Schizophrenia-Related Disability in China: Prevalence, Gender, and Geographic Location

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Objective: This study estimated the prevalence of schizophrenia-related disability in the Chinese population and explored factors that may contribute to differences in prevalence rates between women and men and across geographic regions.

Methods: Data for 1,909,205 noninstitutionalized adults (age 18 and older) from a representative national sample were obtained from the Second China National Sample Survey on Disabilities in 2006 (participation rate of 99.8%). The sample was first screened for disability (activities of daily living and social participation adversely affected by the disorder) via in-person household interviews. Trained clinical psychiatrists then administered the *ICD-10* Symptom Checklist for Mental Disorders and the World Health Organization Disability Assessment Schedule Version II to all individuals who screened positive for a psychiatric disability.

Results: The prevalence of schizophrenia disability was .41% in China. It was higher in rural areas (.45%) than in urban areas (.32%). In rural areas, the prevalence was higher among women than among men (.51% versus .38%), but in urban areas, the rates were similar for women and men (.30% versus .35%). The results of logistic regression analysis showed that after adjustment for variables related to socioeconomic status, the likelihood of having schizophrenia disability was slightly lower among rural residents than among urban residents (odds ratio [OR] =.92, 95% confidence interval [CI]=.86–.98), although the disparity between rural women and rural men remained (OR=1.9, CI=1.78–2.02).

Conclusions: Socially disadvantaged rural women were disproportionately affected by schizophrenia-related disability. Limited access to health services may have contributed to the increased disease burden among rural women.

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In China, neuropsychiatric conditions are the most frequent cause of ill health and disability (1,2). Schizophrenia is one of the most severe mental disorders, leading to impairments in social functioning (3). About 80% of Chinese patients with schizophrenia have functional disabilities (4), and more than 50% of individuals with a psychiatric disability are schizophrenia patients (5).

In this study, a person "living with schizophrenia disability" was defined as a person with schizophrenia whose activities of daily living and social participation were adversely affected by the disorder. Despite the substantial burden of schizophrenia disability in China, few previous national studies have investigated it, and very different prevalence estimates have been reported. In 1987, the First China National Sample Survey on the Handicapped reported that around .26% of Chinese adults had schizophrenia disability; the prevalence was slightly higher in urban than in rural areas and slightly higher among women than among men (6). Another previous study (from 1993), which was conducted in seven areas in China, reported that .42% of Chinese adults age 15 and older had a psychiatric disability as a result of schizophrenia. More rural residents than urban residents and more women than men had schizophrenia-related disability (4). The difference in the prevalence estimates between these two surveys may be attributable to differences in sample size, geographic locations of those surveyed, and diagnostic tools.

The observation that more women than men were disabled as a result of schizophrenia is contradicted by established evidence, which generally shows that men are more likely to be affected by schizophrenia than women (7) and women tend to have a more favorable prognosis (8,9). A person's disability is considered to be a dynamic interaction between the health condition and the person's environment (10). The development of disability among individuals with schizophrenia is attributable not only to the biological nature of the disease but also to factors related to the social environment, such as access to health care, quality of health services, and availability of social support. It has been proposed that social inequality may also contribute to the increased burden of schizophrenia disability among Chinese women (11).

About 20 years have passed since the previous surveys. During the past two decades, China has experienced phenomenal economic growth as well as rapid social change. We

therefore wondered whether the burden of schizophrenia disability had changed as well. In this study, we updated data on the prevalence of schizophrenia disability by gender and geographic location and explored factors contributing to the prevalence differences between men and women and between urban and rural communities.

METHODS

Second China National Sample Survey on Disabilities

We utilized data collected in the Second China National Sample Survey on Disabilities (2006) (5,12,13). The survey, which was approved by the State Council of the People's Republic of China, aimed to investigate the prevalence, causes, and severity of disabilities, as well as the living conditions and health service needs of persons with disabilities. Multiple-stage stratified clustered probability sampling was employed to select a representative sample of noninstitutionalized Chinese people across mainland China. Details of the survey have been presented elsewhere (12,13). In total, 734 counties and 5,964 communities (approximately 420 people from each community) were selected for the survey. [A map showing survey sites is included in an online supplement to this article.]

Regions of China

Mainland China, which includes 22 provinces, five autonomous regions, and four municipalities under the direct administration of the central government, is divided into eight large economic regions. [A map showing these regions is included in the online supplement.] The Northeast Region consists of the three provinces of Liaoning, Jilin, and Heilongjiang (population, 107 million; gross domestic product [GDP] per capita for 2005, US$2,785). The Northeast is the traditional heavy industrial base of China; however, in recent years, it has seen economic stagnation. The North Coast Region consists of the municipalities of Beijing and Tianjin and the provinces of Hebei and Shandong (population, 184 million; GDP per capita for 2005, US$3,775). Beijing is the capital city and is recognized as the political, educational, and cultural center of China. The North Coast Region around Beijing has the advantage of access to national and international transportation networks. In addition, there are many top universities and research institutions in this region that have fostered scientific and technological innovations. The East Coast Region consists of the municipality of Shanghai and the provinces of Jiangsu and Zhejiang (population, 133 million; GDP per capita for 2005, US$5,412). The modernization of the East Coast started earlier than in the other regions. It is a center of commerce between east and west. The South Coast Region consists of the provinces of Fujian, Guangdong, and Hainan (population, 123 million; per capita GDP for 2005, US$4,281). The South Coast has a high level of openness to the world. It has the advantage of access to the ocean and links to overseas Chinese. The Yellow River Region consists of the provinces of Shaanxi, Shanxi, and Henan and the autonomous region of Inner Mongolia (population, 196 million; GDP per capita for 2005, US$2,041). This region is rich in natural resources such as coal and natural gas. The Yangtze River Region consists of the provinces of Hubei, Hunan, Jiangxi, and Anhui (population, 239 million; GDP per capita for 2005, US$1,640). This region is densely populated and has excellent conditions for agriculture production. The Southwest Region consists of the municipality of Chongqing; the provinces of Yunnan, Guizhou, and Sichuan; and the Guangxi autonomous region (population, 251 million; GDP per capita for 2005, US$1,396). The region has barren land, and a substantial number of people live in poverty. The Northwest Region consists of four autonomous regions (Qinghai, Ningxia, Tibet, and Xinjiang) and the province of Gansu (population, 60 million; GDP per capita for 2005, US$1,755). This region has harsh natural conditions. Its vast land area is sparsely populated. A majority of the residents are from ethnic minority groups.

In April and May 2006, the survey was conducted simultaneously at all sites. Through the use of standardized questionnaires, trained staff accompanied by assistants who were familiar with the communities being surveyed visited every household to collect data on demographic characteristics and to administer the screening questionnaire for disabilities (14,15). In total, data were collected for 771,797 households and 2,526,145 individuals, with a participation rate of 99.8%. All participants agreed to complete in-person interviews in their household and, if required, to be subsequently examined by clinicians. A postsurvey quality check in 99 communities showed that data for only .13% of people in the households and .11% of those with disabilities had not been recorded (5).

We restricted our analysis to 1,909,205 participants who were age 18 years and older. Among these, 7,628 were considered to be living with schizophrenia disability.

Schizophrenia Disability

All diagnoses of schizophrenia disability, as well as other disabilities related to a mental disorder, were assessed by using a three-step approach. First, a disability screening questionnaire, administered by trained staff during the interview, was used to identify individuals who were likely to have a psychiatric disability (with social functioning limitations). (Details have been described elsewhere [13]). The questionnaire was shown in three pilot studies to have very good validity (16). Participants were asked to report on themselves and other household members. If a positive response was given to any of the screening questions, the identified person was designated as "likely to be psychiatrically disabled."

Next, experienced psychiatrists assessed the participants who screened positive for psychiatric disability in a quiet, private room (17). If needed, family members or caregivers were permitted in the interview room and answered questions. The ICD-10 Symptom Checklist for Mental Disorders was administered to diagnose schizophrenia (*ICD-10* code F20), mood disorders (*ICD-10* codes F30.1–2, F32.0–3, F33, F34.1, and F31), and other mental disorders. The *ICD-10*

TABLE 1. Characteristics of Chinese adults age 18 years and older and adults with schizophrenia-related disability, by gender and geographic location[a]

Group and characteristic[c]	Urban[b] N	Urban[b] Weighted %[d]	Rural[b] N	Rural[b] Weighted %[d]	Men N	Men Weighted %[d]	Women N	Women Weighted %[d]
All participants								
Age (years)								
18–24	70,378	12.0	150,121	11.5	110,489	11.6	110,010	11.8
25–44	305,149	50.3	524,333	45.2	413,042	46.6	416,440	47.0
45–64	212,355	27.5	396,117	31.2	307,307	30.7	301,165	29.3
≥65	88,167	10.2	162,585	12.1	119,120	11.0	131,632	11.9
Marital status								
Single	83,081	13.7	144,312	11.4	144,339	15.5	83,054	8.9
Married	538,622	79.5	984,491	80.7	752,662	79.3	770,451	81.4
Divorced	13,371	1.8	10,381	.8	14,293	1.4	9,459	.8
Widowed	40,975	5.0	93,972	7.1	38,664	3.8	96,283	9.0
Annual household income in 2005 (US$)								
0–199	4,229	.6	36,556	2.8	20,677	2.2	20,108	2.0
200–999	80,421	12.3	423,606	33.6	253,685	27.2	250,342	26.5
1,000–1,999	166,012	25.8	424,688	34.9	293,051	31.8	297,649	32.1
2,000–4,999	290,469	43.5	307,194	25.3	295,652	30.9	302,011	31.4
≥5,000	134,918	17.7	41,112	3.4	86,893	7.9	89,137	8.0
Education								
Illiterate	45,777	6.1	247,119	18.8	74,283	7.5	218,613	21.9
Primary school or less	112,128	16.6	440,995	35.5	275,314	29.0	277,809	29.8
Junior high school	225,685	34.9	432,676	36.6	371,083	40.7	287,278	31.4
Senior high school or more	292,454	42.4	112,351	9.2	229,271	22.8	175,534	16.9
Participants with schizophrenia disability								
Age (years)								
18–24	84	4.6	298	5.5	212	6.3	170	4.4
25–44	963	49.4	2,407	48.8	1705	54.6	1,665	44.3
45–64	880	36.2	1,958	35.8	1,136	31.7	1,702	39.5
≥65	269	9.8	569	9.8	281	7.4	557	11.8
Marital status								
Single	701	33.7	1,352	26.3	1,672	51.5	381	8.8
Married	1,029	46.5	3,069	59.1	1,118	32.9	2,980	74.9
Divorced	253	11.7	335	6.2	391	11.6	197	4.4
Widowed	213	8.2	476	8.4	153	4.0	536	11.9
Annual household income in 2005 (US$)								
0–199	91	4.7	585	11.1	424	13.3	252	6.3
200–999	600	30.1	2,655	50.7	1,420	43.7	1,835	46.9
1,000–1,999	648	29.3	1,322	25.5	792	23.8	1,178	28.7
2,000–4,999	684	29.6	597	11.3	584	16.1	697	15.8
≥5,000	173	6.3	73	1.4	114	3.0	132	2.4
Education								
Illiterate	300	14.0	1,785	33.3	558	16.7	1,527	38.1
Primary school or less	476	22.9	1,862	35.8	1060	32.9	1,278	32.1
Junior high school	774	34.9	1,234	24.2	1,110	33.3	898	21.6
Senior high school or more	646	28.1	350	6.7	605	17.0	391	8.2

[a] Data source: Second China National Sample Survey on Disabilities (2006)
[b] There are two types of self-governing organizations at the neighborhood level in mainland China: the villagers' committee in villages and the residents' committee in cities. All territories under the jurisdiction of a residents' committee were defined as urban areas, and all territories under the jurisdiction of a villagers' committee were defined as rural areas.
[c] Missing data counts: 2 in location of residence, 20 in education
[d] Adjusted for design weights and poststratification weights

diagnostic criteria have been widely used for the diagnosis of schizophrenia in Chinese populations and have shown very good reliability (18) and validity (19,20).

Finally, the World Health Organization Disability Assessment Schedule Version II (WHODAS II) (21) was administered to evaluate limitations in social functioning. The WHODAS II has been validated among patients with schizophrenia (22). Individuals who scored ≥52 were identified as having a psychiatric disability (23).

Analytic Strategy

The data were weighted to estimate the prevalence of schizophrenia disability and mood disorder–related disability in the noninstitutionalized Chinese population. Design weights were

TABLE 2. Prevalence of schizophrenia-related and mood disorder–related disability in China, by geographic region, rural or urban residence, and gender[a]

Region and group[b]	Survey participants	Weighted N	Schizophrenia disability		Mood disorder–related disability	
			Prevalence (%)[c]	95% CI	Prevalence (%)[c]	95% CI
People's Republic of China						
Urban	676,049	315,756,726	.32	.31–.34	.04	.03–.05
Rural	1,233,156	670,082,289	.45	.43–.46	.05	.05–.06
Urban men	329,300	153,681,086	.35	.32–.37	.03	.02–.04
Urban women	346,749	162,075,641	.30	.28–.32	.05	.04–.06
Rural men	620,658	334,903,892	.38	.37–.40	.04	.03–.04
Rural women	612,498	335,178,397	.51	.49–.53	.07	.06–.07
Northeast						
Urban	86,855	39,735,700	.29	.25–.33	.02	.01–.03
Rural	99,898	48,831,527	.38	.34–.42	.04	.03–.06
Urban men	42,371	19,415,460	.26	.21–.32	.01	.00–.02
Urban women	44,484	20,320,239	.32	.27–.37	.03	.01–.05
Rural men	51,120	24,838,748	.27	.22–.32	.03	.02–.05
Rural women	48,778	23,992,780	.49	.43–.56	.06	.03–.08
North Coast						
Urban	125,781	43,789,989	.27	.24–.31	.04	.03–.05
Rural	179,186	106,491,889	.39	.36–.43	.07	.05–.08
Urban men	61,123	21,339,988	.27	.22–.32	.03	.01–.04
Urban women	64,658	22,450,001	.28	.22–.34	.05	.03–.07
Rural men	89,490	52,935,273	.3	.25–.35	.04	.02–.05
Rural women	89,696	53,556,616	.49	.44–.53	.09	.07–.11
East Coast						
Urban	102,713	44,446,169	.35	.31–.38	.06	.05–.08
Rural	122,979	71,210,427	.42	.38–.45	.09	.07–.11
Urban men	50,019	21,563,105	.37	.31–.43	.05	.02–.07
Urban women	52,694	22,883,064	.33	.28–.38	.08	.05–.11
Rural men	60,074	34,575,859	.39	.34–.44	.06	.04–.08
Rural women	62,905	36,634,568	.44	.39–.49	.11	.09–.14
South Coast						
Urban	62,917	38,083,579	.39	.32–.47	.05	.03–.07
Rural	107,207	61,717,497	.58	.53–.64	.06	.04–.08
Urban men	30,630	18,530,879	.51	.39–.62	.05	.03–.08
Urban women	32,287	19,552,700	.29	.23–.35	.05	.02–.08
Rural men	53,988	30,840,392	.59	.52–.66	.05	.03–.07
Rural women	53,219	30,877,105	.58	.50–.66	.07	.04–.09
Yellow River						
Urban	78,412	39,642,494	.29	.25–.32	.05	.02–.07
Rural	177,586	103,068,518	.39	.36–.42	.06	.05–.07
Urban men	38,474	19,370,945	.30	.25–.35	.03	.01–.06
Urban women	39,938	20,271,549	.28	.22–.33	.07	.03–.10
Rural men	89,847	51,688,150	.31	.28–.35	.03	.02–.05
Rural women	87,739	51,380,368	.47	.42–.52	.08	.06–.10
Yangtze River						
Urban	79,101	46,208,042	.36	.31–.41	.02	.01–.03
Rural	21,096	122,742,011	.41	.38–.44	.03	.02–.04
Urban men	38,605	22,519,870	.39	.32–.46	.02	.01–.03
Urban women	40,496	23,688,171	.33	.27–.39	.03	.01–.04
Rural men	105,787	61,275,390	.35	.31–.39	.03	.02–.04
Rural women	105,129	61,466,621	.48	.43–.52	.03	.02–.04
Southwest						
Urban	94,114	51,436,201	.33	.29–.38	.03	.02–.04
Rural	231,684	124,968,188	.57	.53–.60	.03	.03–.04
Urban men	45,763	24,936,789	.37	.31–.44	.02	.01–.04
Urban women	48,351	26,499,412	.30	.24–.36	.03	.02–.05
Rural men	117,900	63,144,703	.52	.47–.57	.03	.02–.04
Rural women	113,784	61,823,485	.61	.56–.67	.04	.03–.06

continued

TABLE 2, *continued*

Region and group[b]	Survey participants	Weighted N	Schizophrenia disability		Mood disorder–related disability	
			Prevalence (%)[c]	95% CI	Prevalence (%)[c]	95% CI
Northwest						
Urban	46,156	12,414,552	.23	.17–.29	.07	.04–.10
Rural	103,700	31,052,232	.34	.29–.39	.03	.02–.04
Urban men	22,315	6,004,049	.22	.15–.30	.03	.01–.06
Urban women	23,841	6,410,504	.24	.16–.32	.11	.06–.17
Rural men	52,452	15,605,378	.28	.23–.33	.02	.01–.04
Rural women	51,248	15,446,854	.40	.33–.47	.05	.03–.06

[a] Data source: Second China National Sample Survey on Disabilities (2006)
[b] There are two types of self-governing organizations at the neighborhood level in mainland China: the villagers' committee in villages and the residents' committee in cities. All territories under the jurisdiction of a residents' committee were defined as urban areas, and all territories under the jurisdiction of a villagers' committee were defined as rural areas.
[c] Adjusted for design weights and poststratification weights

used to adjust for unequal sampling fractions in the 31 provincial-level administrative divisions. For each region, the design weight equaled the total population in the region divided by the survey sample size. We also obtained poststratification weights to account for location of residence (city, town, or village) and age (in five-year age ranges) by sex distribution. Both the design weights and the poststratification weights were accounted for in the analyses. Prevalence estimates and respective standard errors were estimated with Taylor series linearizations that further adjusted for heterogeneities across villages and for possible homogeneity within each study site.

To quantify differences in prevalence according to gender and according to urban versus rural residence, prevalence ratios (PRs) were calculated. Because the prevalence rates of schizophrenia disability and mood disorder–related disability were very low, PRs could be approximated by odds ratios (ORs) calculated in logistic regression analyses.

Logistic regression models were used to estimate the relationship between schizophrenia disability and population characteristics. Three models were created to analyze the study group (the complete study sample, those living in urban areas, and those living in rural areas). In model 1, age, gender, residence location, and socioeconomic status variables were included as covariates. In models 2 and 3, the same set of covariates was included except for residence location.

All statistical analyses were performed with SAS, version 9.2,

RESULTS

Table 1 presents data for all survey participants at least 18 years old and for individuals with schizophrenia disability. For the overall sample, the average age was 44.3±16.1 years, 50.2% were women, 68.0% lived in a rural area, and 79.8% were married. Compared with persons living in urban areas, those in rural areas were less educated and reported lower household income. Among those with schizophrenia disability, women were older than men and more likely to be married, and women reported lower levels of education. Rural women with schizophrenia disability were more likely to be illiterate (43.6%) and to be married (79.3%) than their urban counterparts (19.9% and 59.9%, respectively). People with schizophrenia disability were on average 46.0±14.3 years old. The mean ages of onset of schizophrenia disability for urban men, urban women, rural men, and rural women were 28.38 years, 32.49 years, 28.84 years, and 31.37 years, respectively.

Table 2 presents the point prevalence estimates of schizophrenia-related and mood disorder–related psychiatric disability by region, residence location (urban versus rural), and gender. Table 3 presents PRs comparing differences by region, residence location (urban versus rural), and gender. [A map included in the online supplement provides a visual reference for the geographic regions.] Overall, .41% of noninstitutionalized adults were living with schizophrenia disability; in general, the prevalence was higher in rural areas than in urban areas (PR=1.38) (Table 3). We observed very different gender prevalence patterns in urban and rural communities. In urban areas, the prevalence of schizophrenia disability was lower among women than among men (PR=.87); in contrast, in rural areas, the prevalence was higher among women than among men (PR=1.32).

In addition, the prevalence of schizophrenia disability varied across geographic regions. Regional analysis found that the prevalence of schizophrenia disability was significantly higher in rural areas than in urban areas in all geographic regions except for the Yangtze River region (the 95% confidence interval nearly reached significance). In the urban areas of most regions, the gender difference in prevalence was not significant. In contrast, in the rural areas of most regions, the prevalence was significantly higher among women than among men.

On the basis of survey data, .05% of noninstitutionalized adults had mood disorder–related disability. Overall, it was more prevalent in rural than in urban areas (PR=1.27). In urban areas, the prevalence was higher among women than among men (PR=1.69), which was also the case in rural areas (PR=1.88).

Figure 1 shows the prevalence distribution of schizophrenia disability across age groups. We found that the prevalence was higher among rural women than among urban

TABLE 3. Prevalence ratios (PRs) comparing schizophrenia-related and mood disorder–related disability in China, by region, rural or urban residence, and gender[a]

	Schizophrenia disability			Mood disorder–related disability		
Region and comparison	PR	95% CI	p	PR	95% CI	p
People's Republic of China						
Rural (reference: urban)	1.38	1.30–1.47	<.001	1.27	1.07–1.50	.007
Women (reference: men)	1.18	1.12–1.24	<.001	1.82	1.57–2.12	<.001
Urban women (reference: urban men)	.87	.79–.96	.004	1.69	1.28–2.21	<.001
Rural women (reference: rural men)	1.32	1.24–1.40	<.001	1.88	1.58–2.25	<.001
Northeast						
Rural (reference: urban)	1.30	1.10–1.54	.002	2.12	1.14–3.92	.017
Urban women (reference: urban men)	1.20	.93–1.55	.158	2.38	.78–7.27	.130
Rural women (reference: rural men)	1.83	1.47–2.27	<.001	1.75	.88–3.48	.112
North Coast						
Rural (reference: urban)	1.44	1.22–1.70	<.001	1.72	1.16–2.54	.007
Urban women (reference: urban men)	1.03	.77–1.38	.829	1.72	.95–3.12	.074
Rural women (reference: rural men)	1.62	1.38–1.91	<.001	2.36	1.53–3.64	<.001
East Coast						
Rural (reference: urban)	1.20	1.04–1.39	.013	1.39	1.00–1.92	.047
Urban women (reference: urban men)	.90	.72–1.12	.329	1.81	.97–3.37	.063
Rural women (reference: rural men)	1.13	.94–1.34	.190	1.87	1.25–2.77	.003
South Coast						
Rural (reference: urban)	1.48	1.21–1.82	<.001	1.13	.67–1.91	.651
Urban women (reference: urban men)	.57	.43–.75	<.001	1.01	.50–2.05	.974
Rural women (reference: rural men)	.99	.82–1.18	.895	1.36	.79–2.33	.263
Yellow River						
Rural (reference: urban)	1.38	1.18–1.61	<.001	1.18	.69–2.03	.545
Urban women (reference: urban men)	.93	.71–1.22	.606	2.05	.97–4.33	.060
Rural women (reference: rural men)	1.52	1.30–1.77	<.001	2.45	1.54–3.91	<.001
Yangtze River						
Rural (reference: urban)	1.15	.99–1.34	.071	1.36	.79–2.35	.266
Urban women (reference: urban men)	.85	.67–1.08	.184	1.37	.56–3.35	.486
Rural women (reference: rural men)	1.37	1.19–1.57	<.001	1.29	.79–2.12	.314
Southwest						
Rural (reference: urban)	1.70	1.46–1.97	<.001	1.22	.74–1.99	.440
Urban women (reference: urban men)	.81	.63–1.03	.081	1.45	.62–3.38	.393
Rural women (reference: rural men)	1.18	1.04–1.35	.010	1.69	1.09–2.62	.020
Northwest						
Rural (reference: urban)	1.49	1.12–1.97	.006	.45	.27–.75	.002
Urban women (reference: urban men)	1.08	.67–1.73	.762	3.65	1.44–9.24	.006
Rural women (reference: rural men)	1.43	1.12–1.83	.004	2.10	.86–5.14	.106

[a] Data source: Second China National Sample Survey on Disabilities (2006). The analysis adjusted for design weights and poststratification weights.

residents (both men and women) across all age groups. Compared with the prevalence among rural men, the prevalence among rural women was slightly lower among those younger than 35 years, but it was higher in the older age groups. In the groups age 50 to 64 years, we observed a strikingly higher prevalence of schizophrenia disability among rural women than among rural men, urban women, and urban men.

Table 4 presents results of three logistic regression models for the entire sample, urban residents, and rural residents. Analysis of the entire sample showed that, after adjustment for socioeconomic status variables, the likelihood of having schizophrenia disability was slightly lower among rural residents than among urban residents (OR=.92). The stratified analyses among the urban and rural residents suggested that women were more likely than men to have schizophrenia disability, although the gender disparity in rural areas (OR=1.90) was greater than that in urban areas (OR=1.11). In addition, it is noteworthy that the effect of socioeconomic status (including education level, marital status, and income) was statistically significant in all three models.

DISCUSSION

In general, we found that the prevalence of schizophrenia-related disability in China was higher in rural than in urban areas and higher among women than among men, mainly because of the strikingly higher prevalence among rural women age 50 to 64. Logistic regression analysis suggested that the observed urban-rural prevalence gap was attributable to socioeconomic disparities. In addition, we observed regional differences in the prevalence of disability among women compared with men and in urban versus rural areas. The geographic variations suggested that environmental factors had played a role in the development of disability among people with schizophrenia.

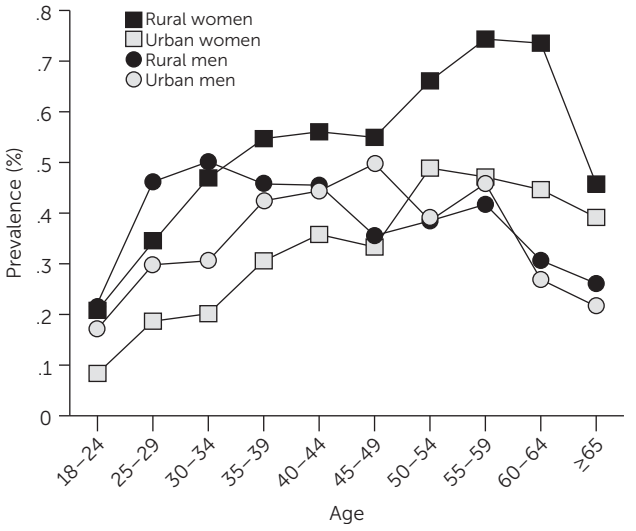
In contrast to previous findings of higher prevalence in urban than in rural areas in surveys conducted two decades ago (4,6), our analyses found that the urban-rural prevalence pattern had been reversed. A possible explanation is the underdevelopment of rural regions and limited use of health care services among rural residents. Since initiating reforms and the "opening up policy" in the 1980s, China has achieved extraordinary economic growth. Chinese household income has increased significantly. However, during this time, marked disparities between urban and rural residents have also emerged as a result of unbalanced development (24), and the income gap between urban and rural residents has continuously increased. The urban-rural income ratio reached 3.21 in 2004 and is among the highest in the world (25). Mental health services are concentrated in urban-based specialty psychiatric hospitals. Most rural households had no health insurance

coverage until the New Rural Cooperative Medical Scheme was implemented in 2003. Today, affordability remains a major barrier to obtaining treatment for rural patients with schizophrenia, because a substantial portion of the cost of care is not covered by health insurance (26).

The treatment rate for patients with schizophrenia is extremely low in poor rural areas of China. A previous study conducted in rural areas of Sichuan found that only 5.9% of patients with schizophrenia had maintained regular antipsychotic treatment for more than one year, and about one-third of patients had never received treatment (27). Lack of treatment is more common among women than among men in rural areas, because women tend to have less access to family finances and support systems (28). It has been reported that a smaller proportion of women than men were covered by health insurance; women were also less likely than men to occupy psychiatric hospital beds (28).

The results of this study showed that rural women were more likely than rural men to have schizophrenia-related disability. This association was independent of socioeconomic status. In fact, this unusual gender prevalence pattern is present not only in the prevalence of schizophrenia disability. In rural China, women have a higher suicide rate than men (29), at birth the proportion of boys is larger than the proportion of girls (30), and young girls have a higher mortality rate than young boys (31). Researchers have pointed out that gender bias, which is embodied in the unequal distribution of resources, such as social support and health care, between women and men in rural China, is the major contributor to this unusual phenomenon.

FIGURE 1. Prevalence of schizophrenia-related disability among men and women in urban and rural areas of China, by age group



A previous study suggested that illiteracy may increase the risk of schizophrenia disability because of social adversity (13). In China, rural women are disproportionately affected by illiteracy. The illiteracy rates among rural women, rural men, urban women, and urban men are 27.4%, 9.5%, 8.8%, and 2.2%, respectively. If the social adversity hypothesis is appropriate, it may explain the increased prevalence of schizophrenia disability among rural women. Although gender bias is a pervasive phenomenon in China, it does not affect all women to the same extent. Discrimination and

TABLE 4. Logistic regression models of the likelihood of schizophrenia-related disability in China, by region, rural or urban residence, and gender[a]

	Model 1: all regions		Model 2: urban area		Model 3: rural area	
Variable	OR	95% CI	OR	95% CI	OR	95% CI
Rural (reference: urban)	.92	.86–.98				
Women (reference: men)	1.65	1.57–1.74	1.11	1.01–1.22	1.90	1.78–2.02
Age (reference: 18–29)						
30–39	5.25	4.67–5.90	9.21	7.48–11.33	4.57	3.97–5.26
40–49	6.01	5.32–6.80	15.24	12.16–19.10	4.74	4.10–5.49
50–59	5.77	5.06–6.56	16.97	13.32–21.61	4.39	3.76–5.12
≥60	3.35	2.89–3.88	10.24	7.75–13.53	2.53	2.13–3.00
Marital status (reference: married)						
Single	10.50	9.68–11.39	22.45	19.40–25.98	8.80	7.98–9.70
Divorced	9.47	8.61–10.43	8.52	7.29–9.95	11.51	10.18–13.02
Widowed	1.32	1.19–1.46	1.71	1.41–2.08	1.24	1.10–1.39
Education (reference: illiterate)						
Primary school or less	.67	.62–.71	.81	.68–.96	.64	.59–.69
Junior high school	.53	.49–58	.69	.58–.83	.50	.45–.55
Senior high school or more	.47	.42–.53	.53	.43–.65	.56	.48–.65
Household income for 2005 (US$) (reference: ≤999)						
1,000–1,999	.55	.51–.58	.63	.56–.72	.52	.48–.56
2,000–4,999	.36	.34–.39	.43	.37–.49	.34	.31–.37
≥5,000	.25	.21–.29	.23	.19–.29	.34	.26–.43

[a] Data source: Second China National Sample Survey on Disabilities (2006). In model 1, age, gender, residence location, and socioeconomic status variables were included as covariates. In models 2 and 3, the same set of covariates was included except for residence location. All of the observed effects that were measured by ORs were statistically significant; none of the CIs included 1.

deprivation are experienced more often by poor and socially disadvantaged rural women (32). Consistent with these findings, our study indicated a higher prevalence of schizophrenia disability among women than among men in rural areas, where poverty is a common problem, in contrast to urban areas, where most people live in affluence.

A striking strength of this study is the very large sample, which is representative of the 1.3 billion Chinese people. The use of the WHODAS II and the ICD-10 Symptom Checklist for Mental Disorders as diagnostic tools, as well as the use of experienced clinical psychiatrists as interviewers, improved the comparability of the diagnostic process; therefore, information bias that might have resulted from the use of different diagnostic procedures was minimized (23). However, our study also had limitations. False-negative reports might have occurred during the screening process in household interviews; consequently, the prevalence of schizophrenia disability might have been underestimated. Nevertheless, there is little reason to suspect that the major findings of our study would change, because no evidence suggests that underestimation tends to be greater in urban areas than in rural areas or among men than among women. Because schizophrenia patients who had scores lower than 52 on the WHODAS II were not identified as "living with a psychiatric disability," the prevalence of schizophrenia itself could not be estimated from our data. The estimated prevalence of disability related to mood disorders was very low. The common symptoms of mood disorders are depressive or manic episodes that last for a short time and then usually subside. Patients in remission may have no difficulties with activities of daily living or social participation. In this study, the diagnostic tool for psychiatric disability included the WHODAS II, which assesses experiences during the past 30 days. Thus patients who were in remission at the time of the interview may not have been identified as "living with a psychiatric disability."

CONCLUSIONS

We found that the prevalence of schizophrenia-related psychiatric disability in China was higher in rural areas than in urban areas and among rural women than among rural men. Although the etiology of schizophrenia remains unclear, in general, the current evidence suggests that biological risk factors, such as heredity (33), as well as infection and malnutrition during the prenatal period (19,34), play an important role in the occurrence of the disease. Schizophrenia affects men more often than women and is more prevalent among those who live in urban areas compared with rural areas (7). However, despite the critical role of biological factors in initiation of the disease, social factors, such as access to health services and social support, may contribute to remission and relapse of the disease and thus to any disability caused by it. Our findings indicate that social inequalities may have resulted in a higher prevalence of schizophrenia-related disability among socially disadvantaged rural patients, especially rural women. Because schizophrenia is not currently preventable, it is important to provide effective treatment and care for all patients to reduce the disease burden. Strategies to improve access to health services for socially disadvantaged rural individuals are urgently needed. Furthermore, we consider that public policies that seek to promote gender equality and empower women will play a fundamental role in improving the mental health of women living in rural areas.

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