Gender Differences in Psychiatric Outpatients: A Before and During COVID-19 Pandemic Study in General Hospitals From China

Wenli He

Zhejiang University School of Medicine Second Affiliated Hospital

Danhong Xu

second people's hospital of yuhuan

Jiafeng Wang

Zhejiang University School of Medicine Second Affiliated Hospital

Yuze Shen

first people's hospital of yuhang

Zheng Lin

Zhejiang University School of Medicine Second Affiliated Hospital

Liemin Ruan

Ningbo City First Hospital

Qiaozhen Chen (✉ crazil@zju.edu.cn)

Zhejiang University School of Medicine Second Affiliated Hospital <https://orcid.org/0000-0001-5302-8945>

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Abstract

Background

Little is known about the gender characteristics and the Corona Virus Disease 2019(COVID-19) impact on psychiatric department outpatients in general hospitals in China.

Methods

We retrospectively collected 225,947 outpatient clinic records before and during COVID-19 pandemic from January 1, 2019 to December 31, 2020 in the psychiatric clinic of 3 general hospitals, gender composition of patients was analyzed in different five age groups and nine diagnostic categories at three levels: total patient visits, number of patients and number of first-visit patients.

Results

The total male-to-female ratio of psychiatric outpatient records in 3 general hospitals from 2019 to 2020 was 1:1.69. Women were more common in all age groups and the male-to-female ratio of 2020 was expanded compared to that of 2019, especially in age group below 34 years old and anxiety disorders category. Most mental disorders showed higher demands for females than that for males except Mental and behavioral disorders due to psychoactive substance use with the male-to-female ratio was 1:0.05. Compared to 2019, the proportions of women were expanded especially in age group below 34 years old, and anxiety disorder and undetermined diagnosis categories were significantly increased in 2020.

Conclusions

The demand for female psychiatric outpatient services is obviously higher than that for males. It is necessary to pay more attention to explore targeted mechanism or psychosocial service strategy for female patients with mental disorders.

Trial registration: ChiCTR2100044894, March 31,2021 retrospectively registered.

Background

Mental disorders are getting more and more common in daily life. According to the latest epidemiological survey in China, the lifetime prevalence of mental disorders in 2013 was 16.6%, which was significantly higher than that in 2002(13.2%)[1]. The global burden of disease study in 2017[2] showed that the global burden of mental disorders increased 31.6% from 1990 to 2007 and 13.5% from 2007 to 2017. As we all know, there are gender differences in some specific mental disorders, for example, female patients have a higher prevalence in mood disorders and anxiety disorders, while mental and behavioral disorders due to psychoactive substance use are more common in male patients [1, 3].

However, the use of mental health service is different by gender. Previous studies [4] have investigated the distribution of gender in outpatients or emergency patients with mental disorders. In the 11 to 24 years old population who were hospitalized in emergency department due to substance use and mental disorders, the proportion of men and women was 45.9% and 54.1% respectively in 1997–2010. In the 2007 to 2010 survey of outpatients with mental disorders in the United States, men and women aged 21 to 64 years accounted for 38.76% and 61.24% respectively, and aged 65 years and older accounted for 32.31% and 67.69% respectively[5]. From 2014 to 2015, 17.36% male adults and 28.27% female adults received mental health services in the United States [6]. However, in the clinic records of outpatients with mental disorders at a central hospital in Mozambique from 2012 to 2014, male patients accounted for 47.0% and female patients accounted for 45.8% respectively, with 7.2% missing gender information [7].

Most previous outpatients surveys in China were concentrated on investigating the prevalence of mental disorders in non-psychiatric departments [8, 9]. In outpatients visiting neurological, cardiovascular, gastroenterological and gynecological clinic in general hospitals the prevalence of sleep disorders in females was significantly higher than males (female 23.2% vs male 20.1%) [10]. In psychiatric clinic of Shanghai Mental Health Center, the frequency of borderline personality disorder reached 3.5% in males and 7.5% in females [11].

In December 2019, COVID-19 broke out in Wuhan, China, and quickly became pandemic all over the world. As of June 10, 2021, World Health Organization has reported 173,989,093 confirmed cases and 3,756,947 deaths of COVID-19[12]. This public health emergency not only threatens people's health, but also has a great impact on their mental health. Previous studies reported that the pandemic of COVID-19 resulted in high rates of anxiety, depression and stress symptoms in the general population as well as in healthcare workers[13, 14]. Moreover, a preliminary study conducted in a general hospital in Chengdu, China, found that 20.9% of outpatients with history of mental disorders reported exacerbated symptoms due to pandemic of COVID-19[15].

So far, we have not found any research describing the gender differences and the possible COVID-19 effect for psychiatric outpatients in general hospitals in China especially. Therefore, this survey is carried out to obtain the corresponding data support to understand the actual needs by gender in general hospitals, so as to provide the basis for the policy-making of relevant departments and the allocation of medical resources in the future.

Methods

Participants and data sources

The data of this study was collected from the psychiatric outpatient records of 3 general hospitals in Zhejiang province, China, including the Second Affiliated Hospital Zhejiang University School of Medicine, the Second People's Hospital of Yuhuan, and the First People's Hospital of Yuhang District, which were representative provincial, municipal and district general hospitals respectively. This study was approved by the Human research ethics committee of the Second Affiliated Hospital Zhejiang University School of

Medicine (2021-0032), the Second People's Hospital of Yuhuan (2106) and the First People's Hospital of Yuhang District (20210510001).

The subjects of this study were patients who visited the psychiatric clinics of above 3 general hospitals from January 1, 2019 to December 31, 2020. The inclusion criteria were the records with the diagnosis in accordance with the *Mental and behavioral disorders* of the International Statistical Classification of Diseases and Related Health Problems – 10th edition(ICD-10)[16]. The exclusion criteria were the records with diagnosis that did not meet the ICD-10 *Mental and behavioral disorders*, the records of repeated visits within the same day, and the records with incomplete information and errors.

Measures

Using Hospital Information System, outpatient clinic records were collected from January 1,2019 to December 31,2020 in the psychiatric department, including unique number, gender, age and diagnoses. The records of diagnosis not in accordance with ICD-10 *Mental and behavioral disorders* and the records of repeated visits within the same day, incomplete information and errors were excluded. Then, the age stratification and disease spectrum were reclassified. Age was divided into 5 groups including 0-18 years, 19-34 years, 35-49 year, 50-64 years and 65 years and over. We used the definite diagnosis as the diagnosis for all the records when there were several visiting records of a unique number. The main diagnosis was selected according to the diagnostic principle of mental disorder hierarchy, ranked from high level to low level were organic, psychotic, affective, neurotic, personality disorder and maladjustment. The high-level diagnosis was selected when there were multiple diagnoses. Diagnoses were classified according to the corresponding ICD code in the Hospital Information System. Then the diagnoses were categorized into 9 groups consisting of dementia, mental and behavioral disorders due to psychoactive substance use, schizophrenia and other psychotic disorders, mood disorders, anxiety disorders, eating disorders, sleep disorders, other mental disorders and undetermined diagnoses. Classification principles were based on the ICD-10 *Mental and behavioral disorders*(Online Resource Table S1). Dementia contained dementia in Alzheimer disease, vascular dementia, dementia in other diseases classified elsewhere and unspecified dementia. Schizophrenia and other psychotic disorders included all diagnoses under the ICD-10 section of *Schizophrenia, schizotypal and delusional disorders*. Mood disorder included all diagnoses under the ICD-10 section of *Mood [affective] disorders*. Anxiety disorders included all diagnoses under the ICD-10 section of *Neurotic, stress-related and somatoform disorders*. Other mental disorders included all diagnoses under the ICD-10 section of *Organic, including symptomatic, mental disorders(except dementia), Behavioral syndromes associated with physiological disturbances and physical factors(except eating disorders and sleep disorders), Disorders of adult personality and behavior, Mental retardation, Disorders of psychological development, Behavioral and emotional disorders with onset usually occurring in childhood and adolescence and Unspecified mental disorder*. Undetermined diagnoses included mental disorders to be determined (such as schizophrenia to be determined, dementia to be determined, etc.), symptom description (such as hallucination, agitation, anxiety state, depression state, etc.) and psychotherapy (with no definite diagnosis of mental illness before and after treatment). The total patient visits per year was defined as the total number of the

reclassified visit records. The number of patients per year was defined as the person-time of all different unique number. The number of first-visit patients was defined as the person-time of all different unique number which didn't appear in the previous year.

Statistical analysis

Data were analyzed using SPSS25.0 (SPSS Inc., Chicago, USA). Non-normally distributed measurement data were described by median and 95% confidence interval. The enumeration data were described by constituent ratio, and chi square test was used to compare the differences between groups or years. $P < 0.05$ was set as the difference with statistical significance, and $P < 0.001$ as extremely significant statistical difference.

Results

We identified a total of 225,947 person-time visiting records between 2019 and 2020, collecting information such as gender, age, unique number, diagnosis and visiting date. Among them, 7,206 records which were not in accordance with ICD-10 *Mental and behavioral disorders* (including diseases unrelated to mental health and consultation), 2,816 records which visited repeatedly within the same day, 6 records with incomplete gender information, 7 records with incomplete age information and 4 records which showed different gender in the same unique number were excluded and 215,908 records were finally included (see Fig. 1). The records meeting the above criteria were sorted out by age groups and diagnosis categories.

In the total medical records of the 3 hospitals from 2019 to 2020, age was ranged from 3 to 103 years old, with a median age of 44[14–79] years old, of which 10.79% were 0–18 years old, 24.15% were 19–34 years old, 25.18% were 35–49 years old, 25.90% were 50–64 years old, and 13.98% were 65 years old and over. The proportion of male and female was 37.22% and 62.78% respectively, and the male-to-female ratio was 1:1.69. The median visit frequency of male and female patients was 2[1–20] and 2[1–19] respectively. Anxiety disorder, mood disorder, undetermined diagnoses, sleep disorders, schizophrenia and other psychotic disorders were the most common diagnostic categories, accounting for 36.83%, 16.60%, 15.45%, 13.57% and 9.40% respectively (see Table 1). The number of medical records in January, February, March, April and December was decreased compared to that in 2019 (see Fig. 2).

Table 1
Characteristics of total medical records of psychiatric outpatients from 2019 to 2020(*n* = 215,908)

	<i>n</i>	%
Age group		
0–18	23,296	10.79
19–34	52,145	24.15
35–49	54,357	25.18
50–64	55,917	25.90
≥ 65	30,193	13.98
Gender		
Male	80,356	37.22
Female	135,552	62.78
Diagnostic category		
Dementia	364	0.17
Mental disorders due to psychoactive substance use	796	0.37
Schizophrenia and other psychotic disorders	20,303	9.40
Mood disorders	35,842	16.60
Anxiety disorders	79,521	36.83
Eating disorders	615	0.28
Sleep disorders	29,305	13.57
Other mental disorders	15,804	7.32
Undetermined diagnoses	33,358	15.45
Year		
2019	110,699	51.27
2020	105,209	48.73
Data sources		
The Second Affiliated Hospital Zhejiang University School of Medicine	139,324	64.53
The Second People's Hospital of Yuhuan	41,160	19.06
The First People's Hospital of Yuhang District	35,424	16.41

Gender difference in years

At the level of total patient visits, the male-to-female ratio in 2019 and 2020 was 1:1.66 and 1:1.72 respectively, and the proportion of women was significantly increased ($\chi^2=18.308, P<0.001$) (see Fig. 3a, Online Resource Table S2). At the level of patient number, the male-to-female ratio in 2019 and 2020 was 1:1.68 and 1:1.76 respectively and the proportion of women was also significantly increased ($\chi^2=8.736, P=0.003$) (see Fig. 3b, Online Resource Table S3). At the level of first-visit patient number, the male-to-female ratio in 2019 and 2020 was 1:1.71 and 1:1.84 respectively, and the proportion of women in 2020 was significant increased ($\chi^2=12.693, P<0.001$) (see Fig. 3c, Online Resource Table S4).

Gender differences in 5 age groups

At the level of total patient visits, the male-to-female ratio in the age group of 50–64 years was 1:2.09, 65 years and over 1:1.97, 0–18 years 1:1.75, 19–34 years 1:1.47, and 35–49 years 1:1.41 (see Fig. 3d, Online Resource Table S2). At the level of patient number, the male-to-female ratio in the age group of 50–64 years was 1:2.17, 65 years and over 1:1.85, 0–18 years 1:1.63, 19–34 years 1:1.61, and 35–49 years 1:1.50 (see Fig. 3e, Online Resource Table S3). At the level of first-visit patient number, the male-to-female ratio in the age group of 50–64 years was 1:2.29, 19–34 years 1:1.76, 65 years and over 1:1.75, 0–18 years 1:1.60, and 35–49 years 1:1.55 (see Fig. 3f, Online Resource Table S4).

The female proportion of group aged 0–18 and 19–34 years old in 2020 was significantly increased when compared to that of 2019, especially in 19–34 years group at the level of total patient visits ($\chi^2=71.657, P<0.001$), patient number ($\chi^2=13.895, P<0.001$) and first-visit patient number ($\chi^2=13.603, P<0.001$) (see Fig. 4, Online Resource Table S5).

Gender Differences in 9 diagnostic categories

At the level of total patient visits, the male-to-female ratio was 1:26.95 in the diagnostic category of eating disorders, 1:2.21 in mood disorders, 1:1.90 in undetermined diagnoses, 1:1.71 in anxiety disorders, 1:1.58 in sleep disorders, 1:1.46 in dementia, 1:1.30 in other mental disorders, 1:1.20 in schizophrenia and other psychotic disorders, and 1:0.05 in mental and behavioral disorders due to psychoactive substance use (see Fig. 5a, Online Resource Table S2).

At the level of patient number, the male-to-female ratio was 1:17.27 in the diagnostic category of eating disorders, 1:2.21 in mood disorders, 1:1.87 in undetermined diagnoses, 1:1.84 in dementia, 1:1.77 in anxiety disorders, 1:1.63 in sleep disorders, 1:1.26 in schizophrenia and other psychotic disorders, 1:1.24 in other mental disorders and 1:0.05 in mental and behavioral disorders due to psychoactive substance use (see Fig. 5b, Online Resource Table S3).

At the level of first-visit patient number, the male-to-female ratio was 1:27.60 in the diagnostic category of eating disorders, 1:2.36 in mood disorders, 1:1.91 in dementia, 1:1.90 in anxiety disorders, 1:1.87 in undetermined diagnoses, 1:1.67 in sleep disorders, 1:1.32 in schizophrenia and other psychotic disorders,

1:1.18 in other mental disorders and 1:0.04 in mental and behavioral disorders due to psychoactive substance use(see Fig. 5c, Online Resource Table S4).

The female proportion of anxiety disorder category in 2020 was significantly increased at the level of total patient visits($\chi^2=9.781, P<0.05$), patient number($\chi^2=7.801, P<0.05$) and first-visit patient number($\chi^2=15.655, P<0.001$) when compared to that of 2019(see Fig. 6, Online Resource Table S6). The female proportion of undetermined diagnoses category in 2020 was significantly increased at the level of total patient visits($\chi^2=27.142, P<0.001$), patient number($\chi^2=11.041, P<0.05$) and first-visit patient number($\chi^2=8.458, P<0.05$) when compared to that of 2019(see Fig. 6, Online Resource Table S6).

Discussion

To the best of our knowledge, this is the first full-sample data study that describes the gender distribution of psychiatric outpatients in 3 general hospitals in China, which provides data support for the needs of different genders in clinical practice for mental health diagnosis and treatment. In this study, women were more common in psychiatric clinics in general hospitals, and the difference in the male-to-female ratio had increased. Besides, women are more common in all age groups, especially in the group aged 50–64 years, as well as in almost of diagnostic categories except the category of mental and behavioral disorders due to psychoactive substance use. Patients with 19–34 years group and anxiety disorders, undetermined diagnosis categories showed an increased proportion of women.

Women suffering from mental disorders were more common in psychiatric clinics in general hospitals. We found an increased proportion in women from 2019 to 2020 at the level of total patient visits, number of patients and number of first-visit patients. The results were obviously contrary to the census data in China, which reported that there were more males than females and the male-to-female ratio reached 1.05:1[17]. Previous studies didn't reach a consensus on gender distribution of mental disorders due to influencing factors such as the study population, social background, and type of mental disorders. Survey conducted on 2–18 years old children who were military dependents reported that mental health conditions were more common in boys, accounting for 57%-60% [18]. However, the Global Burden of Disease Study 2010 showed a heavier burden of mental disorders among women aged 10 years and over than men, while the burden of disease among men under 10 years old was heavier than that of women [19]. This study did not further stratify the population of 0–18 years old, and a more detailed stratified analysis of the age group could be carried out later. In the nationwide epidemiological sampling survey of mental disorders conducted in China[1], the male-to-female ratio in the sample population was 1:1.20(45.40% for men and 54.60% for women), while the male-to-female ratio in the population with mental disorders was 1:0.93(9.70% for men and 9.00% for women). Generally speaking, there was no significant difference in the prevalence of men and women in the mental disorders studied, but gender differences were shown in some specific disorders. For example, mood disorders were significantly more common in women, and substance use disorders and impulse-control disorders were significantly more common in men. The constituent ratio of psychiatric clinic visits in females in this study was significantly higher than that of males, which might be related to the diagnosis of mild and affective diseases

predominated in psychiatric clinics of general hospitals, such as anxiety disorders and mood disorders, in which women had a higher prevalence than men [20–22]. In addition, a study in Australia found that men sought mental health services less frequently than women, with 5.33% of men and 10.2% of women receiving mental health services[23]. A study conducted in the Netherlands found that female patients with anxiety disorders in psychiatric clinics had higher scores on the self-rating scale than men [24]. The prevalence of mental disorders and the burden of disease has increased, while women feel worse about themselves and have more desire for treatment and expression, which may be related to the obvious gender differences in general hospitals. Furthermore, the negative effects of COVID-19 might exacerbate the risk of mental disorders in women and expand the gender difference, such as increased domestic violence against women[25], heavier economic burden, overuse of Internet and social media[26], which were the risk factors of mental illness. The significant gender gap indicates the great demand for women's diagnosis and treatment, which prompting the government and relevant departments and organizations to take targeted measures, especially to strengthen the care and attention to women's mental health. Besides, some male patients suffered from mental illness who have not sought medical treatment also need to be concerned.

The gender composition of all age groups was dominated by women, and the gender difference in the 50–64 age group was the highest at the level of person-time of diagnosis and treatment, patient number and first-visit patient number, followed by group aged 65 years and over at the level of total patient visits and patient numbers. However, at the level of first-visit patient number, the gender difference in the 19–34 age group ranked second among all age groups. Besides, 0–18 and 19–34 age group showed a significantly increased female proportion in 2020. The widening of the gender gap in the 19–34 age group might be related to the following reasons. With the increasing awareness of gender equality, women's social status had gradually improved. Women played more roles in social work and also bore a lot of pressures. For example, they should not only take care of their families, but also bear the pressure of financial resources. Georgia Balta et al [27] analyzed the factors that affected women's mental health from the perspective of social background, including deep-rooted male dominance, the values of thinness for beauty, marital conflicts and so on, all of which had a negative impact on women's mental health. People aged 19–34 years are under the pressure of work, marriage, family and other aspects, and they receive more stress. The COVID-19 pandemic brought higher risk to anxiety and depression as well[28], which might be related to the widening of the gender gap in the 19–34 age group. This was correspondent with a previous study from Austria, which reported that people under 35 years old and female sex showed more mental health symptoms during COVID-19[29].

The proportion of male patients with mental and behavioral disorders due to psychoactive substance use was significantly higher than that of female patients, but in the other diagnostic categories the proportion of female patients was higher. This result was basically consistent with the gender distribution in the previous epidemiological surveys of the prevalence of mental disorders. A meta-analysis on the prevalence of common mental disorders (mood disorders, anxiety disorders, and substance use disorders) showed that women had a higher lifetime prevalence of mood disorders and anxiety disorders, while men had a higher lifetime prevalence of substance use disorders [30]. The data of Global Burden of

Disease Study 2016 showed that there was no gender difference in the prevalence of schizophrenia, but the exception was that the prevalence of male was lower than that of female in China, and the prevalence of dementia in women was higher than that in men [31, 32]. A survey on the prevalence of sleep disorders among non-psychiatric outpatients in 4 general hospitals in China found that the prevalence of women was higher than that of men (23.2% for women and 20.1% for men) [10]. As there are a large number of diagnoses in the categories of other mental disorders and undetermined diagnosis, further stratified analysis and longitudinal follow-up can be carried out to explore the development of diseases with undetermined diagnosis. The female proportion of anxiety disorders and undetermined diagnosis categories was significantly increased in 2020 at all three levels. Several previous studies had illustrated high rates of anxiety and depression symptoms [13, 33]. But in this study it was interesting to find that female proportion in mood disorders didn't show similar trend at all three levels.

Our study has several limitations. First, this is a retrospective study, which lacks of comprehensive longitudinal follow-up investigation. Due to the large number of outpatients and the limited time for each patient to receive diagnosis and treatment, it is possible that the outpatient diagnosis records involved are not completely accurate. Although electronic medical records have been popularized in recent years, the diagnosis basis of each hospital is not completely consistent and homogeneous, so there may be some errors in the classification of diagnosis. In addition, this study used monism, did not analyze the comorbidity of mental disorders, there may be some errors in the gender distribution of each diagnosis. And this study only described and compared the diagnostic categories, but did not further analyze the diagnostic subclasses. More targeted data analysis can be carried out in the future.

Conclusions

This study found that women have significant higher demand for psychiatric clinics in general hospital. The male-to-female ratio of 2020 was expanded compared to that of 2019, especially in adolescent and young adult group and anxiety disorders category which might be partly affected by COVID-19. Female outpatients were more common in all age groups and more common in most diagnosis categories except mental and behavioral disorders due to psychoactive substance use. This provided data support for the current needs of patients in the psychiatric clinic of general hospitals in China. Therefore, it is necessary to further explore the potential mechanisms in gender and strengthen attention to women's mental health prevention and treatment.

Declarations

Ethics approval and consent to participate

This study was performed in line with the principles of the Declaration of Helsinki. This study was approved by the Human research ethics committee of the Second Affiliated Hospital Zhejiang University School of Medicine (2021-0032), the Second People's Hospital of Yuhuan (2106) and the First People's

Hospital of Yuhang District (20210510001). Retrospective data collection was exempted informed consent.

Consent for publication

Retrospective data collection was exempted informed consent.

Availability of data and materials

The data in this study cannot be publicly available due to data protection.

Competing interests

All authors and institutions declare that there are no conflicts of interests.

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Authors' contributions

QZC and LMR conceived the article and made the plan for the study. WLH, YZS and DHX collected data. YZS, DHX, WLH and JFW participated in data filtering. WLH and JFW analyzed the data, WLH drafted the initial paper and all authors commented. QZC, ZL and LMR revised the article. QZC and LMR critically reviewed the article. All authors read and approved the final article.

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Figures

Figure 1

Flowchart of data filtering.

Figure 2

Monthly distribution of medical records of psychiatric outpatients in 2019 and 2020.

Figure 3

The gender differences in years and age groups. The figure represents the gender composition in 2019 and 2020 at the level of total patient visits(a), number of patients(b) and number of first-visit patients(c),

and by age groups in 2019-2020 at the level of total patient visits(d), number of patients(e) and number of first-visit patients(f).

Figure 4

The gender composition change of different age groups in 2019-2020. The figure represents the change of gender composition in different age groups from 2019 to 2020 at the level of total patient visits(a), number of patients(b) and number of first-visit patients(c). *: $p < 0.05$. ***: $p < 0.001$.

Figure 5

The gender differences in diagnostic categories. The figure represents the gender composition by diagnostic categories in 2019-2020 at the level of total patient visits(a), number of patients(b) and number of first-visit patients(c).

Figure 6

The gender composition change of different diagnostic categories in 2019-2020. The figure represents the change of gender composition in different diagnostic categories from 2019 to 2020 at the level of total patient visits(a), number of patients(b) and number of first-visit patients(c). *: $p < 0.05$. ***: $p < 0.001$.

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