Psychology Research and Behavior Management

Dovepress
Taylor & Francis Group

Open Access Full Text Article

ORIGINAL RESEARCH

Urban-Rural Disparities in Depressive Symptoms Among Employed Individual: Education Plays an Important Role

Congshang Xie*, Zhe Zhao*, Lei Gao*, Lei Yuan, Lijuan Liu

Department of Health Management, Faculty of Military Health Service, Naval Medical University, Shanghai, 200433, People's Republic of China

*These authors contributed equally to this work

Correspondence: Lijuan Liu, Email liulijuan79@sina.com; Lei Yuan, Email yuanleigz@163.com

Objective: Focusing on the relationship between education level and the occurrence of depressive symptoms, the purpose of this study was to investigate the factors influencing urban-rural differences in depressive symptoms among employed Chinese workers and to measure the contribution of relevant influencing factors.

Measurements: This study utilized the nationally representative resampled data from the China Family Panel Studies (CFPS) in 2018. A binary logistic regression model was established to explore the major factors influencing depressive symptoms among employed individuals. The Fairlie decomposition method was employed to investigate the impact of education level and other influencing factors on the urban-rural differences in the occurrence of depressive symptoms.

Results: The proportion of depressive symptoms among employed persons in China was 14.51%. The results showed that the proportion of depressive symptoms was higher among rural workers (17.09%) than urban workers (11.75%). The Fairlie model was developed with 65.70% explanatory power, and the differences in depressive symptoms between urban and rural employed persons were mainly related to literacy (39.10%), self-rated health (12.39%), life satisfaction (8.36%), job satisfaction (7.60%), marital status (−4.96%), gender (−3.61%), chronic disease status (2.99%) and BMI (1.41%) were related.

Conclusion: This study found that the prevalence of depressive symptoms was higher among rural employed persons than among urban employed persons, which was mainly related to the differences between urban and rural residents in factors such as education level, health status and marital status. The Chinese government should pay more attention to the mental health of the working population and take measures to reduce the differences in depressive symptoms between urban and rural areas in China.

Keywords: employed person, rural-urban differences, influencing factor, depressive symptoms, decomposition analysis

Introduction

According to the World Health Organization (WHO), approximately 1 billion people worldwide are currently experiencing mental health disorders, with one person losing their life to suicide every 40 seconds due to mental disorders. In its 2012 report titled "Depression: A Global Crisis", the WHO identified depression as the second largest burden of disease in China, projecting it to become the leading cause of global disease burden by 2030. Various studies from different countries have reported a significant increase in anxiety and depression rates among the population since the outbreak of the COVID-19 pandemic in 2019. People from different countries and professions have been widely affected by this pandemic, contributing to increased instances of mental disorders.[1–3] The prevalence of depression in the population has increased,[4–6] Severely harming the physical and mental health of the population, a 2022 mental health survey in China revealed that the current number of individuals with depression in the country is 95 million, with approximately 280,000 people committing suicide each year, 40% of whom suffer from depression.

Depression is a common mental disorder with associations to social factors, physical health conditions, and functional impairments.[7–9] The onset of depression is influenced by various factors, including gender and age,[10,11] marital status,[12]

Received: 24 December 2024
Accepted: 13 February 2025
Published: 25 February 2025

educational level, and income status,[13–16] chronic diseases,[17] medical insurance coverage,[18,19] smoking,[20] alcohol consumption,[21] among others. Among them, education level may be a key influencing factor of depression. Studies have shown that a majority of health outcomes are determined by the level of education,[22] and education significantly impacts the likelihood of experiencing adverse psychological health symptoms as well as the severity of these symptoms.[23] Considering that the factors influencing depression may affect the future trends of depression development in urban and rural areas of our country and the quality of life of the public, this article will analyze based on the factors influencing depression, focusing on exploring the differences in depression between urban and rural areas by education level, providing a reference for subsequent related research.

Previous cohort studies have shown that depression has a greater adverse impact on employed individuals compared to other chronic diseases,[24] Foreign scholars conducting research in countries such as the United States and South Africa have concluded that depression increases the risks of unemployment, job turnover, and absenteeism among employed individuals.[25–27] Adequate labor force plays a crucial role in the development of a country. While employed individuals contribute significantly to global industrial development and economic growth, the health conditions of this population group should also be widely acknowledged. As of the end of 2022, China had a total of 733.51 million employed individuals, with 459.31 million in urban areas, accounting for 62.6% of the total employed population.[28] Depression poses severe harm to various aspects of human mental and psychological well-being, and the prevalence of depressive symptoms among both urban and rural workers in China is significant.[29–31]

In China, distinct urban and rural development mechanisms have fostered a pronounced "dual structure" in various aspects[32] such as the basic public service system, infrastructure development, spatial organization, and other dimensions, resulting in contrasting educational levels, economic conditions, physical and mental well-being and other factors between urban and rural populations.[33,34] Depression poses severe harm to various aspects of human mental and psychological well-being, and the prevalence of depressive symptoms among both urban and rural workers in China is significant.[7] Some studies have indicated disparities in depression rates among urban and rural laborers in China, with a higher prevalence of depressive symptoms observed in rural areas compared to urban areas.[31] Qin et al found that the regional differences in depressive symptoms in China are noteworthy: the prevalence of depressive symptoms in rural areas is 41.21%, significantly higher than the 31.49% in urban areas.[35] Li et al found in a cohort study involving 9140 workers that the incidence of depression among rural workers was higher than that among urban workers.[36] A study on the elderly in a province of China showed that the prevalence of depression among rural elderly was 9.08%, higher than the 6.48% prevalence among urban elderly.[37] Additionally, this finding contrasts with conclusions from research in other countries, which suggested lower prevalence of depressive symptoms in rural areas compared to urban areas.[14,38] Consequently, further exploration is needed to understand the primary factors contributing to the urban-rural disparity in depressive symptoms.

Extensive literature review reveals that previous studies have predominantly focused on the urban-rural disparities in depression symptoms among the elderly,[39–41] with fewer investigations into such disparities among employed individuals. This study takes employed residents aged 16 and above in China as the research subjects, aiming to analyze the factors influencing the differences in depressive symptoms between urban and rural areas and their respective contributions. The study employs binary logistic regression to explore the factors associated with depressive symptoms among employed individuals in urban and rural regions of China. Additionally, it uses the Fairlie decomposition method to investigate the impact of each factor on the urban-rural differences in the occurrence of depressive symptoms. The aim is to provide a basis for precise prevention and control policies for depressive symptoms among employed individuals. Given the large number of people employed in China and the higher risk of illness, there is an urgent need for related research. Hence, utilizing data from the China Family Panel Studies (CFPS), this study preliminarily explores to what extent demographic characteristics, sociological features, personal lifestyles, and health conditions explain the urban-rural disparities in depression symptoms among employed individuals in China.

Methods and Materials

Data Sources and Samples

The data are derived from the China Family Panel Studies (CFPS) in 2018. The CFPS is conducted by the Institute of Social Science Survey (ISSS) at Peking University. The data source and design report of this project can be accessed here:isss.pku.edu.cn/cfps/. It is a major project funded by Peking University and the National Natural Science Foundation of China. The survey covers 25 provinces/ municipalities/ autonomous regions in China, representing approximately 95% of the total population (excluding Hong Kong, Macao, and Taiwan). Therefore, the CFPS sample can be considered representative of the entire country. The survey questionnaire comprises five parts: household member questionnaire, household economic questionnaire, individual self-report questionnaire, questionnaire answered by parents of minors, and individual proxy questionnaire. The fifth wave of the CFPS used in this study was conducted from 2018 to 2019, with approximately 15,000 households visited and about 44,000 individual questionnaires collected. This study was approved by the Ethics Committee of Peking University (No. IRB00001052-14,010). 2018 CFPS national resampling data original sample size was 24,465.

The inclusion criteria for this study are as follows. First, participants must be currently employed. Second, they must be aged 16 or older. Third, individuals with missing values in the CES-D 8 scale, demographic characteristics, sociological features, personal lifestyle, or health status were excluded. After excluding invalid data, 12,953 individuals were included in the study, comprising 6254 employed individuals from urban areas and 6699 employed individuals from rural areas (Figure 1).

Measurement of Depressive Symptoms

We used the short version of the Centre for Epidemiological Studies Depression Scale-8 items (CES-D 8) to measure depressive symptoms in this study. The CES-D 8 scale consists of 8 items (including 2 reverse scored items), each item is assigned a score of 0–3, and the answers are assigned as follows: 0 = hardly ever (<1 day), 1 = some of the time (1–2 days), 2 = often (3–4 days), and 3 = most or all of the time (5–7 days) were assigned as follows: 0=almost never (<1 day), 1=some of the time (1–2 days), 2=frequently (3–4 days), and 3=most or all of the time (5–7 days), with scores ranging from 0–24, with higher scores indicating more severe depressive symptoms.[42] The scale has been widely used in previous studies, which have demonstrated that its psychometric properties are suitable for Chinese's cultural context. It has also been sufficiently validated for measuring depressive symptoms in both urban and rural populations,[42] with an internal consistency Cronbach's α value of 0.778 for the CES-D 8,[43] indicating that the internal consistency of the

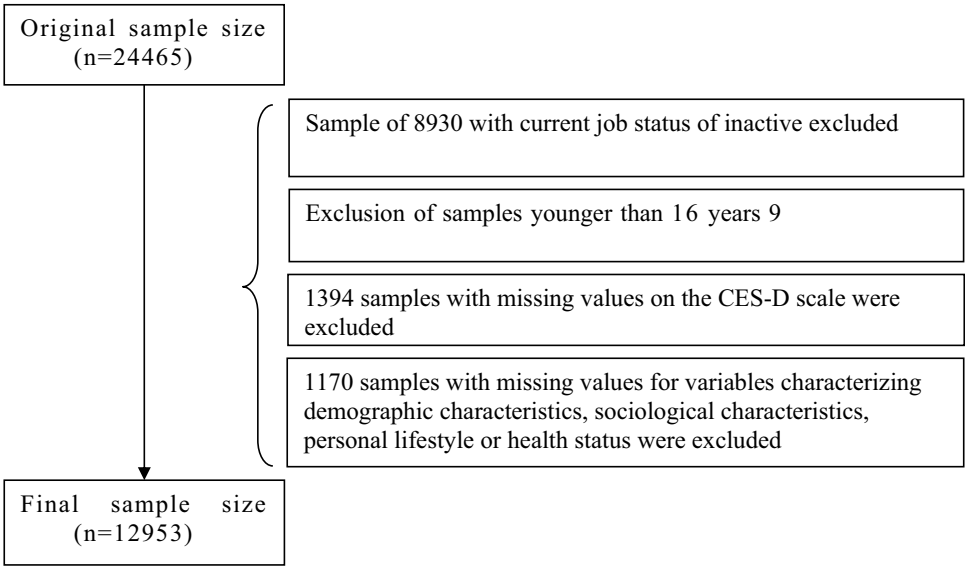

Figure 1 Flowchart of study participant.

questionnaire is at a reasonable level. In accordance with several previous studies that defined 10 as the threshold score, our study followed this and participants were defined as presenting with depression if their score was greater than or equal to 10.[44,45]

Grouping Variables

The respondents were categorized as rural or urban based on the nature of their household registration at the time of the survey.

Covariates

To obtain more reliable results, we controlled for a range of potential confounders. Factors including demographic characteristics, sociological characteristics, personal lifestyle, health status, and satisfaction were included with reference to a large number of studies on depression; demographic characteristics included age, gender, BMI, and education level; sociological characteristics included marital status, self-rated income, and health insurance; personal lifestyle included smoking, alcohol consumption, and exercise; health status included self-rated health, chronic illness, and satisfaction included job satisfaction and life satisfaction.

Demographic indicators were classified as follows: age was classified as 16≤age≤44, 45≤age≤64 and 65≤age; gender was classified as male and female; BMI was calculated by dividing body weight (kg) by the square of height (m), and was classified according to the labeling into four categories: <18.5, 18.5–23.9, 24.0–27.9, and ≥28.0; education level was classified as illiterate, elementary school, junior high school, high school/specialized school, and bachelor's degree and above according to the education obtained.

Indicators of sociological characteristics are categorized as follows: marital status is categorized as not married and married; self-assessed income, ie, the subjective evaluation of the respondent, is categorized as low, medium and high; and health insurance is categorized as no and yes. Indicators of personal lifestyle were categorized as follows: current smoking was categorized as yes and no; current alcohol consumption was categorized as yes and no; and exercise was categorized as yes and no.

The health status indicators categorize them as follows: SRH is a questionnaire entry question collection that categorizes the results into good health (answered as very good or good) and poor health (answered as fair, bad, or very bad); and chronic disease status is categorized as yes or no, ie, whether or not one is suffering from a chronic disease.

Indicator of satisfaction: job satisfaction was assessed based on the survey item "How satisfied are you with your job?" and categorized into two groups: satisfied (responding "fairly satisfied" or "very satisfied") and dissatisfied (responding "very dissatisfied" or "not very satisfied"). Life satisfaction was evaluated using the survey item "Rate your overall life satisfaction on a scale from 1 to 5, where 1 is very dissatisfied and 5 is very satisfied". A higher score indicates greater satisfaction with one's life.

Statistical Analysis

Descriptive statistics were used to analyze the general information characteristics such as demographic characteristics, sociological characteristics, personal lifestyle, health status and satisfaction, chi-square test and Wilcoxon rank-sum test were used to analyze the distributional characteristics of depressive symptoms among urban and rural employed persons, variables with statistically significant differences were included in the regression model for further examination. Given that the variables are dichotomous, a binary logistic regression model was employed to investigate the primary factors influencing depression among employed individuals in urban and rural areas. Finally, Fairlie model decomposition was used to analyze the influencing factors and contributions to the differences in depressive symptoms between urban and rural employed persons. The above statistical analyses were performed using Stata MP17.0 software. The level of statistical significance was defined as 0.05.

Decomposition Analysis

To further analyze the specific reasons for the urban-rural differences in depressive symptoms among employed individuals in China, factors with statistically significant differences were selected as independent variables. A decomposition analysis was then conducted to examine the contributions of these variables to the urban-rural differences in depression among employed individuals. Because the outcome variable was a dichotomous variable, we used Fairlie's nonlinear decomposition to decompose the difference in depressive symptoms into the contributions of various factors.[46] Fairlie decomposition analysis (FDA) is a frequently employed methodology in studies aimed at ascertaining the impact of disparate factors on a dichotomous dependent variable. The results of previous studies have indicated that FDA is a more effective method for quantifying the contribution and significance of various influencing factors.[47] Therefore, this study employs the Fairlie decomposition model to analyze the contributions of different factors to the outcome variable (depressive symptoms). This statistical model helps identify the contributions of each influencing factor and thereby reveals the sources of differences between urban and rural areas. According to Fairlie's[48] study, the nonlinear equation $Y = F\left(X\hat{\beta}\right)$ of the decomposition can be written as:

$$\overline{Y}^{a} - \overline{Y}^{b} = \left[\sum_{i=1}^{N^{a}} \frac{F\left(X_i^{a}\beta^{a}\right)}{N^{a}} - \sum_{i=1}^{N^{b}} \frac{F\left(X_i^{b}\beta^{a}\right)}{N^{b}}\right] + \left[\sum_{i=1}^{N^{b}} \frac{F\left(X_i^{b}\beta^{a}\right)}{N^{b}} - \sum_{i=1}^{N^{b}} \frac{F\left(X_i^{b}\beta^{b}\right)}{N^{b}}\right]$$

$\overline{Y}^{a}$, and $\overline{Y}^{b}$ is the mean probability of the binary outcome of depressive symptoms in the two groups, F is the cumulative distribution function of the logistic distribution, and $\overline{Y}^{a} - \overline{Y}^{b}$ representing the total variance due to group differences, the N^{a} and N^{b} is the sample size of the two populations. The first half of the equation is the interpretable part and the second half is the non-interpretable part, ie, the first term in parentheses represents the portion of the gap due to group differences in observed characteristics and the portion attributable to differences in estimated coefficients, and the second term represents the portion due to differences in Y levels.

Results

Participant Characteristics

A total of 12,953 respondents were included in this study, including 6254 (48.28%) in urban areas and 6699 (51.72%) in rural areas. Table 1 shows the results of descriptive statistical analysis of employed persons in urban and rural areas in

Table 1 Distribution of the Variables in Rural and Urban Respondents

Variable	Residence		x^2/z	P
	Rural [n (%)/$\overline{x} \pm SD$]	Urban [n (%)/$\overline{x} \pm SD$]		
Depressive symptoms			74.325	<0.001
No	5554(82.91)	5519(88.25)		
Yes	1145(17.09)	735(11.75)		
Age (years)			331.549	<0.001
16–44	2696(40.24)	3399(54.35)		
45–64	3086(46.07)	2441(39.03)		
≥65	917(13.69)	414(6.62)		
Gender			0.940	0.332
Male	3644(54.40)	3455(55.24)		
Female	3055(45.60)	2799(44.76)		
BMI (kg/m2)			33.862	<0.001
<18.5	504(7.52)	387(6.19)		
18.5–23.9	3725(55.61)	3306(52.86)		
24.0–27.9	1842(27.50)	1992(31.85)		
≥28	628(9.37)	569(9.10)		

(*Continued*)

Table 1 (Continued).

Variable	Residence		x^2/z	P
	Rural [n (%)/$\bar{x} \pm SD$]	Urban [n (%)/$\bar{x} \pm SD$]		
Education level			0.001	<0.001
Illiteracy	1952(29.14)	743(11.88)		
Primary school	1625(24.26)	933(14.92)		
Middle school	2038(30.42)	1973(31.55)		
High school / Junior college	939(14.02)	1904(30.44)		
Bachelor or above	145(2.16)	701(11.21)		
Marital status			22.259	<0.001
Not married	920(13.73)	1045(16.71)		
Married	5779(86.27)	5209(83.29)		
Self-rated income			71.293	<0.001
Poor	1899(28.35)	1883(30.11)		
So so	3150(47.02)	3212(51.36)		
Rich	1650(24.63)	1159(18.53)		
SRH			4.984	<0.001
Bad	2012(30.03)	1406(22.48)		
Good	4687(69.97)	4848(77.52)		
Chronic disease status			51.014	<0.001
No	5665(84.56)	5556(88.84)		
Yes	1034(15.44)	698(11.16)		
Smoking			1.710	0.191
No	4410(65.83)	4185(66.92)		
Yes	2289(34.17)	2069(33.08)		
Drinking			0.789	0.374
No	5383(80.36)	5064(80.97)		
Yes	1316(19.64)	1190(19.03)		
Exercise			87.071	<0.001
No	4035(60.23)	3258(52.09)		
Yes	2664(39.77)	2996(47.91)		
Medical insurance			15.190	<0.001
No	393(5.87)	474(7.58)		
Yes	6306(94.13)	5780(92.42)		
Job satisfaction			23.156	<0.001
Dissatisfied	1066(15.91)	809(12.94)		
Satisfied	5633(84.09)	5445(87.06)		
Life satisfaction	6.20±1.69	6.07±1.59	6.286	<0.001

Note: The chi-square test was used for categorical variables and the Wilcoxon rank sum test for continuous variables.

China. We found that 14.51% of the employed persons showed depressive symptoms and 85.49% had no depressive symptoms. A higher percentage of rural employed persons (17.09%) showed depressive symptoms than urban employed persons (11.75%) (P<0.001). The results of chi-square test showed that there were differences in the distribution of 11 factors of age, education level, marital status, self-assessed income status, self-assessed health status, chronic disease status, exercise, BMI, health insurance status, job satisfaction and life satisfaction between rural and urban employed persons, and there were no differences in the distribution of 3 factors of gender, smoking and alcohol consumption.

Comparison of the Distribution of Variables Across Depression States

Table 2 shows the distribution of covariates among rural and urban employed persons in different states of depression. The results show that the covariates of rural and urban employed persons have different distributional characteristics, with the specific factors of difference being three factors: age, smoking, and health insurance status.

Table 2 Distribution of the Variables in DS and Non-DS Respondents

Variable	Rural				Urban			
	Non-ds [n (%)/ $\bar{x} \pm SD$]	Ds [n (%)/$\bar{x} \pm SD$]	x^2/z	P	Non-ds [n (%)/$\bar{x} \pm SD$]	Ds [n (%)/$\bar{x} \pm SD$]	x^2/z	P
Age (years)			33.294	<0.001			5.506	0.064
16–44	2322 (41.8)	374 (32.7)			3026 (54.83)	373 (50.75)		
45–64	2497 (45.0)	589 (51.4)			2138 (38.74)	303 (41.22)		
≥65	735 (13.23)	182 (15.90)			355 (6.43)	59 (8.03)		
Gender			54.066	<0.001			18.215	<0.001
Male	2420 (43.57)	635 (55.46)			2416 (43.78)	383 (52.11)		
Female	3134 (56.43)	510 (44.54)			3103 (56.22)	352 (47.89)		
BMI (kg/m2)			31.141	<0.001			12.481	0.006
<18.5	378 (6.81)	126 (11.00)			323 (5.85)	64 (8.71)		
18.5–23.9	3080 (55.46)	645 (56.33)			2906 (52.65)	400 (54.42)		
24.0–27.9	1575 (28.36)	267 (23.32)			1784 (32.32)	208 (28.30)		
≥28	521 (9.38)	107 (9.34)			506 (9.17)	63 (8.57)		
Education level			133.225	<0.001			43.786	<0.001
Illiteracy	1484 (26.72)	468 (40.87)			612 (11.09)	131 (17.82)		
Primary school	1328 (23.91)	297 (25.94)			811 (14.69)	122 (16.60)		
Middle school	1757 (31.63)	281 (24.54)			1734 (31.42)	239 (32.52)		
High school / Junior college	847 (15.25)	92 (8.03)			1715 (31.07)	189 (25.71)		
Bachelor or above	138 (2.48)	7 (0.61)			647 (11.72)	54 (7.35)		
Marital status			31.746	<0.001			32.527	<0.001
Not married	703 (12.66)	217 (18.95)			868 (15.73)	177 (24.08)		
Married	4851 (87.34)	928 (81.05)			4651 (84.27)	558 (75.92)		
Self-rated income			97.629	<0.001			126.166	<0.001
Poor	1443 (25.98)	456 (39.83)			1531 (27.74)	352 (47.89)		
So so	2733 (49.21)	417 (36.42)			2940 (53.27)	272 (37.01)		
Rich	1378 (24.81)	272 (23.76)			1048 (18.99)	111 (15.10)		
SRH			258.557	<0.001			203.748	<0.001
Bad	1441 (25.95)	571 (49.87)			1089 (19.73)	317 (43.13)		
Good	4113 (74.05)	574 (50.13)			4430 (80.27)	418 (56.87)		
Chronic disease status			79.527	<0.001			59.709	<0.001
No	4796 (86.35)	869 (75.90)			4965 (89.96)	591 (80.41)		
Yes	758 (13.65)	276 (24.10)			554 (10.04)	144 (19.59)		
Smoking			4.867	0.027			0.264	0.607
No	3624 (65.25)	786 (68.65)			3687 (66.81)	498 (67.76)		
Yes	1930 (34.75)	359 (31.35)			1832 (33.19)	237 (32.24)		
Drinking			20.877	<0.001			4.779	0.029
No	4407 (79.35)	976 (85.24)			4447 (80.58)	617 (83.95)		
Yes	1147 (20.65)	169 (14.76)			1072 (19.42)	118 (16.05)		
Exercise			4.887	0.027			18.084	<0.001
No	3312 (59.63)	723 (63.14)			2821 (51.11)	437 (59.46)		
Yes	2242 (40.37)	422 (36.86)			2698 (48.89)	298 (40.54)		
Medical insurance			5.402	0.020			3.326	0.068
No	309 (5.56)	84 (7.34)			406 (7.36)	68 (9.25)		
Yes	5245 (94.44)	1061 (92.66)			5113 (92.64)	667 (90.75)		
Job satisfaction			103.751	<0.001			165.406	<0.001
Dissatisfied	769 (13.85)	297 (25.94)			604 (10.94)	205 (27.89)		
Satisfied	4785 (86.15)	848 (74.06)			4915 (89.06)	530 (72.11)		
Life satisfaction	6.36± 1.56	5.44± 2.05	13.992	<0.001	6.21± 1.49	4.99± 1.92	16.884	<0.001

Abbreviation: DS, depression.

https://doi.org/10.2147/PRBM.S499487

Logistic Model Results

Figure 2 demonstrates the results of logistic modeling for depressive symptoms among rural and urban employed persons. Among rural employed persons, BMI<18.5kg/m2 (OR=1.415), having chronic disease conditions (OR=1.453), having smoking (OR=1.262), and job dissatisfaction (OR=1.698) were the risk factors for depressive symptoms; males (OR=0.642), having BMI of 24.0–27.9kg/m2 (OR= 0.835), education level (elementary, OR=0.813; middle School, OR=0.649; high school/specialty, OR=0.412; bachelor's degree and above, OR=0.189), being in a Marriage (OR=0.510),

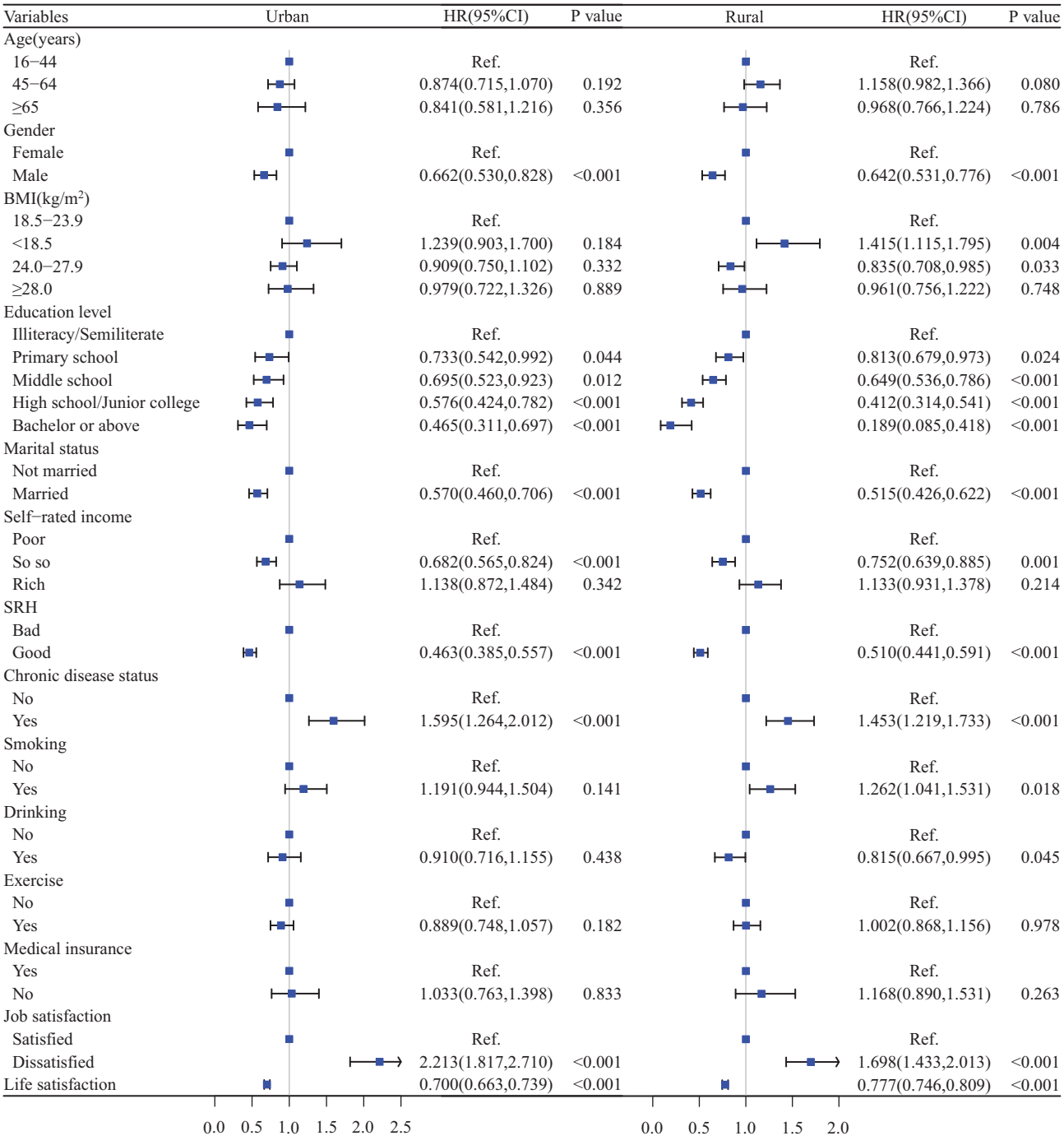

Figure 2 Results of Logistic model in rural and urban employed personnel.

average self-rated income (OR=0.752), good SRH (OR= 0.510), having alcohol (OR=0.815) and life satisfaction (OR=0.777) were protective factors for depressive symptoms.

Among urban employed persons, having a chronic disease condition (OR=1.595) and job dissatisfaction (OR=2.213) were risk factors for depressive symptoms; male (OR=0.662), education level (elementary school, OR=0.733; middle school, OR=0.695; high school/specialty, OR=0.576; bachelor's degree and above, OR =0.465), married (OR=0.570), self-rated income in general (OR=0.682), good SRH (OR=0.463), and life satisfaction (OR=0.700) were protective factors for depressive symptoms.

Thus, the main factors that differentiate depressive symptoms between rural and urban employed people are BMI <18.5 kg/m^2 (OR=1.415) and having smoked (OR=1.262) are risk factors only in rural areas; BMI of 24.0–27.9 kg/m2 (OR=0.835) and having consumed alcohol (OR=0.815) are protective factors only in rural areas.

Decomposition Analysis

The results of previous studies show that Fairlie decomposition based on logistic regression can solve the probabilistic decomposition problem of the binary choice model and can clearly derive the contribution of each observed factor to the difference in depression between urban and rural employed persons[49] The results of the Fairlie decomposition are summarized in the following table To ensure the stability and reliability of the results, we used statistical software to repeat the decomposition model 100 times (Decomposition replications (100)), and Table 3 demonstrates the results of the decomposition model for the difference in depressive symptoms between rural and urban employed persons. The results show that 65.70% of the difference in depressive symptoms is due to observed factors and 34.30% of the difference is due to unobserved factors, ie, our observed indicators explain 65.70% of the difference in depressive symptoms among urban employed persons. The results of this study confirm that education level (39.10%), self-rated health (12.39%), life satisfaction (8.36%), job satisfaction (7.60%), marital status (−4.96%), gender (−3.61%), chronic disease status (2.99%) and BMI (1.41%) are significant in explaining the difference in depressive symptoms (P>0.05).

Table 3 Fairlie Decomposition of Depression Disparity Between Rural and Urban Employed Personnel

Terms of Decomposition	**Depression**				
Difference	0.05339625				
Explained (%)	0.03508268 (65.70)				
Non-explained (%)	0.01831357 (34.30)				
Contribution to difference	**β**	**P**	**Contribution (%)**	**(95% CI)**	
Age	0.0006067	0.691	1.14	−0.0023883	0.0036016
Gender	−0.0019281	0.015	−3.61	−0.0034887	−0.0003675
BMI	0.0007522	0.007	1.41	0.0002056	0.0012988
Education level	0.0208804	<0.001	39.10	0.0156411	0.0261197
Married status	−0.0026469	<0.001	−4.96	−0.0036326	−0.0016613
Self-rated income	0.0000647	0.533	0.12	−0.0001388	0.0002681
SRH	0.0066141	<0.001	12.39	0.0049703	0.008258
Chronic disease conditions	0.0015943	<0.001	2.99	0.000747	0.0024416
Smoking	0.0008934	0.078	1.67	−0.0001017	0.0018886
Drinking	−0.0000075	0.925	−0.01	−0.0001644	0.0001494
Exercise	0.00000808	0.988	0.02	−0.0010553	0.0010715
Medical insurance	−0.0002891	0.250	−0.54	−0.0007814	0.0002032
Job satisfaction	0.0040595	<0.001	7.60	0.0027656	0.0053533
Life satisfaction	0.0044639	<0.001	8.36	0.0033235	0.0056043

https://doi.org/10.2147/PRBM.S499487

Discussion

In this study, we investigated the relationship between demographic characteristics, sociological characteristics, personal lifestyle, and health status of urban and rural employed persons and depressive symptoms in mainland China, and quantitatively analyzed the extent to which these factors contributed to the differences in depressive symptoms between urban and rural employed persons in China. This study confirmed the factors contributing to the differences in depressive symptoms among employed individuals in urban and rural areas of China, with the level of education having the highest contribution, accounting for 39.10%. The findings provide new evidence for the differences in depressive symptoms between urban and rural employed populations in China. This can help inform or adjust the mental health prevention and control policies for employed individuals in China, thereby improving population health.

Prevalence Rate

The present study showed that the percentage of depressive symptoms was higher among the rural working population (17.09%) than the urban population (11.75%), which is similar to the findings of scholars such as Wanlian Li, Fei Sun, and Anderson on the depressive symptoms of Chinese laborers,[31,36] which also confirmed the significant urban-rural differences in depressive symptoms among employed Chinese workers. However, compared with the findings of foreign scholars such as Sarah Romans, Sushmitha Kasturi Sushmitha Kasturi et al,[14,38] which may be related to China's unique dualistic urban-rural structure. Since 1958, the Chinese government has introduced a policy of dual urban-rural structure,[50] ie, the social structure is characterized by urban-rural household registration[31] which restricts rural labor migration to urban areas, thus leading to urban-rural differences in social support, employment treatment, medical care, cultural level, allocation of social resources, welfare policies, and many other aspects of China's working population[7,51–53] These urban-rural differences may be one of the main reasons for the health differences between urban and rural workers.

Logistic Regression Results

Multifactorial logistic regression analysis further revealed differences in the correlates of depressive symptoms between urban and rural working people in China. Among them, Gender, BMI, education, level, married, status, self-rated, income, SRH, chronic disease conditions, Job satisfaction, Life satisfaction, Smoking, and Drinking are key indicators of depressive symptoms, many of which are similar to findings by other researchers.[7,31,54] In this paper, the study found common problems in rural and urban areas, males are less likely to have depressive symptoms than females, non-remarried employed people are more likely to have depressive conditions than married, the less educated, the worse SRH, the worse self-rated income status, chronic diseases, job and life satisfaction, the higher the risk of depressive symptoms, which may be due to the lower socio-economic status of this section of the population, personal emotional emptiness, belonging to vulnerable groups in society, heavier psychological burdens, poorer living conditions, less access to good medical support, and are highly susceptible to negative feelings about society and themselves, while those who are less aware of their own health status and who suffer from illnesses may also suffer from disease-induced pains or limitations that have an adverse effect on their physical level, which can trigger depressive moods.[7,10,12,16,17,55] In addition, we found that the presence of smoking and rural employed people with BMI <18.5 both increased the risk of developing depressive symptoms, probably because such people have more stressful lives, jobs, and average economic conditions, which can lead to more depressive situations. Interestingly, a BMI between 24–27.9 was a protective factor for rural employed persons, a result consistent with the study of Luo Hui-Qiang et al.[56] It is worth noting that the results of this study showed that employed persons in rural areas who have a habit of drinking alcohol are less likely to experience depressive symptoms, which is contrary to the findings of Min Hewei et al[57] which may be related to the age and environment of the respondents, and the specific reasons need to be further investigated.

Causes of Rural-Urban Differences in Depressive Symptoms

There are obvious urban-rural differences in the depressive symptoms of Chinese employed people, and the results of Fairlie's model show that this part of the difference is mainly due to eight factors, namely, education level (39.10%), self-assessed health status (12.39%), life satisfaction (8.36%), job satisfaction (7.60%), marital status (−4.96%), gender

(−3.61%), chronic disease status (2.99%), and BMI (1.41%), and all other factors except gender are intervenable factors. In addition, we found that the indicator of education level has the highest contribution (39.10%), which indicates that when urban and rural employed people have the same education level, the difference in depressive symptoms between urban and rural areas will be reduced by 39.10%, ie, education level is the most important factor affecting the difference in depressive symptoms between urban and rural employed people. Similar conclusions have been drawn in previous studies. For instance, in a study on the urban-rural differences in depression among elderly individuals with hypertension in China, it was found that the number of years of education had the highest contribution, reaching 63.07%.[58] This may be based on China's inherent urban-rural dual structure, the unbalanced distribution of urban and rural educational resources and welfare policies, which leads to a large difference in the education level of urban and rural employed people, and people with lower education levels generally work in units with poorer welfare and greater labor, which makes them more susceptible to depressive psychology. Therefore, adjusting and improving the level of culture and education in urban and rural areas is an important direction for addressing the symptoms of depression in urban and rural areas.

Policy Recommendations

In summary, our study can make more meaningful policy recommendations. For the mental health policy of the working people, one is to increase the investment in rural education resources, encourage all sectors of society to actively participate in the rural education improvement project, improve the quality of rural education, strengthen the construction of rural teachers, improve the teaching level of rural teachers, optimize the rural education infrastructure, realize the sharing and integration of education information technology, and share the urban high-quality education resources by applying on-line teaching and essentially solving the problem of depressing the problem of differences. Secondly, health education should be emphasized, and health concepts can be cultivated regularly through various forms such as announcements, community presentations, and film education, so as to prompt working people of all ages to raise their awareness of health promotion, quit smoking and limit alcohol, eat nutritiously with food, and develop good living habits. Thirdly, the government should pay more attention to rural groups, especially rural working people in poor economic conditions, low literacy, and poor health, and give reasonable consideration to tilting health insurance and employment policies, and formulate targeted assistance programs, such as China's State Council's "14th Five-Year" Employment Promotion Plan, which has been issued in recent years, calls for improving the quality of employment, expanding the space for agricultural employment, and improving the all-around public employment system, as well as improving the quality of employment. Expanding agricultural employment space, and improving the all-round public employment service system.[59]

Limitation

Our study has several limitations. First, our definition of depressive symptoms was based on the CES-D 8 scale, which, although widely validated with good reliability and validity, is still self-reported, and because of the different scale standard settings and work environments, the depression scale scores in this paper are not equivalent to the severity of the illness as assessed by specialists, and there is a lack of accuracy in the assessment of depressive symptoms as compared with medical diagnosis. Secondly, depressive symptoms are influenced by a multitude of factors, such as functional impairments in activities of daily living (ADL) and sleep quality. However, we only included a selection of these indicators in our study. Finally, this study was a cross-sectional study, and the CFPS survey data we used could not cover all working people.

Conclusion

The results of this study based on regression and decomposition analyses showed that the prevalence of depressive symptoms was higher among rural employed persons than urban employed persons, gender, BMI, education level, married status, self-rated income, SRH, chronic disease conditions, job satisfaction, life satisfaction, smoking, drinking were associated with differences in depressive symptoms between urban and rural areas. Therefore, after accurately studying the factors influencing the urban-rural differences in depressive symptoms, if targeted and practical intervention

strategies can be proposed to improve these intervening factors, it will play a positive and important role in controlling the urban-rural differences in depressive symptoms in China.

Ethics

We conducted research using the CFPS database. During the research process, our study did not cause harm to human subjects, did not involve sensitive personal information or commercial interests, and utilized publicly available and anonymized data. The CFPS database has been approved by the Ethics Committee of Peking University (No. IRB00001052-14010), and all participants provided written informed consent. According to Article 32, Items 1 and 2 of the "Ethical Review Measures for Life Science and Medical Research Involving Human Subjects" issued on February 18, 2023, in China:

1. Item 1: Research involving human subjects that only uses de-identified data from public databases and does not involve direct information related to individuals may generally be exempt from ethical review.
2. Item 2: If the research data comes from a project that has obtained informed consent and the use of the data conforms to the scope of the original informed consent, it may also be considered exempt from ethical review.

Therefore, our research meets the criteria outlined above and can be exempt from further ethical review.

Acknowledgment

We are grateful to the National Social Science Foundation of China for their support of the project.

Author Contributions

Lei Yuan and Lijuan Liu share equal responsibility as corresponding authors. All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

This work was supported by the National Social Science Foundation of China (No. 14BGL142). The views expressed by the authors in the manuscript do not necessarily reflect the views of the National Social Science Foundation of China.

Disclosure

The authors have no relevant financial or non-financial interests to disclose.

References

1. Molina-Oliva M, Martín-Sánchez R, Pastor-Benito E, et al. Influence of previous mental state on psychological outcomes of Spanish out-of-hospital professionals during the COVID-19 pandemic. *Int J Environ Res Public Health*. 2023;20(4):3574. doi:10.3390/ijerph20043574
2. Chew NWS, Lee GK, Tan BY, et al. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. *Brain Behav Immun*. 2020;88:559–565. doi:10.1016/j.bbi.2020.04.049
3. Firew T, Sano ED, Lee JW, et al. Protecting the front line: a cross-sectional survey analysis of the occupational factors contributing to healthcare workers' infection and psychological distress during the COVID-19 pandemic in the USA. *BMJ Open*. 2020;10(10):e042752. doi:10.1136/bmjopen-2020-042752
4. Hawes MT, Szenczy AK, Klein DN, Hajcak G, Nelson BD. Increases in depression and anxiety symptoms in adolescents and young adults during the COVID-19 pandemic. *Psychol Med*. 2022;52:3222–3230. doi:10.1017/s0033291720005358
5. Ettman CK, Abdalla SM, Cohen GH, et al. Prevalence of depression symptoms in US adults before and during the COVID-19 pandemic. *JAMA Netw Open*. 2020;3(9):e2019686. doi:10.1001/jamanetworkopen.2020.19686
6. Alnazly E, Khraisat OM, Al-Bashaireh AM, Bryant CL. Anxiety, depression, stress, fear and social support during COVID-19 pandemic among Jordanian healthcare workers. *PLoS One*. 2021;16:e0247679. doi:10.1371/journal.pone.0247679
7. Yan C, Liao H, Ma Y, Xiang Q, Wang J. Association among multimorbidity, physical disability and depression trajectories: a study of urban-rural differences in China. *Qual Life Res*. 2021;30:2149–2160. doi:10.1007/s11136-021-02807-3

8. Fleury MJ, Ngui AN, Bamvita JM, Grenier G, Caron J. Predictors of healthcare service utilization for mental health reasons. *Int J Environ Res Public Health*. 2014;11:10559–10586. doi:10.3390/ijerph111010559
9. Serafini G, Gonda X, Canepa G, et al. Extreme sensory processing patterns show a complex association with depression, and impulsivity, alexithymia, and hopelessness. *J Affect Disord*. 2017;210:249–257. doi:10.1016/j.jad.2016.12.019
10. Kessler RC, Petukhova M, Sampson NA, Zaslavsky AM, Wittchen HU. Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood disorders in the United States. *Int J Methods Psychiatr Res*. 2012;21:169–184. doi:10.1002/mpr.1359
11. Morowatisharifabad MA, Alizadeh A, Bidaki R, Jambarsang S, Hosseini-Sharifabad M. Prevalence of complicated grief and related factors in elderly individuals in Sabzevar City, Iran. *Psychogeriatrics*. 2020;20:718–725. doi:10.1111/psyg.12579
12. Bulloch AGM, Williams JVA, Lavorato DH, Patten SB. The depression and marital status relationship is modified by both age and gender. *J Affect Disord*. 2017;223:65–68. doi:10.1016/j.jad.2017.06.007
13. Andersen I, Thielen K, Nygaard E, Diderichsen F. Social inequality in the prevalence of depressive disorders. *J Epidemiol Community Health*. 2009;63:575–581. doi:10.1136/jech.2008.082719
14. Romans S, Cohen M, Forte T. Rates of depression and anxiety in urban and rural Canada. *Soc Psychiatry Psychiatr Epidemiol*. 2011;46:567–575. doi:10.1007/s00127-010-0222-2
15. Shi J, Zhang Y, Liu F, et al. Associations of educational attainment, occupation, social class and major depressive disorder among Han Chinese women. *PLoS One*. 2014;9:e86674. doi:10.1371/journal.pone.0086674
16. Kim J, Park MJ. Multilevel effect of neighborhood social cohesion and characteristics on suicidal ideation among Korean Older adults. *Community Ment Health J*. 2021;57:522–528. doi:10.1007/s10597-020-00678-5
17. You L, Yu Z, Zhang X, et al. Association between multimorbidity and depressive symptom among community-dwelling elders in Eastern China. *Clin Interv Aging*. 2019;14:2273–2280. doi:10.2147/cia.S221917
18. Sun J, Lyu S, Li C, Coyte PC. The contribution of urban and rural resident basic medical insurance to income-related inequality in depression among middle-aged and older adults: evidence from China. *J Affect Disord*. 2021;293:168–175. doi:10.1016/j.jad.2021.06.027
19. Chiu SYR, Yang Z. Influence of family income and medical insurance coverage on health-related quality of life and optimism in cancer patients at a Hong Kong private hospital: a cross-sectional study. *Psychooncology*. 2019;28:1971–1977. doi:10.1002/pon.5175
20. Fluharty M, Taylor AE, Grabski M, Munafò MR. The association of cigarette smoking with depression and anxiety: a systematic review. *Nicotine Tob Res*. 2017;19:3–13. doi:10.1093/ntr/ntw140
21. Lee RD, Chen J. Adverse childhood experiences, mental health, and excessive alcohol use: examination of race/ethnicity and sex differences. *Child Abuse Negl*. 2017;69:40–48. doi:10.1016/j.chiabu.2017.04.004
22. Suiter SV, Meadows ML. Educational attainment and educational contexts as social determinants of health. *Prim Care*. 2023;50:579–589. doi:10.1016/j.pop.2023.04.007
23. Kondirolli F, Sunder N. Mental health effects of education. *Health Econ*. 2022;31 Suppl 2:22–39. doi:10.1002/hec.4565
24. Wang X, Guo J, Zhang X, et al. The effects of depression and chronic diseases on the work outcomes of employees: a prospective study in Northwest China. *Public Health*. 2014;128:734–742. doi:10.1016/j.puhe.2014.06.007
25. Lerner D, Adler DA, Chang H, et al. Unemployment, job retention, and productivity loss among employees with depression. *Psychiatr Serv*. 2004;55(12):1371–1378. doi:10.1176/appi.ps.55.12.1371
26. McGee RE, Thompson NJ. Unemployment and depression among emerging adults in 12 states, behavioral risk factor surveillance system. *Prev Chronic Dis*. 2010;12(2015):E38. doi:10.5888/pcd12.140451
27. Elwell-Sutton T, Folb N, Clark A, et al. Socioeconomic position and depression in South African adults with long-term health conditions: a longitudinal study of causal pathways. *Epidemiol Psychiatr Sci*. 2019;28(2):199–209. doi:10.1017/s2045796017000427
28. State Statistical Bureau. Statistical Bulletin of the People's Republic of China in 2022. State Statistical Bureau. 2023;12–29.
29. Whiteford HA, Degenhardt L, Rehm J, et al. Global burden of disease attributable to mental and substance use disorders: findings from the global burden of disease study 2010. *Lancet*. 2013;382(9904):1575–1586. doi:10.1016/s0140-6736(13)61611-6
30. Zhong BL, Liu T-B, Huang J-X, et al. Acculturative stress of Chinese rural-to-urban migrant workers: a qualitative study. *PLoS One*. 2016;11:e0157530. doi:10.1371/journal.pone.0157530
31. Li W, Sun F, Anderson S. Differences in depressive symptoms between rural and urban Chinese labor force: the mediating effects of community factors. *Int J Soc Psychiatry*. 2018;64:317–325. doi:10.1177/0020764018754596
32. Jiang ZP. From urban-rural dual development to urban-rural integrated development——the development of urban-rural relationship in the process of Chinese path to modernization. Xinjiang State Farms Economy. 2023;1–19.
33. Xu XL, Chen. F, Tan HW. Urban-rural differences in the accessibility of health services among people over 65. *Chin J Gerontol*. 2017;37:3071–3072.
34. Zhou YQ, Wang GJ. Population structure, medical insurance and high residential savings from the perspective of urban and rural differences. *J Capital Univ Economics Business*. 2018;20:13–20. doi:10.13504/j.cnki.issn1008-2700.2018.03.002
35. Qin X, Wang S, Hsieh C-R. The prevalence of depression and depressive symptoms among adults in China: estimation based on a National Household Survey. *China Economic Rev*. 2018;51:271–282. doi:10.1016/j.chieco.2016.04.001
36. Li W, Gao G, Sun F, Jiang L. The role of community factors in predicting depressive symptoms among Chinese workforce: a longitudinal study in rural and urban settings. *BMC Public Health*. 2022;22:1429. doi:10.1186/s12889-022-13647-2
37. Xing XY, Chen YJ, Xu XT, et al. Urban-rural disparities of depression symptoms and its influencing factors among the elderly aged≥65 years old in Anhui Province from 2019 to 2020. *Chin J Prev Med*. 2023;57:1396–1402. doi:10.3760/cma.j.cn112150-20230129-00061
38. Kasturi S, Oguoma VM, Grant JB, Niyonsenga T, Mohanty I. Prevalence rates of depression and anxiety among young rural and urban Australians: a systematic review and meta-analysis. *Int J Environ Res Public Health*. 2023;20:800. doi:10.3390/ijerph20010800
39. Yang W, Li D, Gao J, Zhou X, Li F. Decomposing differences in depressive symptoms between older rural-to-urban migrant workers and their counterparts in mainland China. *BMC Public Health*. 2020;20:1442. doi:10.1186/s12889-020-09374-1
40. Liu H, Fan X, Luo H. et al. Comparison of depressive symptoms and its influencing factors among the elderly in urban and rural areas: evidence from the china health and retirement longitudinal study (CHARLS). *Int J Environ Res Public Health*. 2021;18. doi:10.3390/ijerph18083886
41. Yan Y, Yin WQ, Meng CX, et al., A study on the difference in depressive symptoms and influencing factors between urban and rural empty-nesters. *School of Management, Weifang Medical College;"Healthy Shandong " Collaborative Innovation Center for Major Social Risk Prediction and Governance; Collaborative Innovation Center for Major Social Risk Warning, School of Public Health, Weifang Medical College*. 49; 2022:557–561.

42. Jian WY, Wang T, Li QS, Liu HR. Urban-rural differentials in the relationship between personality traits and changes in depressive symptoms. *J Peking Univ. Health Sci*. 2023;55:385–391.
43. Turvey CL, Schultz SK, Beglinger L, Klein DM. A longitudinal community-based study of chronic illness, cognitive and physical function, and depression. *Am J Geriatr Psychiatry*. 2009;17:632–641. doi:10.1097/jgp.0b013e31819c498c
44. Jiang CH, Zhu F, Qin TT. Relationships between chronic diseases and depression among middle-aged and elderly people in China: a prospective study from CHARLS. *Curr Med Sci*. 2020;40:858–870. doi:10.1007/s11596-020-2270-5
45. Yao Y, Chen H, Chen L, et al. Type of tea consumption and depressive symptoms in Chinese older adults. *BMC Geriatr*. 2021;21:331. doi:10.1186/s12877-021-02203-z
46. Fairlie RW. An extension of the Blinder-Oaxaca decomposition technique to logit and probit models. *J Econ Social Meas*. 2005;30:305–316. doi:10.3233/JEM-2005-0259
47. Yuan L, Yu B, Du M, et al. Gender differences in depressive symptoms among Chinese older adults based on Fairlie decomposition analysis. *Heliyon*. 2023;9(11):e21555. doi:10.1016/j.heliyon.2023.e21555
48. Fairlie WD, Moore AG, Bauskin AR, et al. MIC-1 is a novel TGF-beta superfamily cytokine associated with macrophage activation. *J Leukoc Biol*. 1999;65:2–5. doi:10.1002/jlb.65.1.2
49. Chao C, Qifa X. Research on urban-rural difference of higher education opportunities: empirical results through O-B decomposition of binary choice institute of statistics, Shandong Industrial and Business Institute of Technology; School of Management, Hefei University of Technology. 2012;87–93.
50. Chan KW, Zhang L. The Hukou system and rural-urban migration in China: processes and changes. *China Q*. 1999;160:818–855. doi:10.1017/s0305741000001351
51. Jie G, Xiao Z, Wang L, Chao W. Urban-rural differences in life satisfaction of elderly patients with chronic diseases in China. Department of Medical Insurance, School of Public Health, Southeast University. *Chinese Gen Pract*. 2020;21:495–498. doi:10.16506/j.1009-6639.2020.05.004
52. Guo J, Liu C, Wang X, et al. Relationships between depression, pain and sleep quality with doctor visits among community-based adults in north-west China. *Public Health*. 2017;147:30–38. doi:10.1016/j.puhe.2017.01.031
53. Zhang Z, Wu X. Occupational segregation and earnings inequality: rural migrants and local workers in urban China. *Soc Sci Res*. 2017;61:57–74. doi:10.1016/j.ssresearch.2016.06.020
54. Peng Y, Shao Y, Li Z, et al. Status and determinants of symptoms of anxiety and depression among food delivery drivers in Shanghai, China. *Int J Environ Res Public Health*. 2022;19(20):13189. doi:10.3390/ijerph192013189
55. Liljas AEM, Jones A, Cadar D, Steptoe A, Lassale C. Association of multisensory impairment with quality of life and depression in English older adults. *JAMA Otolaryngol Head Neck Surg*. 2020;146:278–285. doi:10.1001/jamaoto.2019.4470
56. Luo H, Li J, Zhang Q, et al. Obesity and the onset of depressive symptoms among middle-aged and older adults in China: evidence from the CHARLS. *BMC Public Health*. 2018;18:909. doi:10.1186/s12889-018-5834-6
57. He-wei M, Yi-bo W, Xin-ying S. Relation of family health and depression to nicotine dependence in adult smokers Department of Social Medicine and Health Education, School of Public Health, Peking University, Beijing; Key Research Base of Philosophy and Social Sciences-Health Culture Research Center, Shaanxi. *Chin Dis Control J*. 2023;27:294–299. doi:10.16462/j.cnki.zhjbkz.2023.03.008
58. Yuan L, Jiang Q, Liu Y, et al. Decomposition analysis of depressive symptom differences among older adults with hypertension between urban and rural areas: cross-sectional study. *JMIR Public Health Surveill*. 2024;10:e52536. doi:10.2196/52536
59. Circular of the state council on printing and issuing the plan for boosting employment the state council. 24–38. 2021.