

บทความวิจัย

ปัจจัยที่มีอิทธิพลต่อภาวะซึมเศร้าในผู้สูงอายุที่อาศัยอยู่คนเดียวในชุมชน
เมืองหางโจว สาธารณประชาชนจีนJiaxiang Zhou¹ M.N.S., พรชัย จุลเมตต์² Ph.D., กาญจนา พิบูลย์^{3,*} Ph.D.

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บทคัดย่อ

ภาวะซึมเศร้าในผู้สูงอายุ เป็นปัญหาสุขภาพที่สำคัญและส่งผลกระทบต่อบุคคล ครอบครัว ชุมชน และสังคม โดยเฉพาะอย่างยิ่งผู้สูงอายุที่อาศัยอยู่คนเดียวในชุมชนที่มักถูกมองข้าม ส่งผลให้เกิดความว้าเหว่ ไม่มีความสุข และเกิดภาวะซึมเศร้า หากไม่ได้รับการรักษาอาจนำไปสู่การฆ่าตัวตายได้ ดังนั้น ปัจจัยเสี่ยงของการเกิดภาวะซึมเศร้าจึงควรนำมาใช้ในการระบุกลุ่มเสี่ยง การศึกษาวิจัยหาความสัมพันธ์เชิงทำนายครั้งนี้ มีวัตถุประสงค์เพื่อศึกษาปัจจัยที่มีอิทธิพลต่อภาวะซึมเศร้าในผู้สูงอายุที่อาศัยอยู่คนเดียวในชุมชน ในเมืองหางโจว สาธารณประชาชนจีน กลุ่มตัวอย่าง คือ ผู้สูงอายุที่อาศัยอยู่คนเดียวในชุมชนในเมืองหางโจว สาธารณประชาชนจีน จำนวน 321 คน คัดเลือกกลุ่มตัวอย่างโดยการ สุ่มตัวอย่างแบบง่าย เก็บรวบรวมข้อมูล ตั้งแต่วันที่ 1 มกราคม ถึง 30 มีนาคม พ.ศ. 2568 โดยใช้แบบสอบถามเกี่ยวกับ 1) ข้อมูลทั่วไป 2) แบบสอบถามการรับรู้ภาวะสุขภาพ 3) แบบประเมินบาร์เทล 4) แบบประเมินความว้าเหว่ 5) แบบประเมินสิ่งสนับสนุนทางสังคม 6) แบบประเมินการมีส่วนร่วม กับสังคม และ 7) แบบประเมินภาวะซึมเศร้า วิเคราะห์ข้อมูลด้วยสถิติเชิงพรรณนาและการวิเคราะห์การถดถอย พหุคูณแบบขั้นตอน

ผลการศึกษาพบว่า ร้อยละ 38.0 ของกลุ่มตัวอย่างอาจมีภาวะซึมเศร้าและร้อยละ 1.6 มีภาวะซึมเศร้า การวิเคราะห์การถดถอยพหุคูณ พบว่า ความสามารถในการปฏิบัติกิจวัตรประจำวัน การรับรู้ภาวะสุขภาพและความว้าเหว่ สามารถอธิบายความแปรปรวนของภาวะซึมเศร้าได้ ร้อยละ 41.1 ($F(3, 317) = 25.714, p\text{-value} < 0.05$) ปัจจัยที่ทำนายสูงสุด คือ ความสามารถในการปฏิบัติกิจวัตรประจำวัน ($\beta = -0.341, p\text{-value} < 0.001$) รองลงมา คือ การรับรู้ภาวะสุขภาพ ($\beta = -0.256, p\text{-value} < 0.001$) และความว้าเหว่ ($\beta = 0.235, p\text{-value} < 0.001$) ผลการศึกษานี้ เป็นความรู้พื้นฐานเกี่ยวกับภาวะซึมเศร้าและปัจจัยทำนายภาวะซึมเศร้า ดังนั้น เพื่อลดโอกาสเกิดภาวะซึมเศร้า ในผู้สูงอายุที่อาศัยอยู่คนเดียว ในชุมชน ผู้ให้บริการสุขภาพควรพิจารณา ความสามารถในการปฏิบัติกิจวัตรประจำวัน การรับรู้ภาวะสุขภาพ และความว้าเหว่ ไปใช้ในการออกแบบกิจกรรมหรือโปรแกรมเพื่อป้องกันการเกิดภาวะซึมเศร้าในผู้สูงอายุที่อาศัยอยู่คนเดียวในชุมชน

คำสำคัญ: ชุมชน ภาวะซึมเศร้า ความว้าเหว่ อาศัยคนเดียว

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Factors influencing depression among older adults living alone in the community, Hangzhou, China

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ABSTRACT

Depression in older adults is a significant public health issue with broad impacts on individuals, their families, their communities, and society. It is often underrecognized, especially among older adults living alone in the community, which can lead to loneliness, unhappiness, and a potential suicide risk if left untreated. Therefore, identifying risk factors is crucial for early intervention. This predictive correlational research study aimed to examine factors influencing depression among older adults living alone in the community in Hangzhou, China. The samples consisted of 321 older adults living alone in the community in Hangzhou, China, who were recruited via random sampling. Data were collected from January 1 to March 30, 2025, using the following instruments: 1) a demographic questionnaire, 2) the Self-Rated General Health scale, 3) the Barthel Index, 4) Loneliness Scale, 5) the Social Support Rating Scale, 6) the Impact on Participation and Autonomy Questionnaire (IPA-I), and 7) the Geriatric Depression Scale-Short Form (GDS-SF). Data were analyzed using descriptive statistics and stepwise multiple regression.

The findings showed that 38.0% of the participants had suggestive symptoms of depression, while 1.6% met the criteria for depression. Multiple regression analysis showed that activities of daily living (ADL), perceived health status, and loneliness collectively accounted for 41.1% of the variance in depression ($F(3, 317) = 25.714$, $p\text{-value} < 0.05$). The strongest predictor was ADL ($\beta = -0.341$, $p\text{-value} < 0.001$), followed by perceived health status ($\beta = -0.256$, $p\text{-value} < 0.001$), and loneliness ($\beta = 0.235$, $p\text{-value} < 0.001$). The study results provide foundational knowledge regarding depression and its predictive factors. Therefore, to reduce the likelihood of depression among community-dwelling older adults living alone, healthcare providers should consider incorporating factors such as ADL, perceived health status, and loneliness into the design of interventions or programs to prevent depression in elderly people living alone in the community.

Keywords: Community, Depression, Loneliness, Living alone

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Introduction

Depression among older adults is a significant and growing global public health concern. With rapid demographic aging across regions, the number of individuals aged 60 years and above is projected to double by 2050, reaching 2.1 billion worldwide (World Health Organization, 2025). Aging brings physiological, psychological, and social transitions that increase vulnerability to depressive symptoms and clinical depression. Systematic evidence underscores that depression in later life is ubiquitous, pervasive, and frequently under-recognized. A recent meta-analytic synthesis reported that the pooled prevalence of depression among older adults globally is approximately 28.0-32.0%, with substantial variation across settings, measurement tools, and socioeconomic contexts (Hu, Zhao, Wu, Li, Luo, Yang et al., 2022; Zenebe, Akele, W/Selassie, & Necho, 2021). In community settings, the prevalence of depressive symptoms among community-dwelling older adults was 22.0%, indicating that approximately one in five participants experienced depression (Brasileiro, Dantas, Linhares, Vale, Terradas-Monllor, Ochandorena-Acha et al., 2024). Additionally, the prevalence of depression is also high among older people living alone. The study of Chen (2022) found that the prevalence of depression among older people living alone in community was 26.9%. This finding highlights that depression is highly prevalent even among older adults living independently in the community (Wang, Shao, Wang, Niu, & Wang, 2024).

China, with the world's largest older population, now faces this challenge on an unprecedented scale. According to the latest population projections, adults aged 60 and above constitute more than 18.0% of China's total population, with even higher proportions in rural areas (Wang & Chen, 2022).

The burden of late-life depression in China mirrors global trends but also exhibits unique sociocultural and structural dimensions. Meta-analyses in Chinese samples report depression prevalence estimates ranging from approximately 20.0% to over 50.0%, depending on the assessment instrument and population context (Li, Zhang, Shao, Qi, & Tian, 2014; Wang, Chen, & Liu, 2023). According to studies, the prevalence of depression in older adults in Hangzhou was similar to the country report. Although the prevalence of depression ranged from 20.0% to 60.0%, the main research setting was an urban area and a nursing home (Lou, Wu, Shen, & Ying, 2019; Zhao, Strauss, & Chen, 2020; Zhou, Li, Ogihara, & Wang, 2022). In addition, previous studies have examined older adults in general, there remains a knowledge gap regarding those living alone in the community.

Hangzhou, a major commercial and central regional city on the Southeast coast of China, is facing significant challenges related to population aging. The number of older adults is increasing; according to registered population statistics, by the end of 2023, the elderly population aged 60 and above in Hangzhou totaled 2,163,500, accounting for 25.1% of the total population. Among them, the number of older adults living in households with all elderly members was 267,900, accounting for 12.4% of the elderly population (Hangzhou Bureau of Statistics, 2024). In households with all elderly members, many older adults are living alone due to the high cost of living, high population mobility (especially among the young), the increasing number of nuclear families and prolonged life expectancy in Hangzhou.

As a consequence of living alone, older adults may have reduced opportunities for social

participation. Although Hangzhou city has relatively well-developed community services, older adults living alone may have limited informal support networks, particularly in high-density but socially fragmented urban neighborhoods (Burnette, Ye, Cheng, & Ruan, 2021; Zhang, Burr, Mutchler, & Lu, 2024). In addition, living alone may increase the risk of depression among older. Multiple Chinese studies demonstrate that older adults living alone have significantly higher odds of depressive symptoms compared to those co-residing with family members (Fang, Duan, Hou, Chang, Hu, & Huang, 2024; Fu, Cao, & Yang, 2023). Finally, living alone increases vulnerability when the older adult has functional limitations without a caregiver. This can accelerate the decline in activities of daily living (ADL) and increase psychological distress and risk of depression (Jia, Duan, Gong, Jiang, You, & Qu, 2023; Pimouguet, Rizzuto, Schön, Shakersain, Angleman, Lagergren et al., 2016).

Despite previous studies, attempts have been made to examine bio-psycho-social factors, such as factors influencing depression in community-dwelling older adults. Findings from many studies support that low income is associated with and predicts depression in older people (Kim, Kim, Rhee, & Youn, 2023; Naviganuntana, Kerdcharoen, & Rawdaree, 2022). Educational level has also been associated with depression in community-dwelling older adults (Cheah, Syed Anera, Omar, Abd Manaf, & Idris, 2026). For biological factors, ADL and perceived health status are found to be predictive factors of depression in older people living in the community (Aung, Moolphate, Koyanagi, Angkurawaranon, Supakankunti, Yuasa et al., 2022; Yang, Song, Zhang, Liu, & Hou, 2025). Loneliness is a psychological factor that has been found to be a strong predictor of depression in community-dwelling

older adults (Li, Zhong, He, Yan, Xie, & Meng, 2023). The study of community-dwelling Japanese older adults found that greater loneliness was significantly associated with depressive symptoms (OR = 4.69, 95% CI: 2.84-7.76) (Maki, Matsuda, Eto, Araki, Takao, & Mayers, 2026). Furthermore, social support and social participation are social factors identified as predictive of depression among community-dwelling older adults. A community health survey in older adults aged 65 years and above found that greater participation in social activities (OR = 0.68, 95% CI = 0.53-0.87) was associated with lower odds of depression (Suh, Lee, Yi, & Lee, 2025). In addition, a community-based random sampling study of elderly people found that low social support was identified as the cause of depression (Mulat, Gutema, & Wassie, 2021).

Although the results from the previous studies identify the risk factor of depression among elderly people living in the community alone, the results from Western or other Asian countries may not necessarily apply to the Hangzhou population due to different characteristics and context. Though several studies focused on the rate and predicting factors of older people across China, there are no published studies specifically from Hangzhou, particularly studies exploring biopsychosocial risk factors of depression in older people, particularly those living alone in the community. Therefore, this study was designed to analyze depression levels in this population and examine the impact of various biopsychosocial determinants. The findings aim to provide evidence to support local healthcare policymakers and public health researchers in developing targeted health management strategies for the older adult population.

Objective

To examine the factors influencing depression among older adults living alone in the community of Hangzhou, China.

Methods

This is a predictive correlational research study design. The older adults were defined as those aged 60 years and above who are living alone in community, Hangzhou, China. The data were collected through face-to-face interviews from January 1 to March 30, 2025. The Institutional Review Board of Burapha University accepted this study, which complied with the Declaration of Helsinki's ethical guidelines (Number IRB3 171 2567).

Population and sample

Participants included 321 older adults aged ≥ 60 years living alone in the Hangzhou community, China. The inclusion criteria were as follows: individuals with age ≥ 60 years, living alone in the community for at least 1 year, having the ability to communicate Hangzhou dialect or Mandarin, and providing voluntary consent to participate. The exclusion criteria included individuals with severe cognitive impairments based on Chinese Min Cog screening tool score ≤ 3 . The sample size for multiple regression analysis was determined, the significance level (α) was set at 0.01, the power of the test was set at 0.95, and the effect size was set at 0.10, the moderate effect size (Cohen, 1977). With 7 variables included in the analysis, the initial calculated sample size was 292. After accounting for a 10.0% non-response rate, the final sample size was adjusted to approximately 321 participants.

Tools

Prior to data collection, permission to utilize all instruments was secured from the original and Chinese version authors. Participants were screened for cognitive impairments with the Mini Cog. The questionnaire consisted of seven parts as follows

Part 1 Demographic characteristics consisted of 7 questions regarding age, gender, religious, marital status, income, educational level, and living arrangement.

Part 2 The Chinese version of the Geriatric Depression Scale-Short Form was used to assess depression. Of the 15 items, 10 indicated the presence of depression when answered positively, while the rest (question numbers 1, 5, 7, 11, and 13) indicated depression when answered negatively. The total scores of 0-4 are considered not depression; the total scores of 5-9 indicate possible depression; and 10-15 indicate depression (Xiong, Li, Tang, Zhang, Cao, Ni et al., 2018). The Cronbach's α for this study was 0.827.

Part 3 The Chinese version of the 6-item De Jong Gierveld Loneliness Scale was used to assess for overall, emotional, and social loneliness. The overall loneliness score ranges from 0 to 6, where 0 means no loneliness and 6 indicates severe loneliness. (Tilburg & Gierveld, 2006). The Cronbach's α for this study was 0.893.

Part 4 The Chinese version of perceived health status was used a single-item measure of subjective health. The participants were asked to rate their health. Five options were listed: excellent, very good, good, fair, and poor (Qi, 2014).

Part 5 The Chinese version of the Barthel Index was used to assess participants' abilities to perform ADL. Scores for this 10-item scale range from 0 to 100, with 100 indicating no dependency, 61-99 indicating mild dependency, 41-60 indicating moderate dependency, and 40 indicating severe dependency (Zhang, Zhang, Zhang, Zeng, Yin, Li et al., 2022). The Cronbach's α for this study was 0.959.

Part 6 The Chinese version of the Social Support Rating Scale was administered to assess social support. A 10 items questioner for measuring social support, including objective support (3 items), subjective support (4 items), and the utilization of social support (3 items). A higher score indicated more social support (Xiao, 1994). The Cronbach's α for this study was 0.833.

Part 7 The Chinese version of the Impact on Participation and Autonomy Questionnaire (IPA-I) was used to assess the social participation of older adults. The IPA-I consists of 32 items assessed using a 5 subscale (0 = very good, 4 = very poor). Scores are derived from five categories: indoor autonomy, outdoor autonomy, family roles, social relationships, and work/education. A higher score indicated worse self-perceived social participation (Hong, Ming, & Lanshu, 2012). The Cronbach's α for this study was 0.974.

Data collection

This study was approved by the Ethics Committee of the Institutional Review Board (IRB), Burapha University, prior to data collection. A permission letter from the Dean of the Graduate school, Burapha University was sent to the community directors. The researcher coordinated with community directors to explain the research objectives and procedures, obtain permission for

data collection, and compile a list of older adults residing in the study area. Once the sample list was obtained, a research assistant assisting with the research contacted the selected participants to explain the study, obtaining consent, and conducting a preliminary dementia screening. The study employed the Mini Cog (Li, Dai, Zhao, Liu, & Li, 2018) to screening dementia, a 5-10 minutes screening tool, to identify eligible older adult participants. A total of 321 individuals who had a Mini-Cog score ≥ 4 and met the inclusion criteria were enrolled. Following the provision of informed consent, data were collected via face-to-face interviews at the participants' home that lasted approximately 35-45 minutes. Upon completion, all questionnaires were reviewed for completeness, assigned identification numbers, and handled with strict confidentiality, with access restricted solely to the principal investigator.

Data analysis

The study participant characteristics were analyzed and presented as frequencies and percentages for categorical data or as means and standard deviations for continuous data. A stepwise linear regression analysis was performed to investigate the factors, including educational, incomes, perceived health status, ADL, loneliness, social support, and social participation, influencing depression. Only variables that demonstrated a significant association with depression (p -value < 0.05) in the correlation analyses were included in the multiple linear regression model. Prior to analysis, the assumptions of the multiple regression tests were tested. All variables were found to have a correlation coefficient less than 0.7 with no evidence of severe multicollinearity or outliers. Variance inflation factor (VIF) was used to test the collinearity

between independent variables. The VIF value ranged from 1.155 to 1.477 and the tolerance values range from 0.677 to 0.865, in this study, indicating that the data met the assumptions of multiple linear analysis. A tolerance value greater than 0.20 indicates non-multicollinearity between independent variables. The normal distribution of data was demonstrated through regression residuals, Q-Q plots, and scatter plots. Additionally, the homoscedasticity test yielded significant results ($p\text{-value} > 0.05$). The coefficient of correlation (R) is a crucial indicator for assessing the linearity between variables and also reflects the degree of regression fitting. Typically, R values range from 0 to 1, with larger values indicating stronger linear relationships. In this study, the correlation coefficient R was found to be 0.641, indicating a moderate positive linear relationship between the variables. The data were analyzed using SPSS software version 27.0; IBM SPSS Statistics, Armonk, NY, USA, and statistical significance was set at $p\text{-value} < 0.05$.

Results

A total of 321 older adults living alone in the community participated in the study and had the average age with a standard deviation of 76.58 ± 7.12 years. The majority were female (55.1%). Most participants identified themselves no religious beliefs (85.0%). The majority (62.0%) of the participants were widowed and had completed primary school education (49.2%). Additionally, two-thirds were lived in the rural area (61.1%). Regarding individual pensions, the average monthly income was 888.83 ± 482.38 yuan per month, as detailed in Table 1.

The majority of these participants (60.4%) had no depression, while one-third had possible depression (38.0%), and 1.6% identified depression (Table 2).

Table 1 Demographic characteristics of participants (n = 321)

Variable	n	(%)
Sex		
Female	177	55.1
Male	144	44.9
Age (years) Min = 61, Max = 95, Mean = 76.58, S.D. = 7.12		
Religious		
None	273	85.0
Buddhism	42	13.1
Christian	6	1.9
Marital status		
Single	6	1.9
Separated	65	20.2
Divorced	51	15.9
Widowed	199	62.0
Income per month (Yuan) Min = 300, Max = 1,800, Mean = 888.83, S.D. = 482.38		
Educational level		
Uneducated	65	20.2
Primary school	158	49.2
Secondary school	77	24.0
Vocational Certificate/High Vocational Certificate	17	5.3
Bachelor's degree or higher	4	1.2
Residence		
Urban areas	125	38.9
Rural areas	196	61.1

Table 2 Description of depression among older adults living alone in the community (n = 321)

Variable	Possible score	Actual score	n	%
VariablesNone depression	0-4	0-4	194	60.4
Possible depression	5-9	5-9	122	38.0
Depression	10-15	10-12	5	1.6

Mean = 4.03, S.D. = 2.18

Participants overall exhibited favorable profiles, (mean = 29.73) was in the moderate range. as evidenced by their perceived good health status. Meanwhile, they had loneliness (mean = 3.49) and (mean = 3.43) and independence (mean = 93.02). low perceived social participation (mean = 44.20). In addition, their perceived social support (Table 3)

Table 3 Description of study variables (n = 321)

Variables	Possible range	Actual range	Mean	S.D.
Perceived health status	1-5	1-5	3.43	0.95
ADL	0-100	15-100	93.02	16.32
Loneliness	0-6	0-6	3.49	1.23
Social support	10-66	18-45	29.73	4.30
Social participation	0-128	0-106	44.20	18.87

The correlation coefficient of variables 1 to 7 were computed by Pearson correlation. Based on the correlation matrix, social participation and loneliness was found to be significantly positively correlated with depression ($r = 0.422$, $p\text{-value} < 0.01$; $r = 0.417$, $p\text{-value} < 0.01$, respectively). Conversely, education, perceived health status, ADL, and social support were found to be significantly negatively correlated with depression ($r = -0.139$, $p\text{-value} < 0.05$; $r = -0.482$, $p\text{-value} < 0.01$; $r = -0.556$, $p\text{-value} < 0.01$; and $r = -0.417$, $p\text{-value} < 0.01$, respectively). No statistically significant correlation was found between income and depression ($r = -0.071$, $p\text{-value} > 0.05$), as shown in Table 4

Table 4 Correlation between predictors and depression of older adult living alone in communities in Hangzhou, China (n = 321)

	1	2	3	4	5	6	7	8
1. Depression	1							
2. Incomes	0.071	1						
3. Educational (year)	-0.139*	0.088	1					
4. Perceived health status	-0.482**	-0.228**	0.351**	1				
5. ADL	-0.556**	-0.156**	0.271**	0.507**	1			
6. Social support	-0.417**	-0.101	0.162**	0.271**	0.395**	1		
7. Social participation	0.422**	-0.106	-0.091	-0.317**	-0.624**	-0.367**	1	
8. Loneliness	0.417**	-0.016	-0.064	-0.225**	-0.364**	-0.651**	0.335**	1

* $p\text{-value} < 0.05$, ** $p\text{-value} < 0.01$ (2 tailed)

The stepwise method was used for multiple regression analysis, with depression as the dependent variable. The analysis indicated that ADL, perceived health status and loneliness were significant factors affecting depression, according to the multiple regression analysis (Table 5). The results of the multiple regression analysis revealed that depression was significantly related to ADL ($\beta = -0.341$, $p\text{-value} < 0.001$), perceived

health status ($\beta = -0.256$, $p\text{-value} < 0.001$), and loneliness ($\beta = 0.235$, $p\text{-value} < 0.001$). Moreover, loneliness was positively correlated with depression, meaning that higher scores on these constructs were associated with an increase in depression. However, ADL and perceived health status were negatively correlated, indicating that poor ADL and perceived poor health status were associated with an increased likelihood of depression.

Table 5 Summary of multiple regression analysis of factors influencing depression (n = 321)

Predicting factors	B	SE	β	t	p-value	95% CI	Tolerance	VIF
ADL	-0.045	0.007	-0.341	-6.508	< 0.001	-0.059;-0.031	0.677	1.477
Perceived health status	-0.583	0.114	-0.256	-5.120	< 0.001	-0.806;-0.359	0.741	1.350
Loneliness	0.413	0.081	0.235	5.071	< 0.001	0.253;-0.573	0.865	1.155

Constant = 8.782, $p\text{-value} < 0.001$, $R = 0.641$, $R^2 = 0.411$, $R^2_{\text{adjust}} = 0.406$, $F(3, 317) = 25.714$, $p\text{-value} < 0.001$

Discussion and Conclusion

The study found that the following three variables influenced the risk of depression among older adults living alone in the community, ADL, perceived health status, and loneliness. All three factors predicted the risk of depression among older adults living alone in the community at 41.1%. The predictive factors are described below.

The study results confirmed that ADL had a significant negative effect on depression, it was one of the predictors of depression. The finding was similar to a study done in China, there was a significant negative correlation between depression and the ADL (Wang, Yu, Huang, Wang, Liu, & Xiang, 2025). Additionally, this study also found that age related with decline in daily living abilities in the elderly. A possible reason for this finding is that age-related chronic conditions can increase the risk of osteoporosis, arthritis, and disability, which

subsequently limit activities of daily living (Zhou, Wang, & Ma, 2024). When older adults are unable to independently perform basic daily activities, they often feel helpless and which contributes to depression. This functional loss not only impacts their sense of self-efficacy but also diminishes their social interactions, which in turn exacerbates depressive symptoms (Sun, Sun, Zhang, Jiang, Wang, & Zhang, 2025). From a biological perspective, physical function impairments in older adults—particularly decreased muscle strength, mobility limitations, and balance deficits—significantly reduce the ability to perform Activities of Daily Living (ADL) independently. These impairments reflect underlying frailty and diminished physiological reserve, making ADL disability a key predictor of adverse outcomes such as depression (Lingying, Hong, Hongxiu, Ziyi, Mei, Menglin et al., 2025). In addition, the loss of

physical function can initiate chronic systemic inflammation marked by elevated levels of proinflammatory cytokines, such as interleukin-6 (IL-6) and tumor necrosis factor- α (TNF- α), both of which are strongly associated with the development of depression (Miller & Raison, 2016). Physical decline may also disrupt the hypothalamic–pituitary–adrenal (HPA) axis, leading to abnormal patterns of cortisol secretion and thereby contributing to mood disturbances and depressive symptoms (Pariante, 2017). Furthermore, increased oxidative stress and hormonal imbalances resulting from declining physical health can impact neurotransmitter systems vital for mood regulation, including serotonin and dopamine (Haroon, Miller, & Sanacora, 2017). In addition to these biological pathways, psychosocial factors play a significant role. Diminished functional abilities often lead to reduced autonomy and loss of independence, which can lower self-esteem (Santini, Jose, Cornwell, Koyanagi, Nielsen, Hinrichsen et al., 2020). These changes may also limit opportunities for social engagement, making it harder to participate in community life or maintain social relationships, thereby increasing the risk of social isolation and loneliness (Yang et al., 2025). The results of this study were consistent with the research results carried out by Arayici, Kose, Dolu, Gultekin Arayici, Gedik, Kilic et al. (2025) in Turkey, reporting that the elderly people who were less independent in their daily living had significantly risk of depression, whereas those with intact functionality tended to be free of depressive symptoms. In conclusion, these combined results support the idea that the functional status is the basis and important influencing factor of depression among older adults living alone in the community.

Perceived health status was the second factor predicting depression. This finding aligns with

Hong & Lee (2002) study about depression in older adults living alone in Korea, which identified that fair or poor self-rated health status was associated with depression. In older adults living alone in the community, poorer self-rated health was associated with higher depression scores, a result consistent with a previous study (Rantanen, Korkeila, Kautiainen, & Korhonen, 2019; Sahril, Chan, Chan, Ahmad, Kassim, Shahein et al., 2023). This finding may be explained by the fact that older adults who believe they are in poor health are more likely to suffer from chronic illnesses, pain, and functional limitations. These conditions can impair independence and increase psychological burden, which puts them at risk for depressive symptoms (Yang, Deng, Geng, Tang, Ma, Ye et al., 2021). Furthermore, maladaptive cognitive processes, such as low self-efficacy, pessimism about future health, and feeling of hopelessness, which are key factors in the development of depression, may be shaped by unfavorable health views (Peleg & Nudelman, 2021). Additionally, negative behavioral and social outcomes may result from older persons' perceptions of their health. According to Zhang, Zhao, Li, Guo, Peng, Wan et al. (2024), older persons who believe they are sick are more likely to limit their participation in everyday activities and withdraw from social interactions, which can lead to social isolation and loneliness, both of which are well-known risk factors for depression. Collectively, these mechanisms suggest that self-rated health is not merely a reflection of physical health but a multidimensional indicator that captures the cumulative effects of biological decline, negative cognitive appraisal, and social disengagement, thereby increasing vulnerability to depression in the elderly.

Among the current set of predictors, loneliness was also significant in predicting depression. In this study, the mean loneliness score was 3.49, which exceeded the cut point (2.50), indicating that older adults were considered lonely (Huxhold & Henning, 2023). This result was also similar to those of a Chinese study on depression among community-dwelling elderly (Chen, 2022; Wang, Hu, Xiao, & Zhou, 2017). A possible reason for this finding is that loneliness represents a perceived lack of meaningful social connection, which negatively influences emotional regulation and cognitive processes. Older adults experiencing loneliness are more likely to develop maladaptive cognitions—such as feelings of worthlessness and social disconnection—which are central features of depression (Lee, Pearce, Ajnakina, Johnson, Lewis, Mann et al., 2021). From a behavioral perspective, loneliness reduces engagement in social and physical activities, leading to decreased positive reinforcement and increased social withdrawal, thereby exacerbating depressive symptoms (Roskoschinski, Liang, Duan, Al-Salehi, & Lippke, 2023). In community settings, older adults living alone in the community may experience sadness, losses, loneliness, and boredom due to limited daily activities, a lack of social support, and low social participation (Donovan & Blazer, 2020; Pollak, Pham, Ehrlich, Verghese, & Blumen, 2025) and loss of social roles, further increasing vulnerability to depression (Isik, BaŞoğul, & Yildirim, 2021). The results of this study were similar to a systematic review study done by Lee et al. (2021) there was a moderate positive correlation between loneliness and depression. In addition, Polansky, Dobbs, & Meng (2025) found that loneliness was positively associated with depression ($r = 0.350$, $p\text{-value} < 0.01$) and could predict depression among

the older adults ($\beta = 0.110$, $p\text{-value} < 0.01$). Consistent with existing evidence, the finding demonstrated an increase in loneliness corresponding to elevated depression levels among elderly populations, especially those who are living alone in the community.

A limitation of the present study was that the cross-sectional design precluded establishing causal relationships between the variables. Second, the limited sample size reduces the study's statistical power and limits the generalizability of the findings to the broader population of older adults living alone in the community in China. Third, as all participants were older adults from Hangzhou, China, the results are likely shaped by culture and the local pension system, reducing their direct applicability to other settings. Finally, some psychological factors, such as stress and stressful life events, which may have important impacts on geriatric depression, were not included in this study. However, reaching the 321 community-dwelling older adult participants by door-to-door visits was a great opportunity to determine their preexisting geriatric depression, and it strengthened the findings of our study.

Conclusions

This study contributes to a growing body of evidence highlighting the multifactorial determinants of depression among older adults living alone in China. The findings indicate that limited ADL ability is the strongest predictor of depression. Interventions that simultaneously improve ADL ability and health status and address loneliness can substantially lower depression risk and enhance quality of life for older adults. From a public health perspective, screening for ADLs, self-rated health, loneliness, and depression for early detection of a risk of depression and integrating community

engagement initiatives with mental health promotion represent a sustainable approach to fostering physical function and psychological resilience among aging populations.

Suggestions

Suggestions for applying the research results

The findings have several implications for clinical practice and public health planning. First, screening for depression, loneliness, ADL, and social support in older adults living alone should be a priority for health care providers, especially in the primary care setting. Second, as a part of holistic care, community-based programs and primary care services should integrate ADL and perceived health status enhancement and loneliness management strategies to reduce depression and promote better mental and overall health in this population.

Suggestions for future research

This study found that ADL, perceived health status, and loneliness significantly predict depressive symptoms, accounting for 41.1% of the variance observed. However, because our research used a cross-sectional design, we cannot determine causality or the sequence of these effects. It would be beneficial for future research to use prospective longitudinal cohort studies. These could help clarify whether functional decline tends to precede depression, or if depression, in turn, causes a deterioration in ADL. Using advanced statistical methods, like SEM, could further reveal whether these factors interact reciprocally. Additionally, future studies might explore if loneliness acts as a mediator between ADL impairment and depression. By exploring these relationships more deeply, researchers could strengthen causal claims and help design more effective interventions for older adults living alone in the community.

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