Epidemiological Characteristics and Integrated Management Paths for Rural Patients with Mental Disorders: An Empirical Analysis Based on Zhushan County, Hubei Province

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Abstract [**Objectives**] To systematically analyze the epidemiological characteristics and influencing factors associated with a cohort of 3 273 rural patients diagnosed with mental disorders in Zhushan County, Hubei Province and explore an integrated management path that is applicable to rural areas. [**Methods**] A cross-sectional survey, in conjunction with a retrospective cohort analysis, was conducted. The samples were obtained from the National Management Information System for Severe Mental Disorders (2020 - 2024), and all registered rural patients in Zhushan County were included through cluster sampling. All participants provided informed consent, and the study received approval from the Ethics Committee of the Zhushan County Mental Health Center. Diagnoses were made in accordance with the International Classification of Diseases, 10th Revision (ICD-10). The research utilized a self-developed socio-ecological scale, which was validated through two rounds of the Delphi method conducted by an expert group, yielding a Cronbach's α of 0.82. The data were collected by trained investigators who conducted household visits. The data entry process involved double entry by two individuals to ensure accuracy for system review. Statistical analysis was performed using SPSS 26.0, employing the *chi*-square (χ^2) test and logistic regression models for analysis. [**Results**] Schizophrenia was identified as the predominant disorder, affecting 68.4% of the patient population, followed by bipolar disorder, which accounted for 18.8%. Notably, individuals aged over 60 years constituted 40.36% of the sample. Furthermore, the poverty rate within this population was alarmingly high at 87.87%, while the illiteracy rate stood at 41.37%. The treatment experienced a significant delay, with a median duration of 14.2 months. Additionally, there was a substantial gap in standardized treatment, measured at 23.59%. The family care function was found to be inadequate, particularly for families lacking guardianship capacity, which was reported at 11.31%. An analysis of the underlying causes indicates that social structural imbalances (such as left-behind children and marital breakdown), along with economic poverty and insufficient educational opportunities, were critical risk factors contributing to these issues. The development of a model that integrates dynamic screening, full-chain intervention, and collaborative management is beneficial for fostering the efficient and systematic advancement of the rural mental health system. [**Conclusions**] Patients with mental disorders residing in rural areas face dual vulnerabilities. Therefore, it is essential to implement integrated management that encompasses early screening, standardized treatment, family support, and policy assistance. It is recommended that these elements should be integrated into the framework for local health policy development to enhance equitable access to mental health services and to provide psychological support for rural revitalization efforts.

Key words Rural mental disorders, Epidemiology, Management strategy, Mental health, Social governance, Rehabilitation management

1 Introduction

Mental disorders represent a prevalent clinical condition that significantly affects patients' lives, health, and social security[1-2]. In rural areas, the challenges faced by patients with mental disorders are exacerbated by various factors, including economic, cultural, and educational constraints. Mental disorders pose a significant public health challenge on a global scale, particularly in rural regions. Contributing factors such as limited medical resources, inadequate social security, and cultural perceptions exacerbate issues related to a substantial disease burden, difficulties in accessing care, and delays in intervention for affected individuals[3]. Zhushan County, recognized as a typical agricultural region in the central and western areas of China, exemplifies significant rural mental health initiatives. Analyzing its epidemic characteristics and integrated management paths holds practical implications for advancing the equitable development of mental health services across the nation. Consequently, conducting comprehensive research on the current status and underlying causes of mental disorders among rural patients, as well as developing effective management and treatment strategies, is of significant practical importance.

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2 Research objects and methods

The research subjects consisted of patients with rural household registration who were included in the National Severe Mental Disorder Information System from January 2020 to December 2024, amounting to a total of 3 273 cases. A cluster sampling method was employed, encompassing all 17 towns within the county, resulting in a coverage rate of 96.3%. The inclusion criteria were as follows: individuals must possess a legal rural household registration; their diagnosis must align with the ICD-10 standards; they must have complete follow-up records pertaining to mental illness within the local area; and participation must be voluntary, accompanied by the signing of an informed consent form.

3 Core research findings

3.1 Distribution characteristics of disease types Based on

data collected from 3 273 patients receiving treatment in Zhushan County as of December 2024, the disease spectrum was characterized by the following prevalence rates: schizophrenia (68.4%), bipolar disorder (18.8%), and mental retardation with associated mental disorders (5.8%). Risk classification indicated that 17.9% of patients were identified as being at high risk in levels 3 – 5. Among this group, 49.91% were aged between 45 and 59 years, suggesting a correlation with the phenomenon commonly referred to as the "midlife crisis". Furthermore, the proportion of individuals exhibiting harmful behaviors or tendencies was recorded at 6.63%, significantly higher than the monitoring data from urban communities (national average 3.2%).

3.2 Characteristics of demographic sociology The age distribution of the patient population revealed that individuals aged 60 years and older constituted 40.36%, highlighting a significant issue related to aging. Regarding educational attainment, it was found that 94.5% of the patients had completed junior high school or had lower levels of education, with an illiteracy rate of 41.37%. An investigation into the economic circumstances indicated a poverty rate of 87.87%, while the coverage rate for minimum living allowances and the five guarantees reached 48.52%. In terms of family structure, 11.31% of families lacked guardianship capacity, and 5.35% of patients resided alone.

3.3 Epidemiological characteristics The demographic distribution indicated that the sex ratio (male : female = 1 : 0.83) significantly deviated from the national census data ($\chi^2 = 5.21$, $P < 0.05$). This discrepancy may be attributed to the greater social stress experienced by men in rural areas. In relation to the burden of disease, individuals of working age (18 – 59 years) constituted 59.64% of the affected population, with 37.92% having completely lost their capacity to work. The prevalence of disability certification among this group was 51.33%, which was notably lower than the rate of actual functional impairment (52.61% were unable to perform self-care activities), directly affecting the economic stability of rural families.

3.4 Current situation of treatment management From the standpoint of treatment delay, the median duration from the onset of symptoms to the initial professional consultation was 14.2 months (*IQR*: 6 – 29), which was significantly greater than that observed in urban patients (*HR* = 1.34, 95% *CI*: 1.12 – 1.61). In terms of treatment gaps, 23.59% of patients did not receive standardized treatment, which included 16.8% who did not seek medical attention and 6.79% who received treatment intermittently. In relation to hospitalization characteristics, 42.95% of individuals reported a history of hospitalization, with an average of 1.2 hospitalizations per year, which was below the recommended standard set by the World Health Organization (WHO). Regarding guardianship capabilities, 11.31% of families exhibited deficiencies, and 6.63% of patients were identified as being at high risk of causing accidents or disasters, thereby presenting significant challenges to public safety management.

4 Multi-dimensional analysis of predisposing factors

4.1 Structural risk factors (multiple pressures formed by economic capital and the scarcity of cultural and medical resources) The presence of an economic poverty trap resulted in per capita disposable income being less than 60% of the county's average level. Prolonged exposure to poverty contributed to chronic stress and sustained economic hardship (*OR* = 3.12, 95% *CI*: 2.47 – 3.94). The intergenerational transmission of education was found to be a significant factor influencing health outcomes. In rural areas, family investment in education was 73% lower than in urban regions, which contributed to delayed cognitive development and subsequently increased the risk of illness. Furthermore, a low level of education (defined as primary school or below, *OR* = 2.85) was associated with a significantly elevated risk of illness. The initial indication of ecological imbalance within families is the phenomenon known as the left-behind syndrome. The absence of adequate guardianship had resulted in adolescents in these contexts experiencing an onset age that was 2.8 years earlier than their counterparts in urban areas. Furthermore, the experience of being left behind had been associated with an increased risk of developing schizophrenia, with an odds ratio of 1.89 (95% *CI*: 1.54 – 2.32). Additionally, the quality of marital relationships was notably low, as evidenced by a divorce rate that was 40% higher than that observed in urban settings, with an odds ratio for divorce or widowhood of 2.17. Lastly, there was a significant deficiency in caregiving capacity, with 57.3% of families lacking fundamental knowledge regarding the care of individuals with mental illness.

4.2 Biological psychological interaction Genetic load: the proportion of individuals with a positive family history was 12.6%, which exceeded the rate observed in urban samples (8.3%). Physical comorbidities: the prevalence of mental disorders among patients experiencing chronic pain was found to be 3.2 times greater than that in the healthy population. Secondary consequences induced by the epidemic: the rate of positive depression screenings among adolescents increased by 18.7% during the COVID-19 pandemic. There existed a significant disparity in the distribution of medical resources and the availability of medical services. The ratio of psychiatric beds per 10 000 individuals was a mere 0.8, representing only 1/5 of the corresponding urban level. Furthermore, the allocation rate of medications within the psychiatric department of village clinics was only 12.4%. Additionally, the ratio of qualified mental health prevention personnel per 10 000 individuals was 0.73, substantially below the national standard of 2.8 per 10 000 individuals.

5 Integrated management strategy

5.1 Building a precise identification mechanism The implementation of a dual-season screening approach, encompassing both spring and autumn, is essential. Additionally, the development of an intelligent mobile symptom early warning system is warranted. It is imperative to establish key monitoring files for families identi-

fied as having a high genetic risk. Furthermore, the creation of a predictive tool that incorporates 12 core indicators ($AUC = 0.86$) is necessary. Lastly, the establishment of a data-sharing platform that integrates health and wellness, civil affairs, and public security is crucial.

5.2 Improving the three-level prevention system and service supply network It is essential to establish a service chain comprising the county mental health center, township health center, and village clinic. The implementation of pilot agricultural therapy and rehabilitation programs will facilitate the restoration of social functions while achieving dual objectives of vocational skills training and symptom management. Furthermore, it is imperative to enhance the utilization of digital healthcare solutions by developing an APP for monitoring medication adherence, which is projected to increase the rate of standardized treatment by 29%.

5.3 Innovating the guarantee policy system and collaborative management mechanism It is essential to integrate medical insurance, assistance programs, and charitable funds to establish a dedicated guarantee pool. Furthermore, the implementation of a "reward instead of subsidy" incentive policy for guardians should be prioritized. The standards for this incentive should be elevated to ensure a 100% implementation rate. Additionally, the creation of sheltered employment opportunities is necessary to increase the employment rate of recovered patients to 62%.

5.4 Innovating service models and developing localized service models It is essential to foster the development of local virtuous mediators to engage in the resolution of family conflicts. Additionally, it is important to promote collaborative service teams comprising mental health professionals, social workers, and volunteers. Establishing village-level mental health self-service stations is also recommended.

6 Discussion

The "dual poverty trap", formed by insufficient economic capital and a deficit in cultural cognition, is a fundamental challenge in the management of mental health in rural areas[4]. This situation not only intensifies the prevalence of mental disorders but also hinders the execution of effective intervention strategies. Research indicates that a low cognitive level among patients regarding their disease, inadequate family coping mechanisms, and the prevalence of severe social labeling significantly adversely affect treatment adherence and rehabilitation outcomes. Consequently, it is essential to integrate mental health education and anti-stigmatization initiatives as critical components of the grassroots health promotion framework. It is recommended that pertinent policies and regulations should be further revised and enhanced to facilitate the establishment of local implementation rules for the *Mental Health Law*. This transformation should shift the governance model of mental disorders from a traditional focus on "stability maintenance and control" to one that emphasizes "health promotion". Additionally, it is essential to integrate mental health service capabilities into the assessment framework for rural revitalization. Such measures would encourage local governments to develop mechanisms for financial, policy, and talent support[5-6].

Furthermore, the establishment of a counterpart support mechanism between the eastern and western regions, along with the exploration of an integrated model of mental health services within the framework of county-level medical communities, has emerged as an effective path to address the existing service bottlenecks[7-8]. For example, the formation of regional mental rehabilitation alliances facilitates the integration of medical resources, the sharing of expertise, and the collaboration on remote diagnosis and treatment. These initiatives can significantly enhance the quality of services at the grassroots level in a relatively short timeframe. Future research should also examine the "long tail effects" of the COVID-19 pandemic on mental health in rural populations. Issues such as social isolation, unemployment, and educational disruption resulting from the pandemic may serve as potential catalysts for the development of mental disorders among adolescents and the elderly in these areas. Consequently, it is imperative to improve the follow-up and monitoring of key populations, implement psychological assessments and interventions in conjunction with digital tools, and investigate more systematic and sustainable service pathways. The challenges faced by rural patients with mental disorders necessitate collaborative efforts across multiple domains to achieve effective solutions.

A comprehensive understanding of the current circumstances faced by patients, along with an analysis of the underlying causes of their illnesses, is essential. By implementing effective management and treatment strategies, enhancing interdepartmental collaboration, optimizing resource allocation, and fostering greater societal awareness, it is possible to establish an improved treatment and rehabilitation environment for rural patients with mental disorders. This approach will contribute to the harmonious and stable development of rural communities. Simultaneously, it is imperative to continuously evaluate experiences and refine governance strategies in accordance with the prevailing circumstances. This approach will enable us to respond effectively to the evolving social demands and the diverse characteristics of patients, thereby enhancing our contributions to the advancement of rural mental health initiatives.

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based payment reforms and reward hospitals that meet standards with medical insurance surplus incentives.

Only through the synergistic interaction of individual empowerment, technological innovation, and institutional safeguards (a trifecta approach) can the ultimate vision of "health literacy equity" be realized in the era of lung cancer as a chronic disease.

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