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A comparison of clinical characteristics of psychiatric inpatients in three hospitals from Western China and America

Min Jia^{1†}, Bang An^{2†}, Bin Yan³, Qingyan Ma¹, Binglong Wen¹, Shanshan Zhao², Chengge Gao¹, Xiancang Ma¹, Lili Zhang⁴, Bin Li⁴, Ping Zhang⁴, Jian Wang⁴, Hong Yu^{5*} and Wei Wang^{1*}

Abstract

Background: Different countries have differences in social and cultural context and health system, which may affect the clinical characteristics of psychiatric inpatients. This study was the first to compare cross-cultural differences in the clinical characteristics of psychiatric inpatients in three hospitals from Western China and America.

Methods: Overall, 905 and 1318 patients from three hospitals, one in America and two in Western China, respectively, were included. We used a standardised protocol and data collection procedure to record inpatients' sociodemographic and clinical characteristics.

Results: Significant differences were found between hospitals from the two countries. Positive symptoms were the main reason for admission in the Chinese hospitals, while reported suicide and self-injury symptoms more frequently led to hospital admission in America. Moreover, there were more inpatients with combined substance abuse in the American hospital (97.6% vs. 1.9%, $P < 0.001$). The length of stay (LOS) in America was generally shorter than in China (10.5 ± 11.9 vs. 20.7 ± 13.4 , $P < 0.001$). The dosage of antipsychotic drugs used in the American hospital was higher than in China (275.1 ± 306.9 mg vs. 238.3 ± 212.5 mg, $P = 0.002$). Regression analysis showed that male sex, older age, retirees, being admitted because of physical symptoms, and using higher doses of antipsychotic drugs were significantly associated with longer hospitalisation in the American hospital ($P < 0.05$). Comparatively, patients who were divorced, experiencing suicidal ideation, admitted involuntarily, admitted because of physical, depression, or anxiety symptoms, and using higher doses of antipsychotic drugs had longer hospitalisation in Chinese hospitals ($P < 0.05$).

Conclusion: Significant variations in clinical characteristics of inpatients were found between hospitals from Western China and America. The LOS in Chinese hospitals was significantly longer, but patients used higher doses of antipsychotic drugs in the American hospital. Admission due to physical symptoms and the use of higher dosage drugs were related to longer LOS in both countries.

Keywords: Psychiatry ward, Clinical characteristics, China, America

[†]Min Jia and Bang An contributed equally to this work.

*Correspondence: hongyu@buffalo.edu; xianwv@sina.com

¹ Department of Psychiatry, The First Affiliated Hospital of Xi'an Jiaotong University, 277 Yanta West Road, Xi'an 710061, China

⁵ University at Buffalo-Psychiatry, Erie County Medical Center, 462 Grider Street, Buffalo, New York, USA

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

Introduction

In recent decades, mental health service systems in China and America have made substantial advances with economic and cultural development [1, 2]. Different cultural backgrounds, management systems, treatment patterns, and other factors can affect clinical characteristics of psychiatric inpatients.



The Chinese Mental Health Survey in 2019 showed that the prevalence of most mental disorders has increased; the weighted lifetime prevalence of six major types of mental disorders, excluding dementia, was 16.6%. The most common disorders were anxiety disorders (7.6%), followed by mood disorders (7.4%), substance use disorders (4.7%), impulse control disorders (1.5%), and schizophrenia and other psychotic disorders (0.7%) [3]. The above results also indicate that the prevalence of schizophrenia remains globally unchanged [4]. Comparatively, the survey of American adolescents showed that anxiety disorders were the most common condition (31.9%), followed by behaviour (19.1%), mood (14.3%), and substance use (11.4%) disorders; the comorbidity rate that meets the diagnosis of both mental disorders was approximately 40% [5]. The above survey emphasized that we should shift our attention from the treatment of American youth to prevention and early intervention.

As a representative of western countries, America began to reduce the number of large psychiatric hospitals and transform them into community services many years ago. Furthermore, mental hospitals have been replaced by psychiatric outpatients at general hospitals [6]. With the development of this 'deinstitutionalisation', more patients return to society and recover better; however, there is also evidence that this deinstitutionalisation increases the risk of violent crime [7]. The mental health service system in China has also learned from the experiences of other developed countries. Consequently, after continuous efforts, the number of registered psychiatric doctors and psychiatric hospital beds has increased significantly. However, compared with the large population of patients in China, there is still a limited number of hospital beds [8]. Mental health services rely on mental health hospitals and are separate from the community. This model is not beneficial for the long-term development of patients and increases the burden on the country [9]. Since 2004, China has implemented a national community service model called the National Continuing Management and Intervention Program for Psychoses (686 Program) [1], that has helped patients receive systematic treatment and follow-up.

However, both countries differ in their social and cultural context, health system, and clinical practice, which may affect the clinical characteristics of psychiatric inpatients. To date, no studies have compared the medical information of psychiatric inpatients between hospitals from Western China and America. The aim of this study was thus to address this gap by comparing the differences in clinical characteristics of psychiatric inpatients from three hospitals in these two countries, to provide some references for further research.

Methods

Research design and subjects

The Chinese information was obtained from the psychiatric department of two tertiary hospitals in Shaanxi Province: The First Affiliated Hospital of Xi'an Jiao Tong University and Xianyang Central Hospital, both of which are general hospitals. The American data were obtained from a general hospital with a psychiatric ward located at Buffalo, University at Buffalo-Psychiatry, Erie County Medical Center. All three hospitals have established hospital information systems, from which major information on clinical characteristics was obtained.

Data were collected by reviewing medical records. Using a form designed specifically for this study, information was collected between January and December 2015 from inpatients who were hospitalised in these hospitals. Sociodemographic information included gender, age, marital status, education level, occupation, and living conditions. Medical information mainly comprised reasons for hospitalisation, which was determined by several experienced experts on the basis of review and discussion of previous medical records (If a patient was admitted with plural reasons, the most prominent symptom was defined as the reason for hospitalization), whether they were admitted voluntarily, whether they were restrained or isolated during hospitalisation, existing condition with substance abuse, suicidal ideation, insurance, diagnosis with International Classification of Diseases Tenth Revision (ICD-10) or The Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5), the diagnosis was confirmed by at least two well-trained psychiatrists, and the length of stay (LOS) and antipsychotic drug dosage (the dosage here refers to the final stable daily dosage). Antipsychotic dosages were converted into chlorpromazine equivalent milligrams (CPZeq) [10, 11]. Owing to the anonymous nature of the retrospective chart review and for the purpose of clinical review, informed consent was not required, which was consistent with local ethical standards; only the medical records were reviewed. The study was approved by the Medical Ethics Committees of these hospitals.

Statistical analyses

All statistical analyses were performed using SPSS 24.0. A t-test was used to compare continuous variables, a chi-square test and Fisher's exact test were used to compare categorical variables. First, univariable factor linear regression analysis was used to screen variables affecting LOS. Then, the variables with statistical significance in the univariable regression analysis were included into new multivariable linear regression models to analyze variables affecting LOS in Western China and America,

respectively. Moreover, the one-sample Kolmogorov-Smirnov test was used to check the normality of the distribution for the continuous variables. All statistical tests were two-sided, and a P -value < 0.05 was considered statistically significant.

Results

Socio-demographic characteristics of psychiatric inpatients

Inpatients' socio-demographic characteristics in China and America are summarised in Table 1. A total of 2223 patients' data, 905 from the American hospital and 1318 from the Chinese hospitals, were reviewed. In America, the proportion of male patients in psychiatric hospitals (62.1%) was significantly higher than females (37.9%). Comparatively, in China, the proportion of female patients (57.1%) was higher than male patients (42.9%). The proportion of unmarried inpatients in America was the highest (76.7%), while nearly half of the inpatients in the Chinese hospitals were married (59.1%), which accounted for the highest proportion. Patients with high school education levels were the highest in both countries (56.8% in America and 34.4% in China).

The proportion of unemployed patients in the American (84.4%) was higher than in Chinese hospitals (11.2%). In both countries, most patients lived with their families; however, the proportion in the Chinese hospitals was higher than in America (99.7% vs 70.7%, $P < 0.001$).

Clinical characteristics of psychiatric inpatients

Table 2 presents the clinical characteristics of the psychiatric inpatients. The reasons for admission differed, with suicide and self-injury symptoms accounting for the largest proportion in the American hospital (46.1%), which was much higher than in China (7%), followed by positive symptoms (44.9%). In the Chinese hospitals, the main reason for admission was positive symptoms (46.3%). Most patients were admitted involuntarily in America (94.1%), and voluntarily (64.5%) in China. Moreover, the proportions of patients who were restrained or isolated in these two countries were below 15% (13.7% in America and 13.1% in China, $P = 0.657$). Compared with China, there were more inpatients with combined substance abuse in America (97.6% vs 1.9%, $P < 0.001$). Among them, 54.3% of patients combined alcohol and drug abuse and 43.3% combined narcotics. In the Chinese hospitals,

Table 1 Socio-Demographic of psychiatric inpatients in western China and America

| | America (N = 905) | China (N = 1318) | t/ χ^2 | P |
|--|----------------------|---------------------|-------------|--------|
| Age (years, $\bar{x} \pm s$) | 39.7 \pm 13.7 | 40.3 \pm 18.6 | 0.906 | 0.365 |
| Gender, n (%) | | | 78.772 | <0.001 |
| Male | 562 (62.1%) | 566 (42.9%) | | |
| Female | 343 (37.9%) | 752 (57.1%) | | |
| Marital status, n (%) | | | 498.645 | <0.001 |
| Unmarried | 694 (76.7%) | 463 (35.1%) | | |
| Married | 112 (12.4%) | 779 (59.1%) | | |
| Divorce | 79 (8.7%) | 44 (3.3%) | | |
| Widowed | 20 (2.2%) | 32 (2.4%) | | |
| Education, n (%) | | | 429.311 | <0.001 |
| Primary school and below | 7 (0.8%) | 238 (18.1%) | | |
| Junior middle school | 36 (4.0%) | 355 (26.9%) | | |
| High school | 514 (56.8%) | 453 (34.4%) | | |
| Junior college or undergraduate | 348 (38.5%) | 272 (20.6%) | | |
| Occupation, n (%) | | | 1276.030 | <0.001 |
| Workers | 106 (11.7%) | 227 (17.2%) | | |
| Freelance worker | 5 (0.6%) | 496 (37.6%) | | |
| Students | 10 (1.1%) | 181 (13.7%) | | |
| Retiree | 20 (2.2%) | 267 (20.3%) | | |
| The unemployed | 764 (84.4%) | 147 (11.2%) | | |
| Living condition, n (%) | | | 423.615 | <0.001 |
| Living alone | 265 (29.3%) | 4 (0.3%) | | |
| Groups life | 640 (70.7%) | 1314 (99.7%) | | |

N total number of subjects in the study cohort; n (%) number (percentage) of patients with the indicated characteristic

Table 2 Clinical characteristics of psychiatric inpatients in western China and America

| | America (N = 905) | China (N = 1318) | t/ χ^2 | P |
|--|----------------------|---------------------|-------------|--------|
| Reasons for admission, n (%) | | | 622.279 | <0.001 |
| Positive symptoms | 406 (44.9%) | 610 (46.3%) | | |
| Negative symptoms | 6 (0.7%) | 67 (5.1%) | | |
| Depression and anxiety | 43 (4.8%) | 379 (28.8%) | | |
| Suicide and self-injury | 417 (46.1%) | 92 (7.0%) | | |
| Physical symptoms | 18 (2.0%) | 157 (11.9%) | | |
| Substance abuse | 9 (1.0%) | 8 (0.6%) | | |
| Drug side effects | 6 (0.7%) | 5 (0.4%) | | |
| Whether or not to be admitted voluntarily, n (%) | | | 764.821 | <0.001 |
| Yes | 53 (5.9%) | 850 (64.5%) | | |
| No | 852 (94.1%) | 468 (35.5%) | | |
| Whether restrained or isolated, n (%) | | | 0.197 | 0.657 |
| Yes | 124 (13.7%) | 172 (13.1%) | | |
| No | 781 (86.3%) | 1146 (86.9%) | | |
| Substance abuse, n (%) | | | 2034.822 | <0.001 |
| None | 22 (2.4%) | 1293 (98.1%) | | |
| Substance abuse | 883 (97.6%) | 25 (1.9%) | | |
| Alcohol and Drugs | 491 (54.3%) | 25 (1.9%) | | |
| Narcotics | 392 (43.3%) | 0 (0.0%) | | |
| Suicidal ideation, n (%) | | | 2.807 | 0.094 |
| Yes | 466 (51.5%) | 631 (47.9%) | | |
| No | 439 (48.5%) | 687 (52.1%) | | |
| Insurance, n (%) | | | 3.110 | 0.078 |
| Yes | 892 (98.6%) | 1309 (99.3%) | | |
| No | 13 (1.4%) | 9 (0.7%) | | |
| Diagnosis, n (%) | | | 183.445 | <0.001 |
| Organic mental disorder | 29 (3.2%) | 252 (19.1%) | | |
| Mental and behavioral disorders due to psychoactive substance use | 41 (4.5%) | 10 (0.8%) | | |
| Schizophrenia Spectrum Disorder | 341 (37.7%) | 454 (34.4%) | | |
| Mood disorder | 326 (36.0%) | 345 (26.2%) | | |
| Depression | 176 (19.4%) | 199 (15.1%) | | |
| Bipolar disorder | 150 (16.6%) | 146 (11.1%) | | |
| Neurotic, stress-related and somatoform disorders | 160 (17.7%) | 221 (16.8%) | | |
| Behavioral syndrome with physiological disorders and somatic factors | 1 (0.1%) | 16 (1.2%) | | |
| Personality and behavioral disorders | 6 (0.7%) | 2 (0.2%) | | |
| Intellectual disability | 1 (0.1%) | 7 (0.5%) | | |
| Mental development disorder | 0 (0.0%) | 11 (0.8%) | | |
| LOS (days, $\bar{x} \pm s$) | 10.5 \pm 11.9 | 20.7 \pm 13.4 | 18.719 | <0.001 |
| Organic mental disorder | 9.9 \pm 18.1 | 20.2 \pm 12.3 | 4.023 | <0.001 |
| Mental and behavioral disorders due to psychoactive substance use | 7.3 \pm 5.4 | 13.9 \pm 5.3 | 3.519 | 0.001 |
| Schizophrenia Spectrum Disorder | 13.8 \pm 13.8 | 22.4 \pm 16.0 | 7.983 | <0.001 |
| Mood disorders | | | | |
| Depression | 8.6 \pm 8.9 | 19.7 \pm 10.1 | 11.251 | <0.001 |
| Bipolar disorder | 10.3 \pm 8.1 | 23.3 \pm 16.0 | 8.842 | <0.001 |
| Neurotic, stress-related and somatoform disorders | 6.8 \pm 11.9 | 17.1 \pm 8.0 | 10.129 | <0.001 |
| Behavioral syndrome with physiological disorders and somatic factors | 9.0 \pm 0.0 | 17.3 \pm 8.7 | 0.926 | 0.369 |
| Personality and behavioral disorders | 8.7 \pm 5.1 | 13.5 \pm 10.6 | 0.932 | 0.387 |
| Intellectual disability | 30.0 \pm 0.0 | 23.3 \pm 5.3 | -1.189 | 0.279 |
| Mental development disorder | - | 21.3 \pm 16.9 | - | - |

Table 2 (continued)

| | America (N = 905) | China (N = 1318) | t/χ ² | P |
|--|----------------------|---------------------|------------------|--------|
| Total dose of antipsychotics (mg, $\bar{x} \pm s$) | 275.1 ± 306.9 | 238.3 ± 212.5 | −3.129 | 0.002 |
| Organic mental disorder | 133.0 ± 152.1 | 155.6 ± 135.1 | 0.840 | 0.402 |
| Mental and behavioral disorders due to psychoactive substance use | 153.2 ± 191.7 | 261.0 ± 228.5 | 1.537 | 0.131 |
| Schizophrenia Spectrum Disorder | 447.2 ± 329.0 | 386.2 ± 216.3 | −2.973 | 0.003 |
| Mood disorder | | | | |
| Depression | 77.0 ± 124.5 | 117.7 ± 108.7 | 3.383 | <0.001 |
| Bipolar disorder | 364.8 ± 296.0 | 280.2 ± 212.9 | −2.831 | 0.005 |
| Neurotic, stress-related and somatoform disorders | 99.0 ± 189.2 | 118.8 ± 156.1 | 1.118 | 0.264 |
| Behavioral syndrome with physiological disorders and somatic factors | 420.0 ± 0.0 | 120.1 ± 109.2 | −2.665 | 0.018 |
| Personality and behavioral disorders | 222.5 ± 240.1 | 300.0 ± 424.3 | 0.340 | 0.746 |
| Intellectual disability | 510.0 ± 0.0 | 285.7 ± 163.2 | −1.285 | 0.246 |
| Mental development disorder | – | 169.6 ± 139.4 | – | – |

N total number of subjects in the study cohort; n (%) number (percentage) of patients with the indicated characteristic

only 1.9% of patients had combined substance abuse and no inpatients had combined narcotics. In both countries, more than 90% of patients had insurance (98.6% in America and 99.3% in China, $P=0.078$).

Moreover, schizophrenia was the most evident diagnosis in both countries (37.7% in America and 34.4% in China), followed by mood disorders (36.0% in America and 26.2% in China). The proportion of organic mental disorder patients in Chinese hospitals was higher than in America (19.1% vs 3.2%, $P<0.001$) but that of psychoactive substances in America was higher than in China (4.5% vs 0.8%, $P<0.001$). Patients diagnosed with behavioural syndrome with physiological disorders and somatic factors, personality and behavioural disorders, intellectual disability, and mental development disorders were less than 5% in both countries. Owing to the few patients diagnosed with these diseases, they were excluded when comparing the LOS. Overall, the LOS in hospitals in America was shorter than in China (10.5 ± 11.9 vs 20.7 ± 13.4 , $P<0.001$). Individuals with schizophrenia had the longest hospitalisation in America (13.8 ± 13.8), followed by bipolar disorder (10.3 ± 8.1). In China, the longest hospitalisation was for bipolar disorder (23.3 ± 16.0), followed by schizophrenia (22.4 ± 16.0). In general, excluding the above-mentioned four diseases, the total dosage of antipsychotic drugs used in the American hospital was higher than in China (275.1 ± 306.9 mg vs 238.3 ± 212.5 mg, $P=0.002$). In America, the dosage of antipsychotic drugs in patients with schizophrenia spectrum disorder (447.2 ± 329.0 mg vs 386.2 ± 216.3 mg, $P=0.003$) and bipolar disorder (364.8 ± 296.0 mg vs 280.2 ± 212.9 mg, $P=0.005$) was higher than in China. However, it is worth noting that

the dosage of antipsychotic drugs used by patients with unipolar depression in Chinese hospitals was higher than in America (117.7 ± 108.7 mg vs 77.0 ± 124.5 mg, $P<0.001$). Overall, patients with schizophrenia had the largest dosage of antipsychotic drugs in both countries (447.2 ± 329.0 mg in America and 386.2 ± 216.3 mg in China), followed by bipolar disorder (364.8 ± 296.0 mg in America and 280.2 ± 212.9 mg in China).

Factors affecting LOS

Table 3 presents the regression analysis results in the American hospital. In univariable analysis, we found that nine variables were significantly associated with the LOS. We then conducted a multivariable regression analysis of these variables and found that males, older patients, retirees, patients admitted because of physical symptoms, and patients who used higher dosages of antipsychotic drugs had significantly longer LOS ($P<0.05$). Stratified by gender, we found that male inpatients had more severe symptoms and took higher doses drugs (Supplementary Table).

Table 4 shows the factors affecting LOS in Chinese hospitals. We conducted multivariable regression with seven variables that were statistically significant in the univariable analysis and found that patients who were divorced, had suicidal ideation, were admitted involuntarily, were admitted because of physical, depression or anxiety symptoms, and who used greater dosages of antipsychotic drugs had longer hospitalisations ($P<0.05$). Collinearity analysis showed that there was no obvious collinearity among all factors included in the multivariable linear model for America and China.

Table 3 Mixed linear regression model testing associations of predictors with LOS in American hospital

| Variables | Univariable linear regression | | | | Multivariable linear regression | | | |
|--|-------------------------------|-------------|-------------|--------|---------------------------------|-------------|-------------|--------|
| | β | CI(95%) | | P | β | CI(95%) | | P |
| | | Lower bound | Upper bound | | | Lower bound | Upper bound | |
| Age | 0.143 | 0.087 | 0.199 | <0.001 | 0.144 | 0.082 | 0.205 | <0.001 |
| ^aGender | -2.945 | -4.536 | -1.354 | <0.001 | -2.078 | -3.635 | -0.521 | 0.009 |
| ^bMarital status | | | | | | | | |
| Unmarried | 2.503 | 0.124 | 4.881 | 0.039 | 1.656 | -0.670 | 3.982 | 0.163 |
| Divorce | 2.321 | -1.111 | 5.753 | 0.185 | 1.201 | -1.993 | 4.396 | 0.461 |
| Widowed | 1.575 | -4.095 | 7.245 | 0.586 | -1.018 | -6.322 | 4.287 | 0.707 |
| ^cEducation | | | | | | | | |
| Junior middle school | 4.056 | -5.578 | 13.689 | 0.409 | | | | |
| High school | 3.325 | -5.550 | 12.199 | 0.462 | | | | |
| Junior college or undergraduate | 1.253 | -7.650 | 10.156 | 0.782 | | | | |
| ^dOccupation | | | | | | | | |
| Workers | -14.471 | -20.097 | -8.844 | <0.001 | -10.596 | -16.171 | -5.021 | <0.001 |
| Freelance worker | -17.250 | -28.789 | -5.711 | <0.003 | -11.526 | -22.429 | -0.622 | 0.038 |
| Students | -15.750 | -24.688 | -6.812 | 0.001 | -10.967 | -19.761 | -2.173 | 0.015 |
| The unemployed | -12.028 | -17.256 | -6.801 | <0.001 | -9.761 | -14.956 | -4.566 | <0.001 |
| ^eLiving condition | | | | | | | | |
| Groups life | 0.901 | -0.807 | 2.608 | 0.301 | | | | |
| ^fSubstance abuse | | | | | | | | |
| Yes | -5.139 | -10.176 | -0.102 | 0.046 | | | | |
| ^gSuicidal ideation | | | | | | | | |
| Yes | 4.001 | 2.467 | 5.534 | <0.001 | -0.434 | -3.493 | 2.626 | 0.781 |
| ^hInsurance | | | | | | | | |
| Yes | 6.471 | -0.050 | 12.991 | 0.052 | | | | |
| ⁱWhether or not to be admitted voluntarily | | | | | | | | |
| Yes | -1.206 | -4.516 | 2.104 | 0.475 | | | | |
| ^jWhether restrained or isolated | | | | | | | | |
| Yes | 3.524 | 1.275 | 5.773 | <0.002 | 0.379 | -1.958 | 2.716 | 0.751 |
| ^kReasons for hospitalization | | | | | | | | |
| Negative symptoms | 2.584 | -6.805 | 11.972 | 0.589 | 5.493 | -3.439 | 14.425 | 0.228 |
| Depression and anxiety | -1.649 | -5.310 | 2.012 | 0.377 | 1.466 | -2.194 | 5.125 | 0.432 |
| Suicide and self-injury | -4.138 | -5.730 | -2.546 | <0.001 | -0.609 | -3.858 | 2.639 | 0.713 |
| Physical symptoms | 10.195 | 4.696 | 15.694 | <0.001 | 9.720 | 4.515 | 14.926 | <0.001 |
| Substance abuse | -7.750 | -15.443 | -0.056 | 0.048 | -4.810 | -12.410 | 2.790 | 0.215 |
| Drug side effects | -6.416 | -15.805 | 2.972 | 0.180 | -4.936 | -13.946 | 4.074 | 0.283 |
| ^lDiagnosis | | | | | | | | |
| Organic mental disorder | -3.878 | -8.287 | 0.531 | 0.085 | 0.108 | -4.311 | 4.528 | 0.962 |
| Psychoactive substance | -6.541 | -10.309 | -2.773 | 0.001 | -2.659 | -6.352 | 1.034 | 0.158 |
| Mood disorder | | | | | | | | |
| Depression | -5.241 | -7.357 | -3.126 | <0.001 | -1.070 | -3.636 | 1.496 | 0.413 |
| Bipolar disorder | -3.523 | -5.756 | -1.289 | 0.002 | -1.696 | -3.883 | 0.492 | 0.129 |
| Neurotic, stress-related and somatoform disorders | -6.972 | -9.156 | -4.788 | <0.001 | -2.627 | -5.205 | -0.048 | 0.046 |
| Behavioral syndrome with physiological disorders and somatic factors | -4.809 | -27.637 | 18.018 | 0.679 | -1.416 | -23.230 | 20.398 | 0.899 |
| Personality and behavioral disorders | -5.143 | -14.530 | 4.245 | 0.283 | -0.069 | -9.122 | 8.983 | 0.988 |
| Intellectual disability | 16.191 | -6.637 | 39.018 | 0.164 | 12.694 | -8.841 | 34.228 | 0.248 |
| Mental development disorder | - | | | | | | | |
| Total dose of antipsychotics | 0.012 | 0.009 | 0.014 | <0.001 | 0.010 | 0.007 | 0.013 | <0.001 |

^a Reference category = Male; ^bReference category = Married; ^cReference category = Primary school and below; ^dReference category = Retiree; ^eReference category = Living alone; ^fReference category = None substance abuse; ^gReference category = No suicidal ideation; ^hReference category = No insurance; ⁱReference category = Admitted involuntarily; ^jReference category = No restrained or isolated; ^kReference category = Positive symptoms; ^lReference category = Schizophrenia Spectrum Disorder

Table 4 Mixed linear regression model testing associations of predictors with LOS in Chinese hospital

| Variables | Univariable linear regression | | | | Multivariable linear regression | | | |
|--|-------------------------------|-------------|-------------|--------|---------------------------------|-------------|-------------|--------|
| | β | CI(95%) | | P | β | CI(95%) | | P |
| | | Lower bound | Upper bound | | | Lower bound | Upper bound | |
| Age | -0.006 | -0.045 | 0.033 | 0.750 | | | | |
| ^aGender | -1.066 | -2.527 | 0.395 | 0.152 | | | | |
| ^bMarital status | | | | | | | | |
| Unmarried | 1.533 | 0.002 | 3.063 | 0.050 | 1.248 | -0.428 | 2.924 | 0.144 |
| Divorce | 9.052 | 5.010 | 13.094 | <0.001 | 7.209 | 3.352 | 11.067 | <0.001 |
| Widowed | -0.616 | -5.320 | 4.089 | 0.797 | -2.154 | -6.611 | 2.303 | 0.343 |
| ^cEducation | | | | | | | | |
| Junior middle school | 1.634 | -0.567 | 3.835 | 0.145 | | | | |
| High school | 1.537 | -0.566 | 3.640 | 0.152 | | | | |
| Junior college or undergraduate | 0.745 | -1.586 | 3.077 | 0.531 | | | | |
| ^dOccupation | | | | | | | | |
| Workers | 1.589 | -0.783 | 3.961 | 0.189 | | | | |
| Freelance worker | -0.125 | -2.119 | 1.870 | 0.902 | | | | |
| Students | 0.367 | -2.163 | 2.897 | 0.776 | | | | |
| The unemployed | 0.580 | -2.119 | 3.278 | 0.674 | | | | |
| ^eLiving condition | | | | | | | | |
| Groups life | 2.167 | -10.990 | 15.324 | 0.747 | | | | |
| ^fSubstance abuse | | | | | | | | |
| Yes | -5.443 | -10.741 | -0.146 | 0.044 | -4.063 | -10.239 | 2.113 | 0.197 |
| ^gSuicidal ideation | | | | | | | | |
| Yes | 5.921 | 4.508 | 7.334 | <0.001 | 3.801 | 1.926 | 5.676 | <0.001 |
| ^hInsurance | | | | | | | | |
| Yes | 5.363 | 0.231 | -3.420 | 0.231 | | | | |
| ⁱWhether or not to be admitted voluntarily | | | | | | | | |
| Yes | -7.193 | -8.655 | -5.732 | <0.001 | -4.759 | -6.765 | -2.753 | <0.001 |
| ^jWhether restrained or isolated | | | | | | | | |
| Yes | 1.454 | -0.693 | 3.601 | 0.184 | | | | |
| ^kReasons for hospitalization | | | | | | | | |
| Negative symptoms | -4.583 | -7.943 | -1.222 | 0.008 | -1.744 | -4.948 | 1.460 | 0.286 |
| Depression and anxiety | -1.102 | -2.810 | 0.606 | 0.206 | 2.653 | 0.396 | 4.911 | 0.021 |
| Suicide and self-injury | -4.126 | -7.046 | -1.206 | 0.006 | 1.441 | -1.901 | 4.783 | 0.398 |
| Physical symptoms | -3.221 | -5.558 | -0.885 | 0.007 | 4.323 | 1.382 | 7.265 | 0.004 |
| Substance abuse | -10.941 | -20.232 | -1.650 | 0.021 | -1.916 | -13.965 | 10.133 | 0.755 |
| Drug side effects | 1.859 | -9.865 | 13.583 | 0.756 | 0.549 | -10.469 | 11.568 | 0.922 |
| ^lDiagnosis | | | | | | | | |
| Organic mental disorder | -2.258 | -4.301 | -0.216 | 0.030 | -2.619 | -5.150 | -0.087 | 0.043 |
| Psychoactive substance | -8.545 | -16.858 | -0.232 | 0.044 | -0.289 | -11.717 | 11.140 | 0.960 |
| Mood disorder | | | | | | | | |
| Depression | -2.756 | -4.967 | -0.546 | 0.015 | -2.737 | -5.668 | 0.193 | 0.067 |
| Bipolar disorder | 0.891 | -1.583 | 3.365 | 0.480 | -0.790 | -3.320 | 1.741 | 0.541 |
| Neurotic, stress-related and somatoform disorders | -5.305 | -7.438 | -3.172 | <0.001 | -3.032 | -5.819 | -0.244 | 0.033 |
| Behavioral syndrome with physiological disorders and somatic factors | -5.132 | -11.747 | 1.482 | 0.128 | -3.973 | -10.817 | 2.871 | 0.255 |
| Personality and behavioral disorders | -8.945 | -27.373 | 9.483 | 0.341 | -4.602 | -22.010 | 12.806 | 0.604 |
| Intellectual disability | 0.841 | -9.063 | 10.745 | 0.868 | 2.011 | -7.350 | 11.372 | 0.674 |
| Mental development disorder | -1.172 | -9.107 | 6.763 | 0.772 | -1.244 | -8.837 | 6.349 | 0.748 |
| Total dose of antipsychotics | 0.013 | 0.010 | 0.017 | <0.001 | 0.014 | 0.010 | 0.018 | <0.001 |

^a Reference category = Male; ^bReference category = Married; ^cReference category = Primary school and below; ^dReference category = Retiree; ^eReference category = Living alone; ^fReference category = None substance abuse; ^gReference category = No suicidal ideation; ^hReference category = No insurance; ⁱReference category = Admitted involuntarily; ^jReference category = No restrained or isolated; ^kReference category = Positive symptoms; ^lReference category = Schizophrenia Spectrum Disorder

Discussion

To our knowledge, this is the first study comparing the clinical characteristics of inpatients with psychiatric disorders in hospitals from Western China and America. Our results found differences in the sociodemographic and clinical characteristics of psychiatric inpatients. Most hospitalised patients were men in the American hospital and women in the Chinese hospitals. Furthermore, there were more unmarried and unemployed inpatients in the American hospital. The highest proportion of reasons for admission was suicide and self-injury symptoms in America and positive symptoms in China. Compared with China (1.9%), there were more inpatients with combined substance abuse in the American hospital (97.6%). The two most common diseases in hospitalised patients in these two countries were schizophrenia and mood disorders. Moreover, the LOS in the American hospital was shorter, but the total dosage of antipsychotic drugs was significantly higher than in the Chinese hospitals.

With regards to the higher percentage of psychiatric inpatients for substance use in America, it was noted that the proportion of patients diagnosed with psychoactive substances in American hospitals was also higher than that in China. There is a consensus that the incidence of mental disorders and comorbid substance abuse is very high [12–14]. To illustrate, it is estimated that, in America, the lifetime prevalence of patients with mental disorders combined with some addictive disorder was 29.0%, alcohol dependence was 13.5%, and other drug dependence abuse was 6.1%. Moreover, 37% of those with an alcohol disorder had comorbid mental disorders. In addition, more than half (53%) of patients with drug addiction (excluding alcohol) had a mental disorder. Comorbidity rates of severe mental disorders, such as schizophrenia, bipolar disorder, and anti-social personality disorder, are particularly high, which makes treatment challenging [15]. In China, the most common use of psychoactive substances is drinking alcohol, with most other psychoactive substances being illegal and banned. Moreover, men are more likely to use alcohol than women [16, 17]. To illustrate, alcohol is widely used in China because a drinking culture of repetitive toasting plays a huge role in building relationships with business partners and friends; however, the rate may decrease due to the recent anti-corruption campaign in China which banned the provision of alcoholic beverages in government-sponsored meals [18]. However, the use of some psychoactive substances, such as cannabis, is legal in some states of America. Many states in America have legalised either its medical or its recreational use, making it easier to obtain. This leads to a marked increase in the prevalence of cannabis use, especially among subgroups [19–22]. The above factors may explain why more psychiatric

inpatients combined substance abuse. Furthermore, this highlights the need to focus on inpatients who are diagnosed with psychoactive substances in America in the future. Suicidal behaviour is a leading cause of injury and death worldwide. We found that the proportion of patients admitted because of attempted suicide and self-injury in America was higher than in China. The World Health Organization report indicates that in developed countries, suicide accounts for the largest share of intentional injury burden and the proportion of men is higher than women [23]. Risk factors for suicide include demographic, psychiatric, psychological, and stressful life events. Men with mental disorders, especially mood disorders and substance abuse, are at high risk for suicide [24]. Consistent with this, our results showed that these factors are higher in the American hospital.

Our data also showed that psychiatric LOS in America was significantly shorter than in China, but the total dosage of antipsychotic drugs was significantly higher. The LOS for mental disorders has decreased in America in recent decades [25]. These reductions have coincided with the reduction of public mental health services and an expansion in care provided in private psychiatric and general hospitals [26, 27]. Inpatient care constitutes the most expensive part of psychiatric services. To reduce expenditure, inpatients are required to be discharged as soon as possible [28]. The Healthcare Cost and Utilisation Project on mental health stays in American community hospitals in 2006 showed that the average LOS for mental health hospitalisation was less than 10 days [29]. Consistent with this, a recent report determined that the average LOS in an American inpatient setting was 10.0 ± 3.0 days [30]. Our results confirmed that the average LOS in an American hospital was 10.53 ± 11.91 days. There is consensus that psychotropic drugs usually take effect after 2–4 weeks [31–34]. In China, after being discharged from the hospital, patients rely on family members to take care of them. These family members lack professional knowledge, making it difficult for them to observe improvement in symptoms and adverse drug reactions; thus, patients require a longer hospital stay. Although a reduction in LOS can reduce expenditure, it may lead to early discharge of patients who remain clinically unstable [35]. Furthermore, some studies have claimed that the shorter the hospital stay, the higher the relapse and readmission rate [36]. Therefore, more research is needed to determine which service system is more beneficial to patients. However, with updates to the guidelines, the requirements for rehabilitation of social function with mental illnesses have increased, and most patients may need to recover in the community in the future. Therefore, in China, the improvement of community services will also be a major challenge.

Furthermore, our results showed that the total dosage of antipsychotic drugs used in the American hospital was higher than in China. Ethnic differences in the dosage of antipsychotic drugs have been confirmed by many studies; Caucasians usually require higher antipsychotic dosages than Asians [37–40]. The differential response and side effect profile of antipsychotics are related to genetic makeup, individual intrinsic factors, and cultural and contextual variables [41–44]. Some data show that Caucasians are more likely to have received treatment for all psychiatric disorders (including bipolar disorder, anxiety, and substance use disorders) and have regular follow-ups [45]. Some articles have demonstrated lower clearance in the average East Asian population using antipsychotics due to metabolic activities [40]. These results may be because the dosage of drugs used in America is higher than in China. We found that there was a combination of antipsychotics inpatients with depression in both countries. In recent years, some studies have demonstrated that combining antidepressants and antipsychotics is significantly more effective to treat psychotic depression than using either antidepressant or antipsychotic monotherapy [46]. Most treatment guidelines recommend a combination of an antidepressant with an antipsychotic to treat an acute episode of unipolar psychotic depression [47]. Therefore, antipsychotic drugs are usually used in patients with depression, especially those with psychotic depression. Our results show that inpatients with depression in China used higher dosage of antipsychotics. It is indicated that there is more drug combination in China.

We also analysed the factors affecting the LOS in these two countries. The results showed that admission due to physical symptoms and the use of high-dosage drugs were related to longer LOS. In America, males also had longer hospitalisations, the LOS for male patients is longer, which may be related to the presence of more severe symptoms and higher drugs doses in male inpatients. In China, except for the above factors, patients who were divorced, had involuntary admissions, and experienced suicidal ideation had longer lengths of stay. Almost all studies have achieved consensus that patients with schizophrenia have the longest hospital stay among psychiatric conditions; this is because patients who suffer from severe mental illnesses need lengthier stays to achieve stabilisation and partial recovery [48, 49]. According to previous studies, older patients often have longer hospital stays due to the nature of their physical diseases [50–52]. Comparatively, married patients have shorter stays because they usually have better emotional support and social networks, and family members, who can help patients to regularly take their medication and adhere to treatment plans [53]. In addition, due to the

psychosocial nature of mental disorders, relatives' active participation can enable patients to recover better. This may explain why unmarried and divorced patients had longer hospital stays in this study. Moreover, organic comorbidities are often accompanied by psychiatric problems and patients usually need consultations to reach a better clinical state, which leads to an increase in hospital stay [54, 55]. Patients in psychiatric wards who are restrained and isolated are usually those who have aggressive, impulsive, or violent behaviours; are less compliant with treatment procedures; and have negative attitudes towards medication. Additionally, physicians are more cautious in assessing the discharge of patients who may harm others; thus, longer hospitalisation is required to overcome these barriers [56]. This is consistent with the results of our study.

The main strength of this study is that it is the first to compare the clinical characteristics of psychiatric inpatients in these two countries in the East and West. In addition, the use of comprehensive clinical information, yielded significant results. Moreover, all information was collected through routine practice, which was not biased by any specific research protocol. These strengths ensure that the results reasonably reflect real-world situations. However, this study also had several limitations that should be highlighted. First, this was a retrospective study, and the data were collected by chart review, which might have led to observational bias. Second, we only selected three general hospitals from these two countries, thus, this study's results should be interpreted with caution. Third, the type and name of other drugs were not obtained, such as mood stabilizers or anti-depressants, and only the dosages of chlorpromazine equivalent milligrams of antipsychotic drugs were included.

In conclusion, this study's results highlighted the differences in the clinical characteristics of inpatients with psychiatric disorders in hospitals from Western China and America. Therefore, these findings serve as a starting point for determining the reasons behind these differences in future studies.

Abbreviations

ICD-10: International Classification of Diseases Tenth Revision; DSM-5: The Diagnostic and Statistical Manual of Mental Disorders; CPZeq: Chlorpromazine equivalent milligrams; LOS: Length of stay.

Supplementary Information

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Additional file 1: Supplementary Table. Clinical characteristics between male and female inpatients in America hospital.

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Authors' contributions

Chengge Gao, Xiancang Ma, Hong Yu and Wei Wang conceived the paper. Min Jia and Bang An analyzed the data and wrote the manuscript with input from all the authors. Bin Yan, Qingyan Ma, Binglong Wen and Shanshan Zhao are responsible for collating China's data. Lili Zhang, Bin Li, Ping Zhang and Jian Wang are responsible for collating America's data. All authors read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author (Wei Wang) on reasonable request.

Declarations

Ethics approval and consent to participate

All the procedures implemented in this study involving human participants were in accordance with the ethical standards of the Institutional and/or National Research Ethics Committee and the Declaration of Helsinki. The study was approved by the Medical Ethics Committees of the three participating hospitals (The First Affiliated Hospital of Xi'an Jiao Tong University, Xianyang Central Hospital and Erie County Medical Center). Because of the retrospective nature of this study, patient informed consent for inclusion was waived by the institutional review board of the First Affiliated Hospital of Xi'an Jiao Tong University, and the need for written informed consent was waived by the same committee that approved this study's protocol.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Author details

¹Department of Psychiatry, The First Affiliated Hospital of Xi'an Jiaotong University, 277 Yanta West Road, Xi'an 710061, China. ²Department of Psychiatry, Xianyang Central Hospital, 78 Renmin East Road, Xianyang 712099, China. ³Clinical Research Center for Psychiatric Medicine of Shaanxi Province, The First Affiliated Hospital of Xi'an Jiaotong University, 277 Yanta West Road, Xi'an 710061, China. ⁴Department of Sleep Medicine, Hebei Mental Health Center, 572 Dongfeng East Road, Baoding 050899, China. ⁵University at Buffalo–Psychiatry, Erie County Medical Center, 462 Grider Street, Buffalo, New York, USA.

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References

- Ma H, Liu J, He YL, et al. An important pathway of mental health service reform in China: introduction of 686 program. *Chin Ment Health J*. 2011;25(10):725–8.
- Dwyer E. The final years of central state hospital. *J Hist Med Allied Sci*. 2019;74(1):107–26.
- Huang Y, Yu W, Hong W, et al. Prevalence of mental disorders in China: a cross-sectional epidemiological study. *Lancet Psychiatry*. 2019;6(3):211–24.
- Phillips MR, Zhang JX, Shi QC, et al. Prevalence, treatment, and associated disability of mental disorders in four provinces in China during 2001–05: an epidemiological survey. *Lancet*. 2009;373(9680):2041–53.
- Merikangas KR, et al. Lifetime prevalence of mental disorders in U.S. adolescents: results from the National Comorbidity Survey Replication—Adolescent Supplement (NCS-A). *J Am Acad Child Adolesc Psychiatry*. 2010;49(10):980–9.
- Geller JL. Deinstitutionalization in 19th-century America. *Hospital & Community Psychiatry*. 1989;40(1):85–6.
- Fazel S, et al. Violent crime, suicide, and premature mortality in patients with schizophrenia and related disorders: a 38-year total population study in Sweden. *Lancet Psychiatry*. 2014;1(1):44–54.
- Xiang YT, et al. Rethinking progress and challenges of mental health care in China. *World Psychiatry*. 2018;17(2):231–2.
- Xiang YT, et al. Mental health in China: challenges and progress. *Lancet*. 2012;380(9855):1715–6.
- Kane JM, et al. Guidelines for depot antipsychotic treatment in schizophrenia. European Neuropsychopharmacology consensus conference in Siena, Italy. *Eur Neuropsychopharmacol*. 1998;8(1):55–66.
- Woods SW. Chlorpromazine equivalent doses for the newer atypical antipsychotics. *J Clin Psychiatry*. 2003;64(6):663–7.
- Lamps CA, et al. Youth with substance abuse and comorbid mental health disorders. *Curr Psychiatry Rep*. 2008;10(3):265–71.
- Jones CM, et al. Co-occurring substance use and mental disorders among adults with opioid use disorder. *Drug Alcohol Depend*. 2019;197:78–82.
- Palomo T, et al. Comorbidity of substance abuse with other psychiatric disorders. *Neurotox Res*. 2007;12(1):17–27.
- Regier DA, et al. Comorbidity of mental disorders with alcohol and other drug abuse. Results from the epidemiologic catchment area (ECA) study. *JAMA*. 1990;264(19):2511–8.
- Wei H, et al. Alcohol consumption and alcohol-related problems: Chinese experience from six area samples, 1994. *Addiction*. 1999;94(10):1467–76.
- Organization WH. Global status report on alcohol and health 2014. Global status report on Alcohol. 2014. <https://www.drugsandalcohol.ie/21884/>
- Baxter AJ, et al. Prevalence of mental, neurological, and substance use disorders in China and India: a systematic analysis. *Lancet Psychiatry*. 2016;3(9):832–41.
- Versteeg PA, et al. Effect of cannabis usage on the oral environment: a review. *Int J Dent Hyg*. 2008;6(4):315–20.
- Compton WM, et al. Major increases in opioid analgesic abuse in the United States: concerns and strategies. *Drug Alcohol Depend*. 2006;81(2):103–7.
- Boyd CJ, et al. Adolescents' motivations to abuse prescription medications. *Pediatrics*. 2006;118(6):2472–80.
- Compton WM, et al. Prevalence of marijuana use disorders in the United States: 1991–1992 and 2001–2002. *JAMA*. 2004;291(17):2114–21.
- Moesgaard K, et al. Global Burden of Disease in 2002: Data sources, methods and results. Global Programme on Evidence for Health Policy Discussion Paper No 54. 2003. <https://www.scienceopen.com/document?vid=0edd3205-f38a-4d68-8e1b-ed034f2669b0>.
- Nock MK, Borges G, Bromet EJ, et al. Suicide and Suicidal Behavior. Oxford University Press. 2008;30(1):133–54.
- Mechanic D, et al. Changing patterns of psychiatric inpatient care in the United States, 1988–1994. *Arch Gen Psychiatry*. 1998;55(9):785–91.
- Levinson D, et al. Reduction in inpatient length of stay and changes in mental health care in Israel over four decades: a national case register study. *Isr J Psychiatry Relat Sci*. 2003;40(4):240–7.
- Stefansson CG, et al. Mental health care reform in Sweden, 1995. *Acta Psychiatr Scand*. 2010;104(410):82–8.
- BOD J, et al. Determinants of length of stay in the psychiatric wards of the university college hospital, Ibadan, Nigeria. *Afr J Med Med Sci*. 2012;41(2):147–52.
- Saba DK, et al. Hospital stays related to mental health, 2006. In: Health-care cost and utilization project (HCUP) statistical briefs. Rockville: Agency for Healthcare Research and Quality (US); 2006. <https://pubmed.ncbi.nlm.nih.gov/21595137>.
- Lee S, et al. Length of inpatient stay of persons with serious mental illness: effects of hospital and regional characteristics. *Psychiatric Services*. 2012;63(9):889–95.
- Newcomer JW. Second-generation (atypical) antipsychotics and metabolic effects. *CNS Drugs*. 2005;19(1):1–93.
- EM A, et al. Assessing activity onset time and efficacy for clinically effective antidepressant and antimanic drugs in animal models based on dominant–submissive relationships. *Neurosci Biobehav Rev*. 2007;31(6):904–19.

33. Lam RW. Onset, time course and trajectories of improvement with anti-depressants. *Eur Neuropsychopharmacol.* 2012;22(Suppl 3):S492–8.
34. Keck PE Jr, et al. Time course of antipsychotic effects of neuroleptic drugs. *Am J Psychiatry.* 1989;146(10):1289–92.
35. Masters GA, et al. Factors associated with length of psychiatric hospitalization. *Compr Psychiatry.* 2014;55(3):681–7.
36. Miettunen J, et al. Patterns of psychiatric hospitalizations in schizophrenic psychoses within the northern Finland 1966 birth cohort. *Nord J Psychiatry.* 2006;60(4):286–93.
37. Rosenblatt R, et al. Do oriental psychiatric patients receive different dosages of psychotropic medication when compared with occidentals. *Can J Psychiatry.* 1987;32(4):270–4.
38. Marazziti D, et al. The increasing challenge of the possible impact of ethnicity on psychopharmacology. *CNS spectrums.* 2021;26(3):222–31.
39. Hassan A, et al. Association of ethnicity with antipsychotic dosage using STRUCTURE analysis. *Pharmacopsychiatry.* 2013;46(4):151–5.
40. Ruan CJ, Zang YN, Wang CY, Cheng YH, Sun C, Spina E, et al. Clozapine metabolism in east Asians and Caucasians: a pilot exploration of the prevalence of poor metabolizers and a systematic review. *J Clin Psychopharmacol.* 2019;39(2):135–44.
41. Kim K, et al. Differences in drug pharmacokinetics between east Asians and Caucasians and the role of genetic polymorphisms. *J Clin Pharmacol.* 2004;44(10):1083–105.
42. Bertilsson L. Geographical/interracial differences in polymorphic drug oxidation. Current state of knowledge of cytochromes P450 (CYP) 2D6 and 2C19. *Clin Pharmacokinet.* 1995;29(3):192–209.
43. Lin KM, et al. Culture and psychopharmacology. *Psychiatr Clin North Am.* 2001;24(3):523–38.
44. Wood AJ. Racial differences in the response to drugs—pointers to genetic differences. *N Engl J Med.* 2001;344(18):1394–6.
45. Cook B, et al. Examining racial/ethnic differences in patterns of benzodiazepine prescription and misuse. *Drug Alcohol Depend.* 2018;187:29–34.
46. Farahani A, et al. Are antipsychotics or antidepressants needed for psychotic depression? *J Clin Psychiatry.* 2012;73(4):486–96.
47. McAllister-Williams RH, et al. The identification, assessment and management of difficult-to-treat depression: an international consensus statement. *J Affect Disord.* 2020;15(267):264–82.
48. Tavalaei A, et al. Length of stay at psychiatry Ward in Baqiyatallah(a.s.). *Hospital Milmed J.* 2007;9(1):43–50.
49. Chung W, et al. Determinants of length of stay for psychiatric inpatients: analysis of a national database covering the entire Korean elderly population. *Health Policy.* 2010;94(2):120–8.
50. Ithman MH, et al. Predictors of length of stay in an acute psychiatric hospital. *J Health Educ Res Dev.* 2014;2(2).
51. Jiménez R, et al. Observed-predicted length of stay for an acute psychiatric department, as an indicator of inpatient care inefficiencies. Retrospective case-series study. *BMC Health Serv Res.* 2004;4(1):4.
52. Liu CM, et al. Determinants of psychogeriatric inpatient length of stay and direct medical costs: a 6-year longitudinal study using a national database in Taiwan. *Psychiatry Clin Neurosci.* 2012;66(5):423–31.
53. Yu YH, et al. Schizophrenia, social support, caregiving burden and household poverty in rural China. *Soc Psychiatry Psychiatr Epidemiol.* 2020;55(12):1571–80.
54. Ukpong D, et al. Demographic and clinical correlates of length of stay in a Nigerian university hospital psychiatric unit. *Türk psikiyatri dergisi.* 2009;20(1):49–55.
55. Douzenis A, et al. Factors affecting hospital stay in psychiatric patients: the role of active comorbidity. *BMC Health Serv Res.* 2012;12:166.
56. Gopalakrishna G, et al. Predictors of length of stay in a psychiatric hospital. *Int J Psychiatry Clin Pract.* 2015;19(4):238–44.

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