed by psychiatrists with MINI. The study design is shown in Figure 1.

Statistical analysis

Data analysis and management were performed using the Statistical Package for Social Sciences v17 (SPSS Inc., Chicago, IL, United States). Demographic data were described by frequency and percentage, and the lack of data in one item, such as sex or diagnosis, was treated as a missing value. Subjects who were positive in the preliminary screening stage but did not complete the psy-
Results of this study were based on interviews conducted by psychiatrists and psychopharmacologists who are familiar with the DSM-IV criteria, are able to distinguish depressive disorders from anxiety disorders, and have been trained in the use of the MINI. Among the 323 confirmed subjects, 194 (60.1%) were women (other characteristics are described in the third column of Table 1). Subjects with depressive and/or anxiety disorders were more likely to be female and younger than those without such disorders (Table 1).

Prevalence of depressive and anxiety disorders in gastrointestinal outpatients

The adjusted prevalence of depressive and anxiety disorders are shown in Table 2. One hundred and eighty-one subjects had current depression disorders, 117 had current anxiety disorders, and 59 had current comorbidity. This indicates that 32.6% (59/181) of individuals with current depressive disorders had at least one type of anxiety disorder, and 50.4% (59/117) of subjects with current anxiety disorders were affected by depressive disorders as well.

The prevalence of all types of depressive disorders and anxiety disorders, according to DSM-IV criteria, are detailed in Table 2. Among the depressive disorders, depressive episode was the most common with an adjusted current prevalence of 11.23%, while substance-induced mood disorder had the lowest adjusted current prevalence (0.35%). Among 181 outpatients with depressive disorders, 51 (28.2%) had suicidal problems (suicide attempt or suicide-related ideation prior or current; module C (suicide) of MINI, score 0-1), indicating that over a quarter of individuals with depressive disorders were at suicide risk.

Sex differences among current prevalence of depressive disorders and/or anxiety disorders

The current adjusted prevalence of depressive disorders and/or anxiety disorders was significantly different between male and female outpatients (Table 3). The prevalence of depressive disorders, anxiety disorders, and either depressive or anxiety disorders was significantly (P < 0.05) higher in female GI outpatients. The adjusted current prevalence of depressive disorders with suicidal problems was statistically significantly higher in women (mean 5.84%; 95% CI: 4.44-7.24) than in men (mean 1.64%; 95% CI: 0.82-2.46) (χ² = 23.096, P = 0.00), and the mean relative risk was 3.71 (95% CI: 2.10-6.56, P < 0.01).

Physicians’ treatment and detection of depressive and anxiety disorders in gastrointestinal outpatients

Among 323 digestive outpatients who were diagnosed with depressive disorders and/or anxiety disorders by MINI, complete information of physicians’ diagnoses and treatments was available for 290 cases (n = 13 missing diagnosis information, and n = 21 missing treatment information).

The detection rate by physicians was 4.14% (12/290). Among the 12 detected subjects, five were treated with psychotropic drugs, including amitriptyline or doxepin (n = 2). Another seven were referred to the psychiatry de-
The last four columns present the characteristics and the comparison of the two groups (outpatients with and without depressive disorders and/or anxiety disorders). There are statistically significant differences between the two groups in sex (P < 0.05 vs with depressive disorders group) and age (P < 0.01 vs with depressive disorders group) by $\chi^2$ test and $t$ test, respectively. MINI: Mini International Neuropsychiatric Interview.

### Table 2 Adjusted prevalence of depressive and anxiety disorders among gastrointestinal outpatients in 13 general hospitals in mainland China and Diagnostic and Statistical Manual of Mental Health Disorders (4th edition) by using the Mini International Neuropsychiatric Interview

| Diagnosis | Frequency, adjusted prevalence (%) and 95% CI (%) based on results of the MINI |
|-----------|---------------------------------------------|
| GI outpatients in 13 general hospitals | Current | Lifetime |
| Diagnostic and Statistical Manual of Mental Health Disorders (4th edition). | | |
| Depressive disorders | 181 (14.39) (12.85-15.93) | 228 (18.35) (16.65-20.05) |
| Anxiety disorders | 117 (9.42) (8.14-10.70) | 122 (9.82) (8.51-11.13) |
| Comorbid depressive and anxiety disorders | 59 (4.66) (3.74-5.58) | 69 (5.46) (4.46-6.46) |
| Depressive disorders or anxiety disorders | 239 (19.20) (17.47-20.93) | 281 (22.71) (20.87-24.55) |
| DSM-IV by using the MINI interview | | |
| Depressive episode | 141 (11.23) (9.84-12.62) | 183 (14.79) (12.33-16.35) |
| Depressive disorder with suicidal problems | 51 (3.91) (3.06-4.76) | 58 (4.46) (3.55-5.37) |
| Mood disorders due to physical disease | 26 (2.01) (1.39-2.63) | 32 (2.51) (1.87-3.15) |
| Dysthymia | 16 (1.25) (0.76-1.74) | 34 (2.66) (1.95-3.37) |
| Substance-induced mood disorders | 4 (0.35) (0.10-0.61) | 4 (0.35) (0.10-0.61) |
| General anxiety disorder | 57 (4.66) (3.74-5.58) | 57 (4.66) (3.74-5.58) |
| Specific phobia | 20 (1.65) (1.09-2.21) | 20 (1.65) (1.09-2.21) |
| Social phobia (social anxiety disorder) | 20 (1.60) (1.05-2.15) | 20 (1.60) (1.05-2.15) |
| Panic disorder | 17 (1.35) (0.84-1.86) | 24 (1.95) (1.34-2.56) |
| Agoraphobia | 17 (1.35) (0.84-1.86) | 21 (1.75) (1.17-2.33) |
| Obsessive-compulsive disorder | 16 (1.30) (0.80-1.80) | 16 (1.30) (0.80-1.80) |

Depressive episode is the most common depressive disorder, while substance-induced mood disorder has the lowest adjusted current prevalence. The most common anxiety disorder is general anxiety disorder, followed by social anxiety disorder, panic disorder, agoraphobia, and obsessive-compulsive disorders. MINI: Mini International Neuropsychiatric Interview; GI: Gastrointestinal; DSM-IV: Diagnostic and Statistical Manual of Mental Health Disorders (4th edition).

### DISCUSSION

The current study evaluated the prevalence of depressive and anxiety disorders among mainland Chinese outpatients visiting GI clinics, regardless of confirmed GI diagnosis. The adjusted current prevalence of depressive disorders, anxiety disorders, and comorbid disorders was 14.39%, 9.42% and 4.66%, respectively.

It is well recognized that depressive and anxiety disorders impair life quality and cause a heavy disease burden[35-38]. Nevertheless, more than half of patients with depression or anxiety visit non-psychiatric departments, especially the GI department, for somatic symp-
Table 3  Current adjusted prevalence of depressive disorders and/or anxiety disorders and comparison between men and women

| Diagnosis based on MINI                                                                 | Frequency, adjusted current prevalence (%) and 95% CI (%) based on results of MINI exam | $\chi^2$ | $P$ value |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------|-----------|
| Depressive disorders                                                                 | 70 (12.06 (9.95-14.17)                                                                   | 111    | 16.40 (14.19-18.61) | 7.555 | 0.000* |
| Anxiety disorders                                                                    | 46 (8.00 (6.24-9.76))                                                                   | 116    | 10.75 (8.90-12.60)  | 4.339 | 0.037* |
| Depressive disorders and anxiety disorders                                           | 24 (4.06 (2.78-5.34))                                                                   | 35     | 5.10 (3.79-6.41)    | 1.224 | 0.269  |
| Depressive disorders or anxiety disorders                                            | 92 (16.01 (13.63-18.39)                                                                 | 147    | 21.96 (19.49-24.43) | 11.285 | 0.001* |

There are significant differences between male and female patients in the current prevalence of depressive disorders ($P < 0.01$), anxiety disorders ($P < 0.05$), and either depressive or anxiety disorders ($P < 0.01$), respectively. MINI: Mini International Neuropsychiatric Interview.

The prevalence of depression was 12.5% in family practices in Taiwan, while the prevalence of anxiety disorders was 11.61% in six tertiary general hospitals in Shenyang. Generally speaking, these different results were due to variances in subjects and investigation instruments. The prevalence of depressive disorders and/or anxiety disorders in our study and other domestic studies are lower than results from abroad, which may relate to differences in ethnicity or culture.

The 1.25% current prevalence of dysthymia, the third top depressive disorder in our study, was higher than the 0.6% prevalence in Shanghai subjects reported by the WHO in 1990, but was similar to the 2.1% mean prevalence for all international sites that participated in the research and the 2.8% prevalence of dysthymia in the study of Qin et al. It was lower than the 12.6% prevalence of dysthymia among outpatients from 86 general practices in Belgium.

It is well-known that comorbidity of depressive disorders and anxiety disorders can exacerbate symptoms, and co-occurrence of anxiety is an independent risk factor of suicide among depressive patients. In the current study, anxiety disorders were comorbid in 32.6% of depressive individuals. This comorbid proportion in depressive patients was found to be 68.9% in a study conducted in 15 centers of China, and 50.6% in the United States. It is a common phenomenon that depressive disorders and anxiety disorders are in comorbidity among outpatients in general medical care.

Detection rate by physicians in general hospitals or primary care

Detection rate in this study was 4.14%, similar to the 4% reported for Shenyang. A United States-based study of outpatients with GI symptoms revealed that 52% of anxious patients and 26% of depressive patients were recognized by gastroenterologists. Family practices surveyed in Taiwan indicated that the recognition rate of depression disorders was 12.5%, and that of general anxiety disorder was 8.0%. Prevalence of depression disorders in internal medicine inpatients was 26.9% and only 40% of these patients received antidepressant treatment. Another MINI-based study of internal medicine inpatients revealed that prevalence of depressive disorders was 26%, and 43.8% of them were treated with antidepressants. A meta-analysis conducted by
Mitchell et al.[41] indicated that correct diagnosis rate of clinicians was 47.3%-50.1%. The remarkable difference in detection rate between other investigations and ours suggests the urgent need to improve the diagnosing rates in mainland China.

Meanwhile, comorbid disorders deserve great attention due to their significant correlation to suicide risk. Current prevalence of depressive disorders with suicidal problems was 3.91% in our study, suggesting that over a quarter of patients with depressive disorders were at suicide risk, while only 4.48% of those patients were recognized. Carson et al.[44] indicated that morbidity of major depression with suicide ideation was 29.9%, while its recognition rate by physicians was 58%. Moreover, prevalence of depression and/or anxiety disorders in our study was higher in females than in males, which is consistent with results in Qin's study[52,66], and reminds physicians to pay more attention to female outpatients with mood problems.

Discrepancies of prevalence and detection rate between our study and previous studies likely reflect the limitations of methodology, which require significant effort to be overcome in subsequent research. These findings confirm the high prevalence of depressive and anxiety disorders and disappointing detection and treatment rate in the GI departments, and highlight the particular challenge posed by the contrasts between these two rates. Although all 13 tertiary hospitals represent the top general hospitals in China, low recognition and treatment rates raise significant concerns and indicate the need to improve the physician’s abilities to diagnose and identify emotional disorders in GI patients.

Several potential explanations exist for the high prevalence of depressive and anxiety disorders and low detection rate in GI outpatients. Physicians are less specialized than psychiatrists in recognizing mental disorders correctly. Furthermore, culture may limit physicians’ abilities in this regard. In the Chinese traditional culture, social and cognitive processes or mental status are closely related, which contributes to interpreting emotional distress and anxiety as social or ethical problems rather than mental disorders. Somatic symptoms can also serve as cultural idioms of depressive emotion[53-57]. Depressed or anxious people are inclined to experience physical symptoms, masking the underlying mental disorder[39]. In addition, there is a distorted cognition of mental disorders. It is common to consider depressive individuals as having no self-control and weak. Jorm et al.[39] reported that around a quarter of Australian adults consider antidepressants as harmful to suicidal depressive patients, who are more likely to reject relevant treatments, including psychotherapy. Finally, the established stigma of mental disorders causes hiding of emotional problems and rationalization to resist therapy. Dramatic reports in the mainstream media of aggressive behavior by mental disorder sufferers prejudice both patients and physicians against the disorder[39-41].

Previous studies have proven that depressive and anxiety disorders influence prognosis of physical diseases, raise medical risk, and increase economic burden[62,63]. However, appropriate treatment does benefit recovery from physical disease and maintenance of social function[64,66]. Therefore, clinicians should improve their ability to diagnose depression and anxiety, especially in patients with complaints of unexplained GI symptoms.

**Limitations**

Several limitations exist in the current study. Firstly, excluding outpatients who could not complete the investigation due to severe physical or mental dysfunction may have biased the results since severity of physical symptoms is positively related to depression, anxiety or other mental problems[57,59]. Secondly, the 385 missing cases (due to busy schedules and denial of mental issues) from the diagnostic interview accounted for 19.3% of the total. There were no statistically significant differences between missing and follow-up cases in sex ($\chi^2 = 0.066, P = 0.797$) or age ($t = -0.860, P = 0.390$). Although statistical adjustment was performed, representation of the sample in the study may have been impacted.

**COMMENTS**

**Background**

Depressive disorders and anxiety disorders are common in general hospitals and represent significant risks to patients’ quality-of-life. Patients visiting non-psychiatric departments may have at least one somatic symptom which is partly of emotional origin, challenging non-psychiatric physicians to detect emotional disorders.

**Research frontiers**

Emotional disorders in gastrointestinal (GI) patients have been assessed in a number of studies in America, Europe and China, including non-mainland regions of Hong Kong and Taiwan. However, the economic status and cultural traditions of mainland China are quite distinctive from foreign countries and even the non-mainland regions of China. It is important to understand the mental health situation of mainland Chinese GI patients.

**Innovations and breakthroughs**

The current study determined the prevalence of depressive and/or anxiety disorders and physicians’ detection rates in tertiary care hospitals across mainland China. In particular, this is the first multi-center study from the mainland of China with a large number of patients to report the prevalence of depression and anxiety in adult GI outpatients. Furthermore, the diagnosis of depressive and anxiety disorders was made with the Mini International Neuropsychiatric Interview diagnostic instrument.

**Applications**

The results of this study suggest that clinicians should improve their abilities to detect emotional disorders. Furthermore, they should serve to remind the government or medical institutions of the importance of promoting productive interactions between psychiatry and other departments.

**Peer review**

This study is well designed including group analysis and statistics. In particular, this is the first multi-center study from the mainland of China with a large number of patients to report the prevalence of depression and anxiety in adult GI outpatients.

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