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Distribution characteristics of mental disorders in community health service center: based on outpatient data from 2014—2022 in Shanghai, China

Jie Qian^{1,2†}, Hanzhi Zhang^{3,4†}, Aizhen Guo^{3,4}, Qiangqiang Fu^{3,4}, Jianwei Shi⁵, Hua Jin^{3,4*†} and Dehua Yu^{3,4*†}

Abstract

Background The prevalence of mental disorders is gradually increasing in China. As the Chinese government fully implements the tiered diagnosis and treatment system, community health service centers will take on an increased role in the diagnosis and treatment of mental disorders. However, Chinese general practitioners currently have limited expertise in mental health. The health administration is still exploring which areas should be the focus of training for general practitioners in their capability to handle mental disorders.

Objective To understand the types and characteristics of mental disorders, which can provide direction and evidence for improving the diagnosis and treatment capabilities of mental disorders in community mental health services in China.

Methods The data of outpatient visits of all community health service centers in Shanghai were extracted from the outpatient and emergency information system platform of primary care institutions during 2014 to 2020. All of the diagnoses of mental disorders were classified and counted according to the ICD-10 code. Mental disorders were analyzed by the specific types, gender, age group and regions.

Results From 2014 to 2022, the proportion of patients with mental disorders in community health. Service centers in Shanghai has been increasing year by year, from 0.8% to 2.8%. The most common diagnostic category was F40-48: "Neurotic, stress-related and somatoform disorders", accounting for 50.9% of all mental disorders. Neurotic disorders, Non-organic sleep disorders and depressive episodes were the top three mental disorders. In the children and adolescents group aged 0–18 years, the most common diagnosis category was F80-F89: "Disorders of psychological development", accounting for 68.6% of the total number of children and adolescents with mental disorders in community health service centers. In the adult group, the Nonorganic sleep disorders and dementia gradually increased with age, while neurotic disorders and depressive episodes decreased after peaking at age the group 60 to 79.

[†]Jie Qian and Hanzhi Zhang the two authors contributed equally to this work.

[†]Hua Jin and Dehua Yu these authors are co-corresponding authors on this work.

*Correspondence:

Hua Jin
drjinhua@tongji.edu.cn
Dehua Yu
shgprc@yeah.net

Full list of author information is available at the end of the article



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Conclusions In China, an increasing number of patients with mental disorders are seeking medical attention at community health service centers, while the knowledge and skills of general practitioners on mental disorders were still insufficient. Neurotic disorders, insomnia, depression as well as Disorders of psychological development in children and adolescents need to be studied more and paid attention to by general practitioners.

Keywords Mental disorders, Community health service center, China

Introduction

The Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2019 showed that mental disorders remained among the top ten leading causes of burden worldwide [1]. Mental disorders have become an issue that cannot be ignored, especially in developing countries, particularly in China, which has undergone unprecedented economic development and social change. This may have an impact on the epidemiology of mental disorders.

The prevalence of mental disorders is on the rise in China. The survey conducted in 1993 in seven regions of China (Beijing, Shanghai, Nanjing, Hunan, Daqing, Jilin) showed that the lifetime prevalence rate of mental disorders was 1.35%, which was higher than the result of the same survey in 1982 [2]. The 12-month prevalence of mental disorders in Shanghai and Beijing was 4.3% and 9.1% respectively in the World Mental Health Survey in 2002 [3]. The first nationwide epidemiological Survey of mental disorders in 2015 showed that the 12-month prevalence of any mental disorder (except dementia) was 9.3% and the lifetime prevalence was 16.6% in China [4]. Chinese policy makers and health-care professionals have begun to consider mental health an important outcome to monitor. However, there was an obvious shortage in mental health services in China. There were 40,435 psychiatrists, about 2.9 for every 100,000 population in China, according to the data from the National Health Commission in 2019, which was lower than average of 3.9 for every 100,000 population in the world [5]. In addition, the supply of mental health services was unbalanced between urban and rural areas and regions, with more services in the east and least in west. There were still 1,180 districts (41.4% of all 2853 districts in China) without any mental health facility by the year of 2015 [6], which means that there were few mental health professionals in many districts of China.

The Chinese government has been vigorously developing the ability of community health services and promoting hierarchical diagnosis and treatment in recent years. “The National Mental Health Work Plan (2015–2020)” proposed the model of “Serious illness treatment in the hospital, rehabilitation management in the community” for mental health work, in response to the situation where patients with mental disorders used to receive

treatment throughout the whole course of their illness in specialized mental hospitals, leading to an increasingly evident supply-demand contradiction. It encourages patients with mental disorders who are in a stable phase of their condition to reintegrate into society [7]. Community health service centers will undertake more work such as the first visit, follow-up treatment and rehabilitation for mental disorders. The identification and management of mental disorders in Community health services centers are even more indispensable, especially in the districts where mental health personnel are scarce as mentioned above.

In the past, general practitioners spent more time on the management of common internal diseases such as hypertension and diabetes. They know little about mental disorders [8]. In a survey on general practitioners in Beijing, only 17.57% of them were able to select the symptoms of depression correctly, 12.55% were able to select the proper screening method, and only 29.7% of them knew the principles of depression treatment [9]. It is urgent to improve the ability of general practitioners to deal with mental disorders. In some regions, the general practitioners are being trained on mental disorders. Some districts are exploring various methods such as the combination of specialists and general practitioners, and family contract management, expecting an increase on general practitioners’ knowledge of mental disorders [10, 11]. However, mature training strategies and methods are still in the exploratory stage.

This study aimed to examine the patients with mental disorders who visited community health service centers in the past 9 years, to understand the major types and characteristics of mental disorders, which will provide the evidence on training general practitioners about the knowledge and skills for diagnosis and treatment on mental disorders.

Methods

Study setting and study population

The data for this study was retrieved from the medical records of outpatients visiting all community health service centers within the jurisdiction of Shanghai, China, which included seven urban areas (Huangpu District, Xuhui District, Changning District, Jing’an District,

Putuo District, Hongkou District, Yangpu District) and nine suburban areas (Minhang District, Baoshan District, Jiading District, Pudong New Area, Jinshan District, Songjiang District, Qingpu District, Fengxian District, Chongming District). The time frame was from January 1, 2014 to December 31, 2022. The age range included the entire spectrum of the population.

Data collection

The medical information of each patient who visited the community health service center was recorded in the electronic information system of the medical institution, including basic information such as the patient's name, gender, age, and all diagnosis, which was recorded by ICD-10 encoding. The relevant staff responsible for information management at the community health service centers subsequently report all the data to their higher management authority, the information department of regional Municipal Health Commission. After the regional Municipal Health Commission has gathered all the data from the community health service centers within its jurisdiction, it proceeded to upload these datasets to the information department of Shanghai Municipal Health Commission, which is the higher administrative body. They store these datasets on "The outpatient and emergency information system platform of primary care institutions". We reported the purpose and requirements of this study to Shanghai Municipal Health Commission, applied for the extraction of relevant subsets of data, and upon approval, were granted the permission to use this set of data for research purposes.

We collected the data from the 254 community health service centers in Shanghai from January 1, 2014 to December 31, 2022, including the visit year, gender, age, regional group and ICD-10 diagnostic code. All data collected have been extracted and collated, with incomplete and incorrect data being eliminated. A total of 283,566,225 pieces of medical diagnosis and treatment

information were ultimately included, among which 4,559,436 pieces of information involved the diagnosis of mental disorders.

Data analysis

The study calculated the number of diagnoses for each mental disorder made annually at outpatient of community health centers over the past 9 years, ranked them according to the frequency of each mental disorder. The frequency of mental disorders was calculated and ranked separately for different genders, age groups (0–18 years, 19–39 years, 40–59 years, 60–79 years, and 80 years and above), and regions (urban and suburban), and the differences among them were compared.

Results

The proportion of mental disorders in community health service centers from 2014–2022

The total number of patients increased from 2014 to 2018, but there has been a significant year-on-year decline since 2018. There were about 20 million patient visits in the outpatient departments of Shanghai's community health service centers in recent years. However, the proportion of mental disorders showed a rapid rise from 0.8% in 2014 to 2.8% in 2022, about 3.5 times that of 2014. (Fig. 1).

Demographic characteristics of outpatients with mental disorders in community health service centers

The information of patients with mental disorders includes gender, age group, region in the outpatient department of community health service centers, as shown in Table 1. From 2014 to 2022, females were notably more common, representing 62.8% of all outpatients with mental disorders; suburban patients accounted for 67.4%, significantly more than urban areas; from the perspective of different age groups (Fig. 2), the 60–79 age group emerged as the most prevalent,

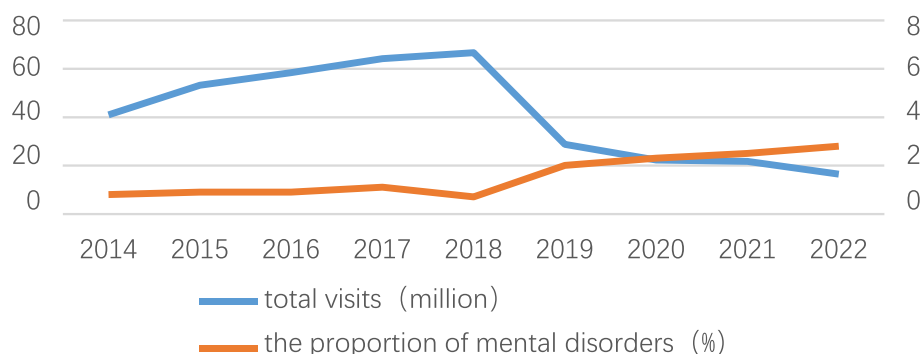


Fig. 1 Total visits and proportion of mental disorders in Shanghai community health service center from 2014–2022

Table 1 Demographic characteristics of outpatients with mental disorders in community health service centers in Shanghai, China

	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Sex										
Male	115,095	171,580	195,092	260,967	179,289	206,466	188,007	205,769	174,328	1,696,593
	36.4%	37.1%	37.3%	37.9%	36.7%	36.6%	37.3%	37.3%	37.8%	37.2%
Female	200,792	290,543	327,868	428,415	309,488	357,912	315,490	345,837	286,498	2,862,843
	63.6%	62.9%	62.7%	62.1%	63.3%	63.4%	62.7%	62.7%	62.2%	62.8%
Age										
0–18	2,009	3,132	4,209	5,267	5,071	6,190	4,864	6,023	3,746	40,511
	0.6%	0.7%	0.8%	0.8%	1.0%	1.1%	1.0%	1.1%	0.8%	0.9%
19–39	10,182	17,447	19,142	25,629	18,161	21,909	17,318	17,417	14,438	161,643
	3.2%	3.8%	3.7%	3.7%	3.7%	3.9%	3.4%	3.2%	3.1%	3.5%
40–59	46,128	75,856	85,558	115,200	83,413	96,110	83,422	89,938	77,009	752,634
	14.6%	16.4%	16.4%	16.7%	17.1%	17.0%	16.6%	16.3%	16.7%	16.5%
60–79	175,359	255,581	293,522	391,301	279,038	325,212	298,796	331,321	282,920	2,633,050
	55.5%	55.3%	56.1%	56.8%	57.1%	57.6%	59.3%	60.1%	61.4%	57.7%
80 岁以上	82,209	110,107	120,529	151,985	103,094	114,957	99,097	106,907	82,713	971,598
	26.0%	23.8%	23.0%	22.0%	21.1%	20.4%	19.7%	19.4%	17.9%	21.3%
Region										
Urban	127,386	157,522	179,649	200,656	175,768	181,931	165,498	169,706	128,070	1,486,186
	40.3%	34.1%	34.4%	29.1%	36.0%	32.2%	32.9%	30.8%	27.8%	32.6%
Suburban	188,501	304,601	343,311	488,726	313,009	382,447	337,999	345,837	332,756	3,073,250
	59.7%	65.9%	65.6%	70.9%	64.0%	67.8%	67.1%	62.7%	72.2%	67.4%
Total	315,887	462,123	522,960	689,382	488,777	564,378	503,497	551,606	460,826	4,559,436

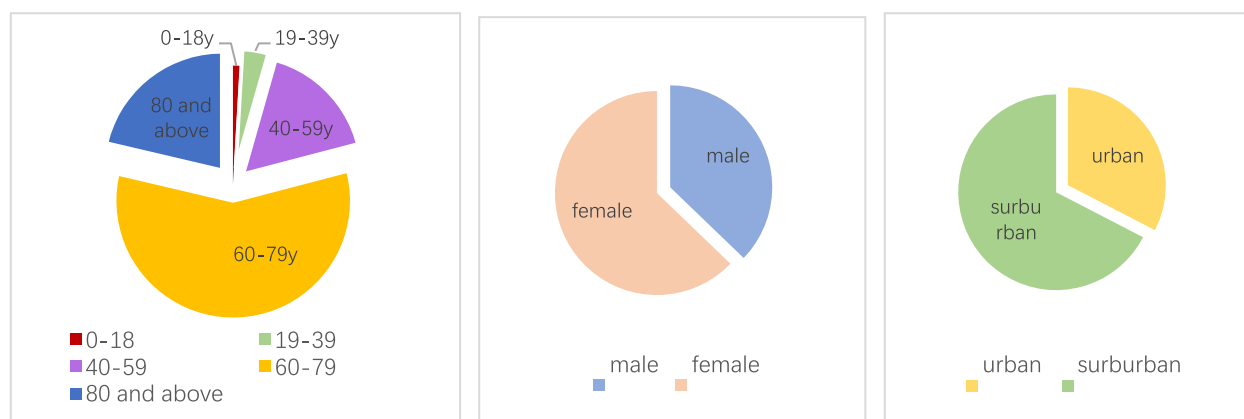


Fig. 2 The composition of outpatients with mental disorders by age, sex and region respectively in Shanghai Community Health Service Center from 2014 to 2020

accounting for 57.7% of all patients, followed by patients over 80 years old, accounting for 21.3%. Therefore, patients over 60 years old accounted for 79.0% of the total population. The 0–18 age group had the fewest visits, accounting for only 1% approximately. These trends were broadly consistent over the past 9 years.

Ranking of outpatients with mental disorders in community health service centers from 2014 to 2022

Ranking of all outpatients with mental disorders

The sum of the top 15 outpatient visits with mental disorders at Shanghai Community Health Service Centers was 4,493,430, accounting for 98.5% of the total outpatient

visits from 2014 to 2022, as shown in Table 2. Patients belonging to the ICD-10 code F40-48: “Neurotic, stress-related and somatoform disorders” accounted for more than half of the total visits with mental disorders (50.9%). The most common diagnosis was F48: “other neurotic disorders”; The second was F51: “Nonorganic sleep disorders”, which accounted for 26.0% of total visits. In third place was F32: “Depressive episode”, accounted for 12.8%. Therefore, neurosis, insomnia and depression have become the top three mental disorders in the Community Health Service Centers. F20: “schizophrenia” ranked fourth accounted for 3.7%; In fifth place was dementia at

Table 2 Ranking and proportion of the top 15 outpatients with mental disorders in community health service center from 2014 to 2022

Rank	ICD-10 code	Diagnosis	Number of visits	Percentage
1	F48	Other neurotic disorders	1,617,694	35.5%
2	F51	Nonorganic sleep disorders	1,186,474	26.0%
3	F41	Other anxiety disorders	700,039	15.4%
4	F32	Depressive episode	583,408	12.8%
5	F20	Schizophrenia	169,532	3.7%
6	F03	Unspecified dementia	67,634	1.5%
7	F01	Vascular dementia	46,477	1.0%
8	F34	Persistent mood [affective] disorders	34,167	0.7%
9	F06	Other mental disorders due to brain damage and dysfunction and to physical disease	24,075	0.5%
10	F89	Unspecified disorder of psychological development	22,153	0.5%
11	F45	Somatoform disorders	20,059	0.4%
12	F79	Unspecified mental retardation	8235	0.2%
13	F99	Mental disorder, not otherwise specified	6172	0.1%
14	F80	Specific developmental disorders of speech and language	3904	0.1%
15	F31	Bipolar affective disorder	3407	0.1%

2.5%, including F03: “Unspecified dementia” at 1.5%, and F01 “Vascular dementia.”

The ranking of mental disorders diagnosis was basically the same in these 9 years except for two special diseases. One was F19: “Mental and behavioural disorders due to multiple drug use and use of other psychoactive substances”, which only occurs about 10 times per year in the six years: 2014, 2018, and 2019–2022, ranking below the 20th place of diseases. However, in the years of 2015, 2016 and 2017, the diagnoses increased significantly, with the number of diagnoses 2,029 (accounting for 0.44% of all mental disorders that year, ranking 9th), 9,659 (1.33%, ranking 6th) and 12,604 (1.83%, ranking 6th). The other was F34: “Persistent mood [affective] disorders”, which refers to persistent mood swings, but not to the extent of hypomania or mild depression, including Cyclothymia, dysthymia, and Other persistent mood [affective] disorders. The diagnosis rate for F34 was relatively high, with occurrences of 6,989, 9,201, 6,807 and 8,066 times from 2014 to 2017, respectively. however, since 2018, the number of diagnoses has decreased annually, with counts of 1708, 482, 397, 289 and 228 in subsequent years.

Ranking of outpatient mental disorders in children and adolescents aged 0–18 in community health service center from 2014 to 2022

The top 10 mental disorders in children and adolescents aged 0–18 are shown in Table 3. Four mental disorders belonging to ICD-10 code F80–F89: “Disorders of psychological development”, accounting for 68.6% of the total number of children and adolescents. F89: “Unspecified disorder of psychological development” was the most frequently diagnosed (54.5%). The

second was F79: “Unspecified mental retardation” at 12.5%.

The main mental disorders of different age groups in adults

In adults, the dominant mental disorders were neurotic disorders, Nonorganic sleep disorders, depressive episodes, schizophrenia and a relatively small number of mental retardation and dementia. As shown in Fig. 3, Non-organic sleep disorders, neurotic disorders and depressive episodes increased with age, but the latter two decrease after reaching a peak in age group 60–79 significantly. The proportion of schizophrenia decreased gradually with age in adult group. In line with our general common sense, dementia increased slowly with age, while mental retardation decreased.

Comparison of mental disorders of different genders children and adolescents aged 0–18

In the group of children and adolescents aged 0–18 with mental disorders, boys were more prevalent than girls, about 1.42 times in community health service centers. The top 4 mental disorders in both boys and girls (Table 4) were F89: “Unspecified disorder of psychological development”, F80: “Specific developmental disorders of speech and language”, F79: “Unspecified mental retardation”, and F48: “Other neurotic disorders”, which add up to 83% of all children and adolescents patients.

F80: “Specific developmental disorders of speech and language” was more common in boys, about 4.84 times that of girls. In addition, more boys were diagnosed as F84: “Pervasive developmental disorders”, about 3.66 times that of girls; F95: “tic disorders”, about 4.64 times; F90: “Hyperkinetic disorders”, about 2.79 times; F81: “Specific developmental disorders of scholastic skills”, about 16.82 times in girls.

Table 3 Top 10 outpatient visits of mental disorders in children and adolescents in community health service centers from 2014 to 2022

Rank	ICD-10 code	Diagnosis	Number of visits	Percentage
1	F89	Unspecified disorder of psychological development	22,076	54.5%
2	F79	Unspecified mental retardation	5057	12.5%
3	F80	Specific developmental disorders of speech and language	3874	9.6%
4	F48	Other neurotic disorders	2600	6.4%
5	F82	Specific developmental disorder of motor function	1008	2.5%
6	F84	Pervasive developmental disorders	866	2.1%
7	F98	Other behavioural and emotional disorders with onset usually occurring in childhood and adolescence	686	1.7%
8	F95	Tic disorders	558	1.4%
9	F51	Nonorganic sleep disorders	543	1.3%
10	F41	Other anxiety disorders	433	1.1%

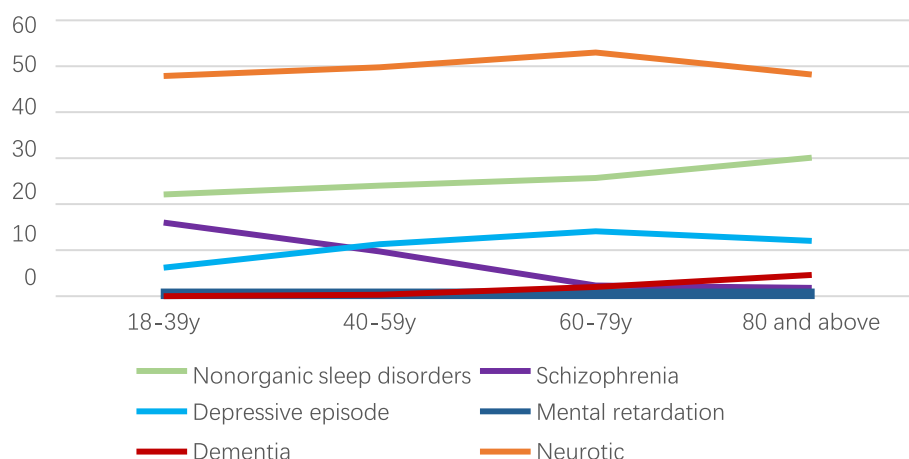


Fig. 3 Proportion of several major mental disorders in adults of different age groups in community health service center from 2014 to 2022

The most diagnosed in girls were F48: “Other neurotic disorders”, about 1.32 times that of boys; F41: “Other anxiety disorders”, about 2.77 times; F32: “Depressive episode”, about 2.99 times; F20: “Schizophrenia”, about 1.33 times more common in boys.

Adults over 18 years old

The diagnostic distribution of adults with mental disorders among males and females was basically the same in community health service centers, with no significant difference in the top 15 diseases from 2014 to 2022. However, as mentioned earlier in this article, the total number of female patients was about 1.7 times that of men. The top 15 diseases had more females than males, in addition to F07: “Personality and behavioural disorder due to brain disease, damage and dysfunction” males slightly more than females. There were several diseases that are disproportionately females, such as F32: “Depressive episode”, females were 2.6 times that of males; F34: “Persistent mood [affective] disorders”, 2.3 times; F45: “Somatoform disorders”, 2.1 times more common in women than in men. (Table 5).

Comparison of mental disorders in urban and suburban areas

The diagnostic distribution of mental disorders in urban and suburban areas was basically the same. The number of outpatients with mental disorders in suburban areas was 2.07 times higher than that in urban areas. However, the following two diseases were more obvious in suburban areas: F20: “Schizophrenia” with 5.06 times higher than urban and F45: “Somatoform

disorders” with 4.3 times. However, there were slightly more F01: “Vascular dementia” patients in urban areas than in suburban areas. (Table 6).

Discussion

This study found that the proportion of mental disorders showed an obvious increasing trend in the outpatient of community health service centers. Most of the patients with mental disorders were female, over 60 years old and in rural areas. Neurosis, insomnia, depression, schizophrenia, dementia were the top 5.

General practitioners (GPs) dealing with more and more patients with mental disorders was not unique to our country, nor to the United States [12]. The numbers of people receiving mental health treatment at community health centers increased dramatically by an average of 14% per year in the United States between 2001 and 2007 [13]. In Denmark, the proportion of mental disorders in primary health care increased by 9.4% in 2009 compared with 1993 [14]. In recent years, the prevalence rate of mental disorders in China has increased in general, ²⁻⁴ Moreover, the Chinese government attached importance to mental health, they have issued “Guidelines for the Development of the National Mental Health Work System (2008–2015)”, “National Mental Health Work Plan (2015–2020)” etc [7, 15]. The education of mental health, publicity and prevention of mental disorders have been strengthened, so that GPs, doctors of other specialties and patients have increased the awareness of mental disorders.

Demographic

In terms of the demographic characteristics of mental disorders, females accounted for 62.2% (female: male

Table 4 Comparison of outpatient visits for mental disorders among children and adolescents aged 0–18 years in community health service center from 2014 to 2022

Boys					Girls				
Rank	ICD-10	Diagnosis	Number of visits	Percent age	ICD-10	Diagnosis	Number of visits	Percentage	
1	F89	Unspecified disorder of psychological development	12,465	52.4%	F89	Unspecified disorder of psychological development	9611	57.4%	
2	F80	Specific developmental disorders of speech and language	3211	13.5%	F79	Unspecified mental retardation	1939	11.6%	
3	F79	Unspecified mental retardation	3118	13.1%	F48	Other neurotic disorders	1478	8.8%	
4	F48	Other neurotic disorders	1122	4.7%	F80	Specific developmental disorders of speech and language	663	4.0%	
5	F84	Pervasive developmental disorders	680	2.9%	F82	Specific developmental disorder of motor function	368	2.2%	
6	F82	Specific developmental disorder of motor function	640	2.7%	F41	Other anxiety disorders	318	1.9%	
7	F95	Tic disorders	459	1.9%	F98	Other behavioural and emotional disorders with onset usually occurring in childhood and adolescence	260	1.6%	
8	F98	Other behavioural and emotional disorders with onset usually occurring in childhood and adolescence	397	1.7%	F51	Nonorganic sleep disorders	245	1.5%	
9	F51	Nonorganic sleep disorders	298	1.3%	F32	Depressive episode	224	1.3%	
10	F90	Hyperkinetic disorders	251	1.1%	F84	Pervasive developmental disorders	186	1.1%	
11	F81	Specific developmental disorders of scholastic skills	185	0.8%	F45	Somatoform disorders	165	1.0%	

Table 4 (continued)

Boys			Girls					
Rank	ICD-10	Diagnosis	Number of visits	Percent age	ICD-10	Diagnosis	Number of visits	Percentage
12	F45	Somatoform disorders	165	0.7%	F20	Schizophrenia	120	0.7%
13	F41	Other anxiety disorders	115	0.5%	F95	Tic disorders	99	0.6%
14	F20	Schizophrenia	90	0.4%	F90	Hyperkinetic disorders	90	0.5%
15	F32	Depressive episode	75	0.3%	F81	Specific developmental disorders of scholastic skills	11	0.1%
Total			23,774	97.9%			16,738	94.3%

Table 5 Number of gender-specific diagnoses of adult patients with mental disorders in community health service centers from 2014 to 2022

Male			Female					
Rank	ICD-10 code	Diagnosis	Number of visits	Percentage	ICD-10 code	Diagnosis	Number of visits	Percentage
1	F48	Other neurotic disorders	582,305	34.8%	F48	Other neurotic disorders	1,032,789	36.3%
2	F51	Nonorganic sleep disorders	495,856	29.6%	F51	Nonorganic sleep disorders	690,373	24.3%
3	F41	Other anxiety disorders	234,575	14.0%	F41	Other anxiety disorders	465,031	16.3%
4	F32	Depressive episode	177,471	10.6%	F32	Depressive episode	405,638	14.3%
5	F20	Schizophrenia	79,733	4.8%	F20	Schizophrenia	89,589	3.1%
6	F03	Unspecified dementia	26,617	1.6%	F03	Unspecified dementia	41,017	1.4%
7	F01	Vascular dementia	18,850	1.1%	F01	Vascular dementia	27,627	1.0%
8	F06	Other mental disorders due to brain damage and dysfunction and to physical Disease	10,174	0.6%	F34	Persistent mood [affective] disorders	23,746	0.8%
	F34	Persistent mood [affective] disorders	10,141	0.6%	F06	Other mental disorders due to brain damage and dysfunction and to physical disease	13,901	0.5%
9	F19	Mental and behavioural disorders due to multiple drug use and use of other psychoactive substances	7849	0.5%	F19	Mental and behavioural disorders due to multiple drug use and use of other psychoactive substances	13,768	0.5%
10	F45	Mental and behavioural disorders due to multiple drug use and use of other psychoactive substances	6375	0.4%	F45	Mental and behavioural disorders due to multiple drug use and use of other psychoactive substances	13,354	0.5%
11	F79	Unspecified mental retardation	1502	0.1%	F99	Mental disorder, not otherwise specified	3465	0.1%
12	F99	Mental disorder, not otherwise specified	2707	0.2%	F07	Personality and behavioural disorder due to brain disease, damage and dysfunction	2379	0.1%
13	F07	Personality and behavioural disorder due to brain disease, damage and Dysfunction	2465	0.1%	F31	Bipolar affective disorder	1928	0.1%
14	F31	Bipolar affective disorder	1479	0.1%	F79	Unspecified mental retardation	1676	0.1%
15	F05	Delirium, not induced by alcohol and other psychoactive substances	817	0.0%	F05	Delirium, not induced by alcohol and other psychoactive substances	1395	0.0%
Total			1,672,819				2,846,105	

Table 6 Comparison of outpatient visits with mental disorders in community health service centers in different regions from 2014 to 2022

Urban					Suburban			
Rank	ICD-10	Diagnosis	Number of visits	Percentage	ICD-10	Diagnosis	Number of visits	Percentage
1	F48	Other neurotic disorders	639,777	43.0%	F48	Other neurotic disorders	977,917	31.8%
2	F51	Nonorganic sleep disorders	371,742	25.0%	F51	Nonorganic sleep disorders	814,732	26.5%
3	F41	Other anxiety disorders	177,263	11.9%	F41	Other anxiety disorders	522,776	17.0%
4	F32	Depressive episode	177,098	11.9%	F32	Depressive episode	406,310	13.2%
5	F03	Unspecified dementia	31,990	2.2%	F20	F03Unspecified dementia	141,577	4.6%
6	F20	F03Unspecified dementia	27,955	1.9%	F03	F03Unspecified dementia	35,644	1.2%
7	F01	Vascular dementia	27,073	1.8%	F01	Vascular dementia	24,038	0.8%
8	F89	Unspecified disorder of psychological development	10,455	0.7%	F45	Somatoform disorders	16,327	0.5%
9	F06	Other mental disorders due to brain damage and dysfunction and to physical disease	8982	0.6%	F06	Other mental disorders due to brain damage and dysfunction and to physical disease	15,093	0.5%
10	F45	Somatoform disorders	3732	0.3%	F89	Unspecified disorder of psychological development	11,680	0.4%
11	F79	Unspecified mental retardation	843	0.1%	F79	Unspecified mental retardation	7392	0.2%
12	F07	Personality and behavioural disorder due to brain disease, damage and dysfunction	1272	0.1%	F99	Mental disorder, not otherwise specified	4967	0.2%
13	F99	Mental disorder, not otherwise specified	1205	0.1%	F31	Bipolar affective disorder	3197	0.1%
14	F05	Delirium, not induced by alcohol and other psychoactive substances	719	0.0%	F07	Personality and behavioural disorder due to brain disease, damage and dysfunction	3013	0.1%
15	F00	Dementia in Alzheimer's disease	467	0.0%	F80	Specific developmental disorders of speech and language	2880	0.1%
Total			1,486,186					3,073,250

=1.65:1). In Huang's [4] epidemiological survey, the 12-month prevalence of any mental disorder (except dementia) in females and males was similar, female: male =0.93:1, which did not show a high prevalence of mental disorders in women. According to the 2020 Shanghai Census yearbook [16], the sex ratio of Shanghai's population was 1.07. However, the proportion of females gradually increased after the old age, the ratio was about 1.0 around the age of 60, then it was inverted with female: male =1.07:1 in the age group 60–79, and increased to female: male =1.47:1 in the age group over 80 years old. Although the female population exceeds in Shanghai after the age of 60, it does not reach such a high ratio of 1.65. Looking back at the gender of patients with all kinds of diseases in Shanghai Community health Service Center from 2014 to 2018, females accounted for 58.2%,

female: male =1.39:1 [17]. Which was similar to the results of this study on mental disorders.

Therefore, the high proportion of females with mental disorders might be relate to more female patients in the outpatient of community health service centers. In Australia, a survey of four general practitioner training sites in towns and villages in four states showed that female patients dominated by 60.7% [18], The 2015 national survey in the United States also showed that women accounted for 55% of all patients [19]. A survey in China showed that women go to outpatient clinics and hospitalization more often than men among the elderly, and women were more dependent on primary medical institutions [20].

Among the outpatients with mental disorders in community health service centers, people aged 60–79 accounted for 57.7%, followed by people over 80 years

old for 21.3%, and then the 40–59 for 16.5%. The groups above over 60 years old accounted for 79.0% of the total patients, accounting for the majority of all mental disorders. According to the 2020 Shanghai Census Yearbook [16], the population over 60 years old accounted for 23.4%. Despite the phenomenon of aging, less than a quarter of the population was over 60 years old. So does the prevalence of mental disorders increased with age? Huang's survey showed that the prevalence of mental disorders among 50–64 years old was the highest, which was 12.0%, followed by the 35–49 group, 10.8%, the third was between 18–34 years old, 6.4%; Those 65 and older were the lowest at 4.9% (except for dementia) [4]. Therefore, the difference between age groups in the prevalence of mental disorders in this study may still be consistent with the demographic characteristics of outpatients for all disorders [17]. People over 60 years old accounted for 23.4% of the total population, but for 81.5% of outpatients in the community health service centers. From this perspective, the proportion of people over 60 years old who go to the community for medical treatment was obviously higher in Shanghai. They seemed to be more in line with China's hierarchical diagnosis and treatment policy, and have a preference for community health service centers. In Australia, patients aged 25–64 were the most frequently referred to general practitioners, accounting for 52.8% of all patients, compared with 17% over 65 [18]. The average age of primary care patients was 44 years old in the United States, which was very different from the structure of our country [19].

The study showed that 67.4% of the outpatients with mental disorders were in the suburbs, which means that the patients in the suburbs was 2.07 times that in urban areas in community health service centers. According to the 2020 census yearbook [16], the suburban population was 2.72 times that of the urban population. The disparity in the prevalence of mental disorders between urban and suburban areas may be attributed to the difference in the total population of these regions. Alternatively, it could be related to the greater availability of medical choices for the urban population. [20].

Discussion of mental disorder ranking

The top 15 diagnosis accounted for 98.5% of all mental disorders, which basically reflected the actual situation. F48: "Other neurotic disorders" included four disorders: "Neurasthenia", "Depersonalization - derealization syndrome", "Other specified neurotic disorders", and "Neurotic disorder, unspecified". The diagnosis of Neurasthenia was popular in the early years in China. The epidemiological survey in 1982 showed that the prevalence of neurasthenia was 1.3% in China. Later, most scholars believed that the diagnosis of neurasthenia had

been expanded. In 1984, Quan Yang re-diagnosed 50 cases of Neurasthenia with DSM-III, and 80% changed to depression or other neuroses [21]. The United States has eliminated the concept of Neurasthenia since the DSM-III was published. In China, the diagnosis of Neurasthenia was retained in "The Classification and Diagnostic Criteria of Mental Disorders (Third Edition) (CCMD-3)" but the status was reduced. In the long run, domestic scholars also tend to abandon the diagnosis of neurasthenia [22]. Therefore, the first ranking of F48: "Other neurotic disorders" in addition to the influence of the historical reasons, it is more likely to reflect that the doctors did not know the specific types of patients. This was not the only case which the diagnosis was not clear, such as F03: "Unspecified dementia", indicating that the GPs can only distinguish the patient as dementia, but don't know the types. There are also F89: "Unspecified disorder of psychological development", F79: "Unspecified mental retardation", F99: "Mental disorder, not otherwise specified". These kinds of ambiguous diagnosis accounted for more than 38% of patients. Which reflected that the general practitioners might have limited understanding and insufficient knowledge of mental disorders. Or the patients were unable or unwilling to provide specific diagnosis for various reasons, such as stigma or lack of understanding of the disease.

Neurosis, insomnia, depression, schizophrenia, dementia constitute the top 5 mental disorders in community health service centers according to the diagnosis of mental disorder. The recent large-scale epidemiological survey of mental disorders in China revealed that the lifetime prevalence rates for anxiety disorders and depression were 7.6% and 6.8%, respectively. The prevalence rate for schizophrenia was 0.6%, while for dementia (over 65 years of age), it was 5.6% [4]. These findings were consistent with the results of the present study, indicating that these categories of mental disorders are relatively common in China. There was a lack of normative epidemiological data on insomnia, but many patients went to the community health service centers for insomnia problems and asked for prescriptions for sleeping pills which was consistent with the impression that Chinese general practitioners have always had. Anxiety and insomnia were the most common mental problems in primary care Settings in Singapore [23]. In an Australian survey, depression and anxiety were the most common mental disorders encountered by general practitioners, ranking in the top 20 of all conditions [18]. This was similar to China.

The diagnosis of F34: "Persistent mood [affective] disorders" was more frequently given from 2014 to 2017, with a maximum of 9201 cases, which has decreased

significantly year by year from 2018 to only 228 cases in 2022. The decline might be related to general practitioners' increased knowledge of mood disorders such as depression and bipolar disorder, possibly giving a more accurate diagnosis over time.

A total of 3407 cases met the diagnostic classification of F31: "Bipolar affective disorder", accounting only for 0.1% of all patients with mental disorders. The global average prevalence of bipolar disorder is approximately 0.5%. In high-income regions such as Australia, Western Europe, and the United States, the prevalence is higher, ranging from 0.9% to 1.1%. In East Asia, where China is located, the prevalence is about 0.2% [24]. In the 2015 mental disorders survey in China [4], the lifetime prevalence of bipolar disorder was 0.6%. The low prevalence of bipolar disorder in community health service centers in China could be attributed to several factors: firstly, Bipolar disorder is susceptible to misdiagnosis and underdiagnosis. An earlier survey in China indicated that the diagnosis rate of bipolar disorder was only 11.8% [25], even in psychiatric settings, the rate of bipolar disorder being misdiagnosed as depression is 20.8% [26]. Secondly, the "non-reporting" behavior. A survey found that only 13.4% voluntarily provided their medical history when bipolar disorder patients and their relatives attended internal medicine clinics. Moreover, when physicians inquired about the medical history, just 18.3% were capable of narrating the symptoms about bipolar disorders [27]. Thirdly, there is a deficiency in the diagnostic capabilities of general practitioners when it comes to mental disorders. A qualitative research study has indicated that Chinese general practitioners find it difficult to accurately diagnose and systematically evaluate mental health conditions without additional support [4]. In the children and adolescents aged 0–18 group, the first and second mental disorders were "Unspecified disorder of psychological development" and "Unspecified mental retardation" respectively, accounting for 67.0% of all children and adolescents outpatients. This vague diagnosis might indicate the lack of understanding of GPs in childhood and adolescent mental disorders, which makes it difficult to give a clear diagnosis. The epidemiological survey showed that the prevalence of mental disorders in school-age children who were 6–16 years old was 17.5% in China from 2014–2015 [28]. However, due to the school-wide survey, the patients with psychological development disorders and mental retardation were not fully included. The problem of mental disorders in children and adolescents deserves more attention.

Discussion on the ranking of mental disorders by gender

In the children and adolescents aged 0–18 group, the disorders more common in boys were F80: Specific

developmental disorders of speech and language, F84: Pervasive developmental disorders, F95: Tic disorder, F90: Hyperkinetic disorders; F81: "Specific developmental disorders of scholastic skills". This was consistent with the epidemiological findings. The prevalence of Pervasive developmental disorder has a significant gender difference, more boy-patients than girls [29, 30]. Tic disorder affects about four times as many boys as girls [31, 32]. Hyperkinetic disorders also appeared to be more common in boys than girls [33, 34]. The study on "Specific developmental disorders of scholastic skills" was rare in China, but male gender was a prominent risk factors for language delay [35].

Girls were more likely to be diagnosed with F48: "Other neurotic disorders", F41: "Other anxiety disorders", F32: "Depressive episode", and F20: "Schizophrenia". There was no significant difference in the prevalence of anxiety disorders between men and women in general [4]. However, the prevalence of generalized anxiety disorder in girls was higher than that in boys aged 6–18 in Iran [36]. In a cohort study of children and adolescents aged 0–17 years in Germany, it also found that the incidence of anxiety problems was higher in girls, especially in the 13–17 age group [37]. The survey on depression in children and adolescents aged 9–18 showed that there was no significant difference between males and females in China [38]. However, a meta-analysis suggested that the prevalence might be slightly higher in males [39]. So far, the gender difference in the detection rate of depressive symptoms in adolescence has not been uniform, but many studies supported the phenomenon of "female dominance" of depressive symptoms in adolescence consistently, and believed that sex hormones were the main cause [40]. Current data on the prevalence of schizophrenia in children and adolescents were insufficient, and rare sex-related studies had been found.

There was no significant gender difference in most mental disorders. However, F32: "Depressive episode", F34: "Persistent mood [affective] disorders", and F45: "Somatoform disorders" were three conditions that affect more women than men. This was consistent with the previous researches in China [4, 41].

The diagnostic distribution of mental disorders was similar between urban and suburban areas. Outpatients with mental disorders in suburban areas was more prevalent than that in urban areas, with about 2.07 times higher. This might be related to the relative lack of medical resources in suburban areas, while patients in urban areas had more choices of medical institutions. Schizophrenia and Somatoform disorders were diagnosed more often in suburban areas than in urban areas. The prevalence difference between urban and rural areas was analyzed more in the existing surveys rather than between

urban and suburban areas. Some studies showed that the prevalence of schizophrenia is higher in rural areas than that in urban areas [42], yet some found no statistical significance between urban and rural areas [43, 44]. However, it was generally believed that the prevalence of schizophrenia was negatively correlated with family economic level.

Strengths and limitations

It was the first time for scholars to analyze the characteristics of mental disorders in community health service centers by using longitudinal big data in the last almost 10 years in China. On the one hand, the trend change of demands for mental disorders in community health service centers was observed dynamically. And on the other hand, the ability of Chinese GPs in diagnosing mental disorders was reflected, which provided the evidence for improving of diagnosis and treatment policy on mental disorders in community health service centers and setting of general practitioners' training program.

Only community health service centers in Shanghai were investigated in this study. As the most developed area in economy and medicine in China, it cannot represent the situation all over the country entirely. In addition, the specific conditions of some diagnoses cannot be known, wrong or missing diagnosis cannot be ruled out due to the shortage of mental health expertise previously. In the future, researches could be conducted in western China or other representative cities or regions, to explore the needs and characteristics of mental health services in Chinese community medical institutions.

Conclusions

In China, an increasing number of patients with mental disorders are seeking medical attention at community health service centers, while the knowledge and skills of general practitioners on mental disorders are still insufficient. Neuroses, insomnia, depression and psychological development in children need to be paid more attention to by Chinese general practitioners.

Authors' contributions

Jie Qian: As the first author, she was responsible for the writing of the original draft, undertook the main work on the data analysis and explaining the results, she provided part of the fund. Hanzhi Zhang: She was responsible for the information retrieval, analyzing partial data and the visualization as the co-author. Aizhen Guo: She did part of the investigation. Qiangqiang Fu: He offered some help with the data analysis. Jianwei Shi: He was responsible for the supervision and validation. Hua Jin: She concretizes the entire research, conducting surveys, data collection, and revision and review of articles as the co-corresponding author. She also provided part of the fund. Dehua Yu: Professor Yu administered the whole project, completed the study design and provided the main Funding.

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Data availability

All data generated or analyzed during this study are included in this paper. The data was not public, if needed we have to get the permission of the outpatient system platform of Shanghai Community Health Service Center.

Declarations

Ethics approval and consent to participate

This study was approved by the Ethics Committee of Yangpu Hospital, School of Medicine, Tongji university (Approval NO. LL- 2021-ZRKX-018). Informed consent waiver was also approved by the Ethics Committee of Yangpu Hospital, School of Medicine, Tongji university (Approval NO. LL- 2021-ZRKX-018), as this study has the lowest risk of harm to participants, and the data were collected Anonymously. Descriptive analysis was authorized. None of the patients' personal information included in the database was available to individuals outside the research team.

Competing interests

The authors declare no competing interests.

Author details

¹Department of Clinical Psychology, Yangpu Hospital, School of Medicine, Tongji University, Shanghai 200090, China. ²Shanghai Mental Health Center, Shanghai Jiao Tong University School of Medicine, Shanghai 200030, China. ³Department of General Practice, Research Center for General Practice, Yangpu Hospital, School of Medicine, Tongji University, Shanghai 200090, China. ⁴Shanghai General Practice and Community Health Development Research Center, Shanghai 200090, China. ⁵School of Public Health, Shanghai Jiao Tong University School of Medicine, Shanghai 200025, China.

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