

## Depression Status and Its Influencing Factors Among Middle-Aged and Elderly Patients with Chronic Diseases in China: An Empirical Analysis Based on CHARLS Data (Postprint)

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### Abstract

**Background:** The number of middle-aged and elderly patients with chronic diseases is substantial; however, there is limited research on the national large-scale depressive status and its influencing factors among this population.

**Objective:** To investigate the depressive status and influencing factors among middle-aged and elderly patients with chronic diseases in China, and to provide a reference basis for improving their mental health status.

**Methods:** Utilizing data from the fifth round of the national survey conducted in 2020 by the China Health and Retirement Longitudinal Study (CHARLS), a total of 12,551 middle-aged and elderly patients with chronic diseases were selected as study subjects. Depressive status was measured using the Center for Epidemiologic Studies Depression Scale (CES-D), and chi-square test and multivariate Logistic regression analysis were used to analyze the main factors influencing depressive status in middle-aged and elderly patients with chronic diseases.

**Results:** Among middle-aged and elderly patients with chronic diseases, the proportion with depressive symptoms was (5,111/12,551). Multivariate Logistic regression analysis showed: gender (male: OR=0.613, 95%CI=0.553~0.680), age (65~<75 years: OR=0.862, 95%CI=0.769~0.965;  $\geq$  75 years: OR=0.604, 95%CI=0.510~0.716), whether living with a spouse/partner (yes: OR=0.730, 95%CI=0.648~0.822), residence (rural: OR=1.515, 95%CI=1.387~1.654), education level (junior high school: OR=0.727, 95%CI=0.657~0.805; high school and above: OR=0.561, 95%CI=0.488~0.646), social engagement (1 item: OR=0.870, 95%CI=0.793~0.956;  $\geq$  2 items: OR=0.866, 95%CI=0.779~0.963), satisfaction with child relationships (satisfied: OR=0.266, 95%CI=0.218~0.324),

smoking (OR=1.131, 95%CI=1.014~1.263), alcohol consumption (OR=0.873, 95%CI=0.795~0.959), nighttime sleep duration (6~<8 h: OR=0.539, 95%CI=0.493~0.590; ≥8 h: OR=0.443, 95%CI=0.396~0.495), BADL (impaired: OR=1.875, 95%CI=1.692~2.077), IADL (impaired: OR=2.251, 95%CI=2.030~2.496), and number of chronic diseases (2 types: OR=1.202, 95%CI=1.076~1.342; 3 types: OR=1.452, 95%CI=1.289~1.636; ≥4 types: OR=1.954, 95%CI=1.749~2.183) were influencing factors of depressive symptoms in middle-aged and elderly patients with chronic diseases ( $P<0.05$ ).

Conclusion: The prevalence of depressive symptoms among middle-aged and elderly patients with chronic diseases was 40.7%, indicating a concerning situation. Their depressive status is influenced by multiple factors. Medical and health institutions and policymakers should pay attention to their mental health and take targeted measures from individual, family, community, and other aspects to improve the situation.

## Full Text

# Analysis of Depression Status and Influencing Factors in Middle-aged and Elderly Patients with Chronic Diseases in China: An Empirical Analysis Based on CHARLS Data

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## Abstract

**Background:** Depression acts as a precipitating factor for various diseases including dementia and diabetes, with patients experiencing reduced quality of life, functional decline, emotional distress, and irritability. Studies project that depression will become the leading cause of global disease burden by 2030. The “14th Five-Year Plan for Healthy Aging” indicates that during the 14th Five-Year Plan period, China’s population aging will deepen further, with the

proportion of people aged 60 and above exceeding 20% of the total population, and more than 78% of older adults suffering from at least one chronic disease, representing a massive population of middle-aged and elderly chronic disease patients.

Chronic diseases have become a significant public health issue affecting national economic and social development. In recent years, the incidence of chronic diseases has risen rapidly. As chronic disease patients endure long-term pressures from illness and financial burdens, their risk of depression increases, yet their depressive status receives little attention from doctors and family members. Previous research on chronic disease patients has primarily focused on disease prevention and control, health service utilization, and medical expenses, with limited studies addressing depression status among chronic disease patients. Therefore, this study utilizes the latest fifth-round national survey data from the China Health and Retirement Longitudinal Study (CHARLS) to analyze the current status and influencing factors of depression among middle-aged and elderly chronic disease patients nationwide, providing a reference for improving mental health in this population.

**Methods:** Based on the fifth-round national survey data conducted by CHARLS in 2020, a total of 12,551 middle-aged and elderly chronic disease patients were selected as study participants. Depression status was measured using the Center for Epidemiologic Studies Depression Scale (CES-D), and main factors affecting depression status were analyzed using chi-square tests and multivariate logistic regression.

**Results:** Among middle-aged and elderly chronic disease patients, 5,111 individuals (40.7%) exhibited depressive symptoms. Multivariate logistic regression analysis revealed the following influencing factors: gender (male: OR=0.613, 95%CI=0.553-0.680), age (65-<75 years: OR=0.862, 95%CI=0.769-0.965;  $\geq$  75 years: OR=0.604, 95%CI=0.510-0.716), presence of spouse/partner cohabitation (yes: OR=0.730, 95%CI=0.648-0.822), residence (rural: OR=1.515, 95%CI=1.387-1.654), education level (junior high school: OR=0.727, 95%CI=0.657-0.805; senior high school and above: OR=0.561, 95%CI=0.488-0.646), social activities (1 item: OR=0.870, 95%CI=0.793-0.956;  $\geq$  2 items: OR=0.866, 95%CI=0.779-0.963), satisfaction with child relationships (satisfied: OR=0.266, 95%CI=0.218-0.324), smoking (OR=1.131, 95%CI=1.014-1.263), alcohol consumption (OR=0.873, 95%CI=0.795-0.959), nighttime sleep duration (6-<8 h: OR=0.539, 95%CI=0.493-0.590;  $\geq$  8 h: OR=0.443, 95%CI=0.396-0.495), BADL (impaired: OR=1.875, 95%CI=1.692-2.077), IADL (impaired: OR=2.251, 95%CI=2.030-2.496), and number of chronic diseases (2 types: OR=1.202, 95%CI=1.076-1.342; 3 types: OR=1.452, 95%CI=1.289-1.636;  $\geq$  4 types: OR=1.954, 95%CI=1.749-2.183) ( $P<0.05$ ).

**Conclusion:** The incidence of depressive symptoms among middle-aged and elderly chronic disease patients is 40.7%, indicating a concerning situation. Depression in this population is influenced by multiple factors. Healthcare institutions and policymakers should prioritize their mental health and implement

targeted interventions at the individual, family, and community levels.

**Keywords:** Chronic disease; Depression; Middle-aged and elderly population; China Health and Retirement Longitudinal Study; Root cause analysis

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## 1. Materials and Methods

Depression serves as a precipitating factor for multiple conditions including dementia and diabetes. Patients with depression may experience declines in quality of life and functional capacity, emotional distress, and irritability. Research indicates that by 2030, depression will become the leading cause of global disease burden. The “14th Five-Year Plan for Healthy Aging” notes that during the 14th Five-Year Plan period, China’s population aging will deepen further, with individuals aged 60 and above exceeding 20% of the total population, and more than 78% of older adults suffering from at least one chronic disease, representing a massive population of middle-aged and elderly chronic disease patients.

Chronic diseases have become a critical public health issue affecting national economic and social development. In recent years, the incidence of chronic diseases has risen rapidly. As chronic disease patients endure prolonged pressures from illness and financial strain, their risk of depression increases substantially. However, the depressive status of chronic disease patients receives scant attention from physicians and family members. Previous research on chronic disease patients has primarily focused on disease prevention and control, health service utilization, and medical expenses, with few studies examining depression status. Therefore, this study utilizes the most recent fifth-round national survey data from the China Health and Retirement Longitudinal Study (CHARLS) to analyze the current status and influencing factors of depression among middle-aged and elderly chronic disease patients across China, providing evidence to improve mental health in this population.

### 1.1 Data Source

This study extracted data from the fifth-round national survey conducted by CHARLS in 2020. CHARLS is China’s first nationally representative population survey of individuals aged 45 and above, providing researchers with a high-quality public micro-database. To investigate the depression status and influencing factors among middle-aged and elderly chronic disease patients in China, we included patients with 12 types of chronic diseases: hypertension, dyslipidemia, diabetes or elevated blood glucose, malignant tumors, chronic lung disease, liver disease, heart disease, stroke, kidney disease, stomach or digestive system diseases, arthritis or rheumatism, and asthma. After excluding individuals with missing values in key variables, 12,551 middle-aged and elderly chronic disease patients were selected as the final study sample.

The CHARLS survey obtained approval from the Biomedical Ethics Committee

of Peking University. The fieldwork protocol for the household questionnaire survey was approved under IRB number IRB00001052-11015.

## 1.2 Measurements

**1.2.1 Depression Status** Depression status was assessed using the Center for Epidemiologic Studies Depression Scale (CES-D). This scale comprises 10 self-evaluation questions, including 2 positively worded items and 8 negatively worded items. Each question offers four response options: “rarely or none of the time” (scored 0), “some or a little of the time” (scored 1), “occasionally or a moderate amount of the time” (scored 2), and “most or all of the time” (scored 3). Positively worded items were reverse-scored. A total depression score of  $\geq 10$  indicated depressive symptoms, while  $< 10$  indicated no depressive symptoms.

**1.2.2 Independent Variables** Independent variables included demographic characteristics (education level, presence of spouse/partner cohabitation, gender, age), health status [Basic Activities of Daily Living (BADL), Instrumental Activities of Daily Living (IADL), number of chronic diseases], behavioral habits (smoking, alcohol consumption, nighttime sleep duration, nap duration), economic status (medical insurance, pension insurance), satisfaction with child relationships, and social activities.

BADL assessment included six items: dressing, bathing, eating, getting in and out of bed, toileting, and controlling bowel and bladder functions. IADL assessment included six items: doing housework, cooking, shopping, making phone calls, taking medication, and managing money. For both BADL and IADL, participants who reported no difficulty in completing all items were defined as having intact function, while those reporting any difficulty were defined as having functional impairment. Social activity participation was determined based on questionnaire items asking whether respondents had engaged in various social activities during the past month, with participation in any activity counted as social engagement.

## 1.3 Statistical Analysis

Data analysis was performed using SPSS 27.0 statistical software. Categorical data were expressed as relative frequencies, and chi-square tests were used for univariate analysis. Variables showing statistically significant differences in univariate analysis were subsequently included in a multivariate logistic regression model to identify influencing factors of depressive symptoms in chronic disease patients.  $P < 0.05$  was considered statistically significant.

## 2. Results

### 2.1 Basic Characteristics of Study Participants

Among the 12,551 middle-aged and elderly chronic disease patients, 5,964 (47.5%) were male and 6,587 (52.5%) were female. A total of 4,619 (36.8%) resided in urban areas and 7,932 (63.2%) in rural areas. Most participants (10,767, 85.8%) lived with a spouse or partner, while 1,784 (14.2%) did not. Regarding education, 7,919 (63.1%) had primary school education or below, 2,935 (23.4%) had junior high school education, and 1,697 (13.5%) had senior high school education or above.

### 2.2 Prevalence of Chronic Diseases and Depression

Depressive symptoms were present in 5,111 patients (40.7%), while 7,440 (59.3%) showed no depressive symptoms. Regarding chronic disease burden, 3,546 patients (28.3%) had one chronic disease, 3,229 (25.7%) had two, 2,353 (18.7%) had three, and 3,423 (27.3%) had four or more. The three most prevalent chronic diseases were hypertension (6,210 patients, 49.5%), arthritis or rheumatism (5,997, 47.8%), and stomach or digestive system diseases (4,958, 39.5%).

### 2.3 Univariate Analysis of Depression Status

Univariate analysis revealed statistically significant differences in depressive symptom prevalence across categories of gender, age, presence of spouse/partner cohabitation, residence, education level, medical insurance, social activities, satisfaction with child relationships, smoking, alcohol consumption, nighttime sleep duration, nap duration, BADL, IADL, and number of chronic diseases ( $P < 0.05$ ). No significant difference was observed in depressive symptom prevalence among patients with different types of pension insurance.

### 2.4 Multivariate Logistic Regression Analysis

Using the presence of depressive symptoms as the dependent variable (no depressive symptoms=0, depressive symptoms=1), variables showing significant differences in univariate analysis were included as independent variables in a multivariate logistic regression analysis. Results identified the following influencing factors: gender, age, presence of spouse/partner cohabitation, residence, education level, social activities, satisfaction with child relationships, smoking, alcohol consumption, nighttime sleep duration, BADL, IADL, and number of chronic diseases ( $P < 0.05$ ).

## 3. Discussion

Based on the 2020 CHARLS data, this study found a depressive symptom prevalence of 40.7% (5,111/12,551) among middle-aged and elderly chronic disease patients. Duan Rui et al. [12] reported a 35% depressive symptom prevalence

among the general middle-aged and elderly population using 2018 CHARLS data, while Lei Puchao et al. [13] found a 40.8% prevalence among middle-aged and elderly chronic disease patients using the same dataset. These findings suggest that mental health status is poorer among chronic disease patients compared to the general population, with no significant improvement over time, highlighting the urgent need to prioritize mental health in this vulnerable group.

Multivariate logistic regression analysis revealed that male patients had lower depression risk compared to females. This may be attributed to women's disadvantaged status in terms of voice and physical strength, greater responsibilities in household labor and child-rearing, and higher susceptibility to emotional fluctuations [14-15]. Higher education levels were associated with lower depression risk, consistent with findings from Si Mingshu et al. [16]. This likely reflects that individuals with higher education possess richer social and economic resources, broader knowledge, stronger health awareness, and better self-regulation abilities for psychological stress [17].

Patients aged 65-<75 years showed depression rates 0.862 times (95%CI=0.769-0.965) those of patients aged 45-<55 years, while patients aged  $\geq 75$  years showed rates 0.604 times (95%CI=0.510-0.716) those of the youngest group. Ye Haichun et al. [18] identified the peak age for depression onset as 52 years, noting that individuals aged 45-<55 face peak pressures from caring for both aging parents and children while managing career demands, making them more vulnerable to depression. Rural-dwelling middle-aged and elderly chronic disease patients exhibited higher depression risk than their urban counterparts, likely due to substantial disparities in economic development and access to medical resources and social support between urban and rural areas in China, resulting in lower well-being among rural patients [19].

Patients without a spouse or partner and those dissatisfied with their children or without children showed higher depression risk, consistent with Duan Rui et al. [12]. This may be because spouses and children serve as primary caregivers and emotional support providers; lack of companionship and support can lead to feelings of loneliness that hinder coping with disease burden and psychological stress. Participation in more social activities was associated with lower depression risk, possibly because active social engagement enhances sense of belonging, enriches life, and reduces physical discomfort [13].

Regarding health status, impaired BADL and IADL and a greater number of chronic diseases were associated with higher depression risk, consistent with findings from Wang Yue [20] and Yan Yu [21]. Poor physical health may foster feelings of inferiority and helplessness, while functional limitations reduce opportunities for social interaction and increase economic burden and physical discomfort, thereby elevating depression risk.

In terms of behavioral habits, smokers showed higher depression risk than non-smokers, possibly because smoking as an addictive behavior causes physical discomfort that may trigger depression [22]. Conversely, alcohol consumption

was associated with lower depression risk compared to non-drinking, potentially because moderate drinking among middle-aged and elderly individuals can improve cardiovascular function and promote relaxation [23-24]. Shorter nighttime sleep duration was associated with higher depression risk, consistent with Xian Deqiang et al. [25]. Short sleep duration may activate the sympathetic nervous system, increase inflammatory markers, and stimulate inflammation-related gene expression, with inflammation closely linked to depressive symptoms. Additionally, individuals with short sleep duration experience low sleep efficiency and fragmented sleep, leading to daily fatigue and negative depressive states.

Depression among middle-aged and elderly chronic disease patients is influenced by multiple dimensions including demographic characteristics, health status, behavioral habits, satisfaction with child relationships, and social activity participation. Mental health in this population warrants urgent attention and targeted interventions. At the individual level, patients should adopt healthy lifestyles (e.g., smoking cessation, adequate sleep), actively participate in social activities, enhance communication with others, prioritize mental health, and improve psychological self-regulation capabilities. At the family level, family members should provide more companionship and care, create a supportive family environment, offer emotional support alongside physical care, alleviate negative emotions, and encourage engagement in enriching social and cultural activities. At the community level, implementation of the “Notice on Carrying Out Elderly Psychological Care Actions” issued by the National Health Commission in 2022 should be strengthened through building mental health service platforms, enhancing health education on mental health knowledge, strengthening mental health monitoring, providing timely interventions and referrals, improving service capabilities of primary-level staff, and fully leveraging community-based support networks [26].

This study has several limitations. First, as a cross-sectional study using 2020 CHARLS data, it lacks longitudinal analysis of temporal trends. Second, based on literature review and data availability, only commonly available variables were included in the influencing factor analysis; future studies should incorporate additional variables to explore factors associated with depressive symptoms.

**Author Contributions:** WEI Xuan was responsible for conceptualization, data analysis, and manuscript writing. WANG Ning conducted data verification and manuscript revision. WEI Ying performed literature review and manuscript revision. CHEN Qilin contributed to manuscript revision. ZHAO Yang supervised the overall project, provided critical revisions, and is accountable for the final version.

**Conflict of Interest:** The authors declare no conflict of interest.

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## References

- [1] SHI Meng, ZOU Yuliang. Association between afternoon nap duration and depressive symptoms among middle-aged and elderly people in China: analysis based on CHARLS data [J]. *Modern Preventive Medicine*, 2023, 50(8): 1461-1467. DOI: 10.20043/j.cnki.MPM.202209192.
- [2] Notice on Issuing the “14th Five-Year Plan for Healthy Aging”[EB/OL]. (2022-03-01) [2024-01-01]. <http://www.nhc.gov.cn/links/pqt/202203/c51403dce9f24f5882abe13962732919.shtml>.
- [3] LI Jin, ZHAO Ning, ZHANG Haiyan, et al. Analysis of mental health status and influencing factors among middle-aged and elderly chronic disease patients in a rural area of Beijing [J]. *Chinese Journal of Health Education*, 2022, 38(4): 322-327. DOI: 10.16168/j.cnki.issn.1002-0202.2022.04.009.
- [4] LI Xiao, CAI Le, CUI Wenlong, et al. Study on the prevalence and economic risk of common chronic diseases among rural elderly in Yunnan Province [J]. *Chinese General Practice*, 2019, 22(25): 3082-3087, 3093. DOI: 10.12114/j.issn.1007-9572.2019.00.545.
- [5] ZHAO Ziyin, ZHANG Jiajun, SUN Wenjun, et al. Complex multimorbidity patterns and their impact on health service utilization among Chinese elderly [J]. *Chinese General Practice*, 2024, 27(20): 2498-2504.
- [6] YU Lei, SHI Bin, JING Hailing, et al. Application of integrated medical-preventive management model in disease control among middle-aged and elderly chronic disease patients [J]. *China Health Standard Management*, 2023, 14(9): 50-54.
- [7] LI Yue, YANG Xia, XU Jingyi, et al. Study on economic risk of disease among middle-aged and elderly chronic disease patients in China: based on social-population-family levels [J]. *Health Economics Research*, 2023, 40(2): 10-13, 17. DOI: 10.14055/j.cnki.33-1056/f.2023.02.018.
- [8] ZHAO Yaohui, CHEN Xinxin, WANG Yafeng, et al. *China Health and Retirement Longitudinal Study (CHARLS) Wave 5 (2020) User's Guide*. National School of Development, Peking University, 2023.
- [9] XU Minglu, XU Wanglai, ZHANG Yan, et al. Study on the relationship between chronic diseases and depression among Chinese elderly [J]. *Chinese Journal of Health Statistics*, 2020, 37(6): 929-931. DOI: 10.3969/j.issn.1002-3674.2020.06.034.
- [10] ZHAO Y W, HAREGU T N, HE L, et al. The effect of multimorbidity on functional limitations and depression amongst middle-aged and older population in China: a nationwide longitudinal study [J]. *Age Ageing*, 2021, 50(1): 190-197. DOI: 10.1093/ageing/afaa117.
- [11] HAN Leijuan, OUYANG Wei. Study on influencing factors of home and community-based elderly care service utilization among elderly: empirical analysis based on CHARLS data [J]. *Chinese Journal of Health Policy*, 2023, 16(8):

16-23. DOI: 10.3969/j.issn.1674-2982.2023.08.003.

[12] DUAN Rui, WANG Hong. Trend analysis of depressive symptoms among middle-aged and elderly people in China from 2011 to 2018 [J]. Preventive Medicine, 2023, 35(8): 649-654. DOI: 10.19485/j.cnki.issn2096-5087.2023.08.002.

[13] LEI Puchao, WU Yangyang, LI Lingling, et al. Analysis of influencing factors of depression among middle-aged and elderly chronic disease patients in China from the perspective of health ecology [J]. Modern Preventive Medicine, 2021, 48(7): 1253-1258.

[14] PAN Feng, ZHANG Xiaoyue, GAN Yadi, et al. Study on current status and influencing factors of depression and anxiety symptoms among patients with different chronic diseases in Daxing District, Beijing [J]. Chinese Journal of Health Education, 2023, 39(10): 948-954. DOI: 10.16168/j.cnki.issn.1002-0202.2023.10.010.

[15] LI Lei, MA Mengyuan, PENG Hongye, et al. Study on prevalence and influencing factors of depressive symptoms among elderly in rural China [J]. Chinese General Practice, 2021, 24(27): 3432-3438. DOI: 10.12114/j.issn.1007-9572.2021.00.577.

[16] SI Mingshu, AI Di, HUANG Xiao, et al. Study on the impact of lifestyle behaviors on mental health of urban elderly in China: empirical research based on CHARLS2018 [J]. Chinese Health Service Management, 2023, 40(7): 552-556.

[17] JIANG Mingzhu, XIONG Juyang, SHEN Xiao, et al. Latent class analysis of lifestyle and behavioral patterns among elderly [J]. Chinese Journal of Public Health, 2020, 36(7): 998-1001. DOI: 10.11847/zgggws1119786.

[18] YE Haichun, YAN Yajie, WANG Quan. Study on depression status and influencing factors among middle-aged and elderly women [J]. Chinese General Practice, 2021, 24(36): 4574-4579. DOI: 10.12114/j.issn.1007-9572.2021.02.053.

[19] YANG Jieli, LI Xiaoju, MAO Lu, et al. Study on risk and influencing factors of depression among middle-aged and elderly patients with hypertension [J]. Chinese Preventive Medicine, 2021, 22(11): 827-832. DOI: 10.16506/j.1009-6639.2021.11.003.

[20] WANG Yue, CHEN Qing, LIU Lurong. Meta-analysis of depression detection rate and influencing factors among Chinese elderly [J]. Chinese General Practice, 2023, 26(34): 4329-4335. DOI: 10.12114/j.issn.1007-9572.2023.0269.

[21] YAN Yu, YIN Wenqiang, ZHANG Yujie, et al. Study on differences in depressive symptoms and influencing factors between urban and rural empty-nest elderly [J]. Modern Preventive Medicine, 2022, 49(3): 557-561.

[22] CHANG Yunqi, ZHENG Xiao, LI Mimi, et al. Study on urban-rural differences in depression status and influencing factors among elderly chronic dis-

ease patients [J]. Chinese General Practice, 2021, 24(10): 1254-1259. DOI: 10.12114/j.issn.1007-9572.2021.00.129.

[23] YUAN Ni, LIU Qiankun, ZHANG Ying, et al. Ordinal logistic regression analysis of influencing factors of life satisfaction among Chinese elderly: based on 2015 CHARLS data [J]. Chinese Journal of Gerontology, 2020, 40(21): 4671-4676. DOI: 10.3969/j.issn.1005-9202.2020.21.058.

[24] ZHOU Xufeng, MA Yana. Analysis of disability status and influencing factors among rural elderly in China [J]. Chinese Journal of Public Health, 2017, 33(11): 1665-1668. DOI: 10.11847/zgggws2017-33-11-32.

[25] XIAN Deqiang, SHU Hui, MA Xiaoying, et al. Analysis of current status and influencing factors of depressive symptoms among solitary elderly in China: based on 2018 CHARLS database [J]. Medical Theory and Practice, 2023, 36(20): 3440-3442, 3439. DOI: 10.19381/j.issn.1001-7585.2023.20.006.

[26] Notice of the General Office of the National Health Commission on Carrying Out Elderly Psychological Care Actions [EB/OL]. (2022-06-20) [2024-01-01]. <http://www.nhc.gov.cn/llicks/pqt/202206/c8cfbfd7dd464bc0afc6fssafe170bbb.shtml>.

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