

Association of socioeconomic factors and prevalence of depression with quality of life among the elderly in rural China: a cross-sectional study

Jia-tian YANG

Kunming Medical University

Fang WANG

Kunming Medical University

Le Cai (✉ caile002@hotmail.com)

Kunming Medical University

Jing-Rong SHEN

Kunming Medical University

Ying-Nan LIU

Kunming Medical University

Allison Rabkin Golden

Kunming Medical University

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Abstract

Background This study investigates how prevalence of depression differs across socioeconomic status (SES) and examines the association of depression with quality of life (QOL) among southwest China's rural elderly population.

Methods A cross-sectional survey of 1,629 participants aged ≥ 60 years was conducted in rural Yunnan Province, China in 2017. Older adults' depressive status and QOL were measured with the Geriatric Depression Scale (GDS-30) and Concise Health Scale (SF-36). A multivariate logistic regression model was used to analyze the association between individual SES variables and the prevalence of depression, while multivariate linear regression was used to model the variation in QOL.

Results The overall prevalence of depression was 12.0% in the study population, and females had a higher prevalence of depression than males (14.2% vs. 8.9%, $P < 0.01$). After adjusting for age, sex, and residential status, older adults with lower annual household income and poor access to medical services had a higher probability of suffering from depression than their counterparts ($P < 0.01$). Older adults who suffered from depression also had lower scores in all domains of SF-36 and overall dimensions of physical component summary (PCS) and mental component summary (MCS) than older adults without depression ($P < 0.01$). Multivariate linear regression analysis indicated negative correlations between depression and dimensions of PCS and MCS ($P < 0.01$).

Conclusion Improving mental health profoundly transforms quality of life. Future interventions to reduce the prevalence of depression in the elderly should focus on female and low-income populations as well as those with poor access to medical services.

Introduction

Depression is a common mental illness and a primary cause of disability. The World Health Organization (WHO) reported that more than 300 million people of all ages suffer from depression globally.^[1] This public health problem is particularly acute in the 7% of the global population over 60 years of age: over 20% of people aged 60 years and over suffer from a mental or emotional disorder.^[2] Moreover, these rates have been growing: global studies from 2004 to 2014 present a significantly higher prevalence of depression than studies published from 1994 to 2003 (15.4% vs. 9.8%).^[3] Depression in the elderly has already become a major contributor to the burden of disease on society and families across the globe.

The prevalence of depressive symptoms differs across China by geography: in rural areas the rates are nearly 10% higher than in urban ones (27.0% vs. 17.4%).^[5] Additionally, large numbers of people with other severe mental disorders also live in rural areas.^[6] Previous research indicates rural-urban disparities in the utilization of mental health services in China may be contributing to this difference in prevalence:^[7] compared to urban regions, rural areas across China lack medical services, awareness about depression,

and information on the mental health status of their residents, especially older adults. Given these deficiencies, depression is increasingly becoming a public health challenge for rural older adults in China.

Studies across the world previously demonstrated that prevalence of depression is associated with several factors. Specifically, the prevalence of depression is significantly higher in females, those not living with a spouse or living alone, those with less family support, the elderly, the unemployed, those with functional or cognitive impairments, and those with low socioeconomic status (SES) (including illiteracy, low household income level, and poverty).^[8-11] However, data on the association of depression and socioeconomic factors in China, particularly in rural older populations, is limited.

Depression not only causes mental health disorders that may lead to suicide, but also negatively impacts quality of life (QOL). QOL assesses individuals' perception of their position in life and in relation to their goals, expectations, standards, and concerns, within the context of their culture and value systems.^[12] In this way, it assesses how a disease, disability, or disorder may impact an individual's well-being.^[13] Western studies have shown that depression has a significant impact on QOL,^[14-15] finding those with depression have lower QOL than those not depressed and that the degree of depression is negatively associated with QOL. A previous Chinese study also showed that all domains of QOL were negatively correlated with depression except the social domain.^[7] Most research of depression and its relationship with QOL in China was studied in hospital patients. Thus, little is known about the prevalence of depression and its relationship with QOL in the rural elderly population.

China's population has been aging since 1999. The proportion of people aged 60 years and over is predicted to increase from 12.4% in 2010 to 28% in 2040.^[4] Today, those aged 60 years and over in China number 250 million, with 44.2% of this elderly population living in rural areas.^[16] Yunnan Province is located in southwest China and has a population of 47.4 million, including 6.1 million adults aged 60 years and over.^[17] Mental health problems are routinely under diagnosed in rural areas in China due to inconvenient transportation to medical centers, a lack of mental health resources, and stigma around mental illness that makes people reluctant to seek help. Until now, research in Yunnan on the related risk factors of depression was rare, and mental disorders remained poorly understood across the province, especially among rural elderly people.

This study aimed to investigate how the prevalence of depression differs across socioeconomic factors, including ethnicity, level of education, level of annual household income, and access to medical services, as well as to examine the association of depression with QOL among people aged 60 years and older in rural Yunnan Province, China.

Methods

Study area and population

A community-based cross-sectional health survey was conducted in rural areas of Yunnan Province, China from 2017-2018. A multistage stratified random sampling method was used to select Yunnan residents aged 60 years and over. This sampling method has previously been described in detail.^[18]

Data collection and measurement

Each participant who gave informed consent completed a questionnaire interview with trained interviewers. The questionnaire included questions on demographic characteristics (age, sex, ethnicity, educational level, annual household income, and residential status), as well as walking time to the nearest village hospital.

Individuals' mental status was assessed using the Geriatric Depression Scale (GDS-30).^[19] A dedicated depression screening scale for the elderly, GDS-30 evaluates the mental health of elderly participants in the week prior to administration of the survey, and removes those physical symptoms that may occur due to age. The scale has a total of thirty items, including depression symptoms, mood measures, and activity level, as well as irritability, retreating, and painful thoughts indicators. Each item of the GDS-30 is scored from 0 to 1, with a total score ranging from 0 to 30 points. Depression was defined as a GDS-30 score from 11 to 30.

The Chinese assessment tool Concise Health Scale (SF-36) was used to evaluate quality of life (QOL).^[20] SF-36 contains eight domains consisting of thirty-six items: physical function (PF), role physical (RP), bodily pain (BP), general health (GH), vitality (VT), social function (SF), role emotional (RE), and mental health (MH). The SF-36 scale measured two component dimensions: a physical component summary (PCS) and a mental component summary (MCS), which represented physical and mental dimensions, respectively. The higher the total SF-36 score, the better the QOL.

Definitions

Illiterate was defined as a person who is unable to read or write a short simple statement on his or her everyday life with understanding. Access to medical services was defined as good when walking time to the nearest village hospital was less than 30 minutes and poor when walking time to the nearest village hospital was ≥ 30 minutes. Level of education was classified into two categories: illiterate and primary (grade 1-6) or higher. Annual household income level was divided into two categories: high ($\geq \$850$) and low ($< \850), with the median value as the cut-off point.

Ethical approval

This study was approved by the Ethics Committee of Kunming Medical University before commencement of research.

Statistical analysis

Descriptive analysis techniques, chi-squared tests, independent sample t-tests, and multivariate linear regression were used in this study. Categorical variables were presented as counts and percentages, and continuous variables were expressed as mean \pm standard deviation (). A chi-square test was used to compare categorical variables, while an independent sample t-test was used to analyze continuous variables by depression status. Multivariate logistic regression was used to analyze the relationship between individual SES variables and prevalence of depression, and their associations were expressed as odds ratios (OR) and 95% confidence intervals (CI). Multivariate linear regression was used to model the variation in QOL. All data analyses were done with SPSS 22.0 software and all statistical significance decisions were based on two-tailed P values of <0.05 .

Results

A total of 1,700 individuals aged ≥ 60 years were invited to participate in the present study. Of these, 1,629 participants consented to participate and completed the study, corresponding to an overall response rate of 95.8%.

The sociodemographic characteristics and mean score of GDS and SF-36 of the study participants is shown in Table 1. Of the 1,629 participants, 688 (42.2%) and 941 (57.8%) were male and female, respectively. A higher proportion of females were illiterate, lived alone, and had higher GDS scores than males ($P<0.01$), whereas male participants had higher scores in all domains and two component dimensions of SF-36 than females ($P<0.01$). The overall prevalence of depression was 12.0%, and females had a higher prevalence of depression than males (14.2% vs. 8.9%, $P<0.01$).

Table 2 displays the results of both univariate and multivariate logistic regression analysis of prevalence of depression by individual sociodemographic variable. The results of the univariate logistic regression analysis (model 1) indicate that females, older adults with lower levels of education and lower annual household income, older adults who live alone, and older adults with poor access to medical services had a higher probability of suffering from depression than their counterparts ($P<0.01$). Adjusting for age, sex, and residential status in model 2 did not affect the associations (Odds Ratios) of annual household income and access to medical services with prevalence of depression estimated in model 1, and there was no significant difference between level of education and prevalence of depression ($P>0.05$).

As shown in Table 3, both male and female older adults who suffered from depression had lower scores in all domains of SF-36 and two components of PCS and MCS than older adults not suffering from depression ($P<0.01$).

Table 4 indicates that there were negative correlations between depression and dimensions of physical component summary (PCS) and mental component summary (MCS) among elderly participants ($P<0.01$), after adjusting for age, sex, ethnicity, residential status, level of education, access to medical services, and annual household income.

Discussion

The findings indicate that there are significant relationships between SES variables and prevalence of depression among older adults in rural southwest China. Further, the present study also reveals that older adults with depression have significantly lower QOL scores compared to those without depression.

The prevalence of depression was higher in the present study than in the WHO-SAGE survey results of China (2.6%), Ghana (11.0%), South Africa (6.4%),^[21] and Sweden (5.9%),^[22] but lower than of? India (27.4%), Mexico (23.7%), Russia (15.6%),^[21] and Brazil (30.2%).^[23] It was also lower than that found in a meta-analysis of Chinese studies from 1987 to 2012 (23.6%).^[24] Furthermore, females in the present study had a higher prevalence of depression than males, a finding in line with previous research.^[25-26] This gender disparity may result both from biological factors, as sex hormones play an important role in occurrence of depression,^[27] as well as environmental factors. Specifically, women in rural China commonly engage in heavy physical labor, suffer from social injustices, and have a widowed rate that increases with life expectancy, all key factors that could impact their mental health status.^[28] The findings thus suggest future community-based depression prevention and intervention efforts should pay particular attention to female older adults.

The present study also indicated that older adults who live alone are more likely to develop depression compared to those living with a spouse and/or with their children. This is consistent with previous research and possibly results from the fact that living with family may provide psychological safety and sense of belonging, which has a positive effect on depression.^[29] Moreover, spousal support and family support were associated with protection from depression, an association particularly salient for older adults.^[30]

While previous studies demonstrated those with lower levels of education had a higher likelihood of suffering from depression,^[31-33] the present study found no association between educational level and depression. Further investigation is needed to examine the exact nature of the association between education and depression.

The present study did however align with previous research demonstrating lower household income is associated with higher risk of depression.^[33] Furthermore, the present study also found older adults with poor access to medical services are more likely to be depressive. This may be attributed to disadvantages in conditions and healthcare access in rural regions compared with urban ones.^[34] Poor access to medical services can cause or aggravate poor physical health, which in turn can influence mental health status and make depressive symptoms worse.

Our study additionally found that depression had a significant impact on older adults' QOL, with depressive older adults achieving significantly lower scores on all domains of QOL compared to those without depression. This result accords with previous research^[14, 35]. These negative correlations between depression and dimensions of PCS and MCS remained after adjusting for possible confounders, which

also showed significant differences in the univariate analysis. These findings underscore the importance of taking measures to improve mental health in order to optimize QOL among the rural elderly.

The present study was limited by the following factors. Firstly, the prevalence of depression was based on self-assessment using GDS-30, and the lack of validation of clinical diagnosis for depressive status may have underestimated the prevalence of depression and thereby affected the accuracy of the rates of depressive status recorded. Secondly, the data analyzed in this study was cross-sectional, so causal relationships could not be determined.

In conclusion, based on the finding that individual SES has a significant impact on prevalence of depression, future interventions to reduce prevalence of depression should focus on female, low-income, older adults, as well as older adults with poor access to medical services. These findings additionally underscore the importance of improved mental health among older adults in order to optimize QOL.

Declarations

Ethical approval and consent to participate

This study was approved by the Ethics Committee of Kunming Medical University prior to the commencement of research. Written informed consent was obtained from all persons participating in the study, and the Ethics Committee of Kunming Medical University approved this consent procedure.

Consent for publication

Not applicable.

Availability of data and material

The datasets used and/or analysed during the current study is available from the corresponding author on reasonable request.

Competing interests

The authors declare that there are no conflicts of interest.

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Author contributions

LC conceptualized the research idea and drafted the manuscript. JTY and FW carried out the study and drafted the manuscript with the same contributions. JRS and YNL collected the data. ARG provided comments on the paper during the writing process. All authors have read and approved the manuscript.

Authors' information

¹1168 Yu Hua Street Chun Rong Road, Cheng Gong New City, School of Public Health, Kunming Medical University, Kunming 650500, China; and ² 1168 Yu Hua Street Chun Rong Road, Cheng Gong New City, Department of Science and Technology, Kunming Medical University, Kunming 650500, China.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

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Tables

Table 1

Socio-demographic characteristics and mean scores of GDS and domains of SF-36

Characteristics	Male (n = 688)	Female (n = 941)	All (n = 1629)
Age (%)			
60–64 years	235(34.2)	343(36.5)	578(35.5)
65–69 years	186(27.0)	258(27.4)	444(27.3)
70–74 years	120(17.4)	155(16.5)	275(16.9)
≥ 75 years	147(21.4)	185(19.7)	332(20.4)
Ethnicity (%)			
Han	394(57.3)	520(55.3)	914(56.1)
Minority	294(42.7)	421(44.7)	715(43.9)
Educational level (%)			
Illiterate	126(18.3)	412(43.8)**	538(33.0)
Primary (grades 1–6) or higher	562(81.7)	529(56.2)	1091(67.0)
Residential status (%)			
Living alone	133(19.3)	349(37.1)**	482(29.6)
Living with a spouse	240(34.9)	264(28.1)	504(30.9)
Living with a spouse and child(ren)	315(45.8)	328(34.8)	643(39.5)
Access to medical services (%)			
Good	399(58.0)	572(60.8)	971(59.6)
Poor	289(42.0)	369(39.2)	658(40.4)
Annual household income (%)			
High	336(48.8)	479(50.9)	815(50.0)
Low	352(51.2)	462(49.1)	814(50.0)
Depression			
Yes	61(8.9)	134(14.2)**	195(12.0)
No	627(91.1)	807(85.8)	1434(88.0)
Mean GDS scores	5.2 ± 4.3	6.3 ± 4.9**	5.8 ± 4.7

Characteristics	Male (n = 688)	Female (n = 941)	All (n = 1629)
Mean Physical function (PF)	83.9 ± 19.1**	80.9 ± 19.6	82.2 ± 19.4
Mean Role physical (RP)	72.5 ± 44.1**	62.3 ± 47.8	66.6 ± 46.5
Mean Bodily pain (BP)	76.4 ± 20.8**	71.0 ± 20.8	73.2 ± 21.0
Mean General health (GH)	51.0 ± 20.2**	46.4 ± 21.1	48.3 ± 20.1
Mean Vitality (VT)	72.3 ± 12.2**	69.7 ± 13.4	70.8 ± 13.0
Mean Social function (SF)	79.7 ± 13.9**	76.4 ± 15.0	77.8 ± 14.6
Mean Role emotional (RE)	88.3 ± 31.6**	80.2 ± 39.2	83.6 ± 36.4
Mean Mental health (MH)	76.6 ± 11.9**	74.5 ± 12.8	75.4 ± 12.5
Mean Physical component summary (PCS)	69.5 ± 15.8**	64.9 ± 16.4	66.9 ± 16.3
Mean Mental component summary (MCS)	76.2 ± 11.1**	73.4 ± 12.3	74.6 ± 12.0
*P < 0.05,**P < 0.01			

Table 2

Univariate and multivariate logistic regression for prevalence of depression among rural adults aged ≥ 60 years in Yunnan Province, China

Characteristic	Univariate logistic regression (model 1)		Multivariate logistic regression (model 2)	
	unadjusted odds ratio	95% CI	adjusted odds ratio†	95% CI
Sex (reference: female)	0.59**	0.43–0.81	0.66*	0.47–0.93
Age (reference: ≥ 75 years)				
60–64 years	0.77	0.52–1.16	0.88	0.56–1.37
65–69 years	0.63	0.40–1.00	0.70	0.44–1.12
70–74 years	1.18	0.76–1.85	1.34	0.84–2.14
Ethnicity (reference: ethnic minority)	0.77	0.57–1.03	0.88	0.65–1.20
Educational level (reference: primary, grades 1–6, or higher)	1.63**	1.21–2.22	1.27	0.91–1.77
Residential status (reference: living alone)				
Living with a spouse	0.47**	0.32–0.69	0.54**	0.36–0.81
Living with a spouse and child(ren)	0.56**	0.40–0.79	0.65*	0.44–0.94
Access to medical services (reference: good)	1.16**	1.20–2.18	1.49*	1.09–2.05
Annual household income (reference: high)	1.63**	1.20–2.21	1.52*	1.10–2.10
*P < 0.05, **P < 0.01, † adjusted for age, sex, and residential status				

Table 3

Mean scores in domains of SF-36 by depression status among rural adults aged ≥ 60 years in Yunnan Province, China

Domains of SF-36	No depression (n = 1434)			Depression (n = 195)		
	Male	Female	All	Male	Female	All
Physical function (PF)	85.2 \pm 18.1	82.8 \pm 18.1	83.8 \pm 18.1	70.8 \pm 23.6**	69.9 \pm 24.2**	70.2 \pm 24.0**
Role physical (RP)	75.9 \pm 42.3	67.5 \pm 46.2	71.2 \pm 44.7	38.1 \pm 48.0**	31.0 \pm 45.1**	33.2 \pm 46.0**
Bodily pain (BP)	77.5 \pm 20.3	73.0 \pm 20.2	74.9 \pm 20.3	65.8 \pm 23.5**	59.0 \pm 20.8**	61.1 \pm 21.9**
General health (GH)	52.4 \pm 19.8	48.3 \pm 20.8	50.1 \pm 20.4	36.1 \pm 18.6**	35.2 \pm 19.5**	35.5 \pm 19.2**
Vitality (VT)	73.4 \pm 11.6	71.7 \pm 12.0	72.5 \pm 11.8	61.2 \pm 13.1**	57.4 \pm 15.0**	58.6 \pm 14.5**
Social function (SF)	81.0 \pm 12.6	78.4 \pm 13.7	79.5 \pm 13.3	66.5 \pm 19.0**	64.2 \pm 16.7**	64.9 \pm 17.4**
Role emotional (RE)	91.8 \pm 26.7	84.8 \pm 35.3	87.9 \pm 32.0	51.9 \pm 50.0**	52.5 \pm 49.1**	52.3 \pm 49.3**
Mental health (MH)	77.9 \pm 10.8	76.6 \pm 10.9	77.2 \pm 10.9	63.0 \pm 14.1**	61.9 \pm 15.7**	62.2 \pm 15.2**
Physical component summary (PCS)	70.9 \pm 14.9	67.1 \pm 15.5	68.8 \pm 15.3	54.6 \pm 17.2**	52.2 \pm 15.8**	52.9 \pm 16.2**
Mental component summary (MCS)	77.5 \pm 9.9	75.6 \pm 10.5	76.5 \pm 10.3	62.3 \pm 13.6**	60.2 \pm 14.2**	60.9 \pm 14.0**
**P < 0.01						

Table 4

Multiple linear regression analysis of depression and QOL among rural adults aged ≥ 60 years in Yunnan Province, China

Predictors	PCS		MCS	
	Standardized Beta	SE ⁺	Standardized Beta	SE ⁺
Sex (reference: female)	-0.102 ^{**}	0.790	-0.063 ^{**}	0.565
Age (reference: ≥ 75 years old)				
60–64 years old	0.280 ^{**}	1.087	0.029	0.777
65–69 years old	0.161 ^{**}	1.117	-0.025	0.799
70–74 years old	0.059 [*]	1.235	-0.016	0.883
Ethnicity (reference: ethnic minority)	-0.044	0.753	-0.067 ^{**}	0.539
Educational level (reference: primary, grades 1–6, or higher)	0.072 ^{**}	0.839	0.058 [*]	0.600
Residential status (reference: living alone)				
Living with a spouse and child(ren)	-0.015	0.950	-0.014	0.679
Living with a spouse	0.035	0.980	0.092 ^{**}	0.701
Access to medical services (reference: good)	-0.003	0.781	0.008	0.558
Annual household income (reference: high)	0.054 [*]	0.770	0.076 ^{**}	0.551
Depression (reference: no)	-0.284 ^{**}	1.149	-0.400 ^{**}	0.822
* $p < 0.05$, ** $p < 0.01$, + standard error				