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A Review of the Prevalence, Determinants, and Interventions for Depression in Older Adults

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Abstract. Mental health in the elderly has emerged as a major public health issue, with late-life depression attracting widespread societal attention. This study retrieved and analyzed 19 English-language publications published between 2016 and 2025 to review the prevalence, determinants, and intervention strategies related to depression among older adults. The findings indicated that the prevalence of depression among older adults had shown an upward trend in recent years in both Western and Asian countries. Female sex, low income, exposure to famine during childhood, comorbidity with chronic diseases, and insufficient social support were identified as significant risk factors for late-life depression. Mindfulness-based cognitive therapy, psychoeducation, and combined exercise programs integrating aerobic exercise, resistance training, or balance training have been shown to significantly alleviate depressive symptoms. The review also revealed that existing evidence was largely derived from urban populations, with insufficient representation of rural and disabled older adults. Longitudinal cohort studies remained scarce in low-income countries, and intervention trials frequently exclude the oldest-old and individuals with multiple comorbidities. In light of these limitations, three actionable recommendations were proposed: first, to incorporate brief screening tools for late-life depression into national primary healthcare programs to reduce underdiagnosis; second, to strengthen cohort studies on late-life depression, to identify key risk factors, to prioritize follow-up of high-risk older populations, and to enhance causal inference; and third, to expand intervention research tailored to older adults with diverse characteristics in order to provide stronger evidence for depression management in later life.

Keywords: depression, prevalence, older adults, determinants, intervention strategies

1. Introduction

The World Health Organization (WHO, 2025) reported that global population aging was advancing at an unprecedented pace. By the year 2030, it is projected that people who are 60 years old and above will make up one sixth of the world's total population [1]. Under this population-related background, the mental health of elderly people has become a crucial public health problem, and late-life depression has been gaining more and more attention from the whole society. Depression that occurs in people who are 65 years old and above is usually called late-life depression (LLD) in clinical practice. A meta-analysis that collected related studies published from 2000 to 2021 made an

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estimate that the global prevalence rate of LLD stands at 28.4% [2]. The 2019 Global Burden of Disease (GBD) study reported that depression is the main cause of the global mental health burden, and this burden has a particularly great influence on societies with an aging population [3]. Even though late-life depression brings a heavy burden to people and society, this kind of depression in elderly people is still not fully noticed and properly treated in reality. In many countries around the world, depression is often not diagnosed and treated as it should be, and this problem is especially obvious among the elderly population as well as in low and middle-income countries and regions [4,5]. Two surveys that reflect the situation of the whole population in China showed that 5.5% to 5.9% of elderly people living in communities suffer from depression, yet nearly 97% of these people with depression have never asked for professional care from mental health workers [6,7].

Also, the bad results of late-life depression on individuals, families and society are becoming more and more serious. When elderly people have depression, it will lead to higher health care costs for them, and it will also damage their personal, work and social abilities to live a normal life. These people also fail to follow the medical treatment advice well, and some even take their own lives, and all these situations will finally make their quality of life drop a lot [8-9]. Related research evidence also shows that elderly people with late-life depression face a higher risk of certain diseases than those who do not have depression [10]. To be specific, their risk of getting Alzheimer's disease is 1.65 times higher, and their risk of getting vascular dementia is 2.52 times higher. All these differences have clear statistical meaning and are not accidental in the research [10]. These research findings make it clear that we have an urgent need to take the mental health of elderly people as a top priority to deal with.

Though more research about late-life depression has been carried out in recent years, there is still no systematic and overall summary about its epidemiological features, the factors that affect it and the possible ways to intervene in it. This review sums up the new progress achieved in the research on the prevalence rate, influencing factors and intervention strategies of depression among elderly people. The main aim of this review is to build a solid scientific base for developing screening programs that can be widely used in the future, and it also aims to lay such a base for clinical and nursing intervention methods that are based on real research evidence.

2. Methods

A systematic literature search was conducted in the PubMed and Google Scholar databases. The primary search strategy included the following keywords: ("depression" OR "depressive disorder" OR "major depression") AND ("elderly" OR "elderly population" OR "aged over 60 years" OR "elderly patients") AND ("prevalence" OR "epidemiology" OR "incidence").

This review included original research articles on depression in older adults published in English between 2016 and October 2025. Eligible study designs comprised cross-sectional surveys, cohort studies, and randomized controlled trials (RCTs). Exclusion criteria were as follows: publications available only in abstract form, commentaries, studies involving animal studies, systematic reviews, meta-analyses, and study protocols. A total of 19 articles were ultimately included.

Relevant information from the selected studies was extracted and organized into a predesigned Excel spreadsheet. Key data elements included authors, titles, year of publication, study design, and principal findings. The results of the included studies were then systematically synthesized and analyzed.

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3. Results

3.1. Marked regional and population differences in the prevalence and factors associated with depressive symptoms among older adults

3.1.1. Regional variations

A representative cross-sectional survey conducted in 2002 among adults aged 65 years and older showed that 14.6% and 17.6% of older adults in the United States and England, respectively, had clinically significant depressive symptoms [11]. A survey conducted from October 2021 to September 2022, revealed that the overall prevalence of depressive symptoms among people aged 65 and above in 27 European countries and Israel, with a cut-off point of ≥4 on the EURO-D scale, was 29.2%. Among those aged 85 and above, the prevalence rate was as high as 43.6% [12].

In Asian countries, the 2022-2023 Singapore Elderly Resident Survey reported a prevalence of 4.4% for depressive disorder and 11.9% for subclinical depression among older adults [13]. A longitudinal follow-up in Japan conducted between 2019 and 2022 showed that the 3-year cumulative prevalence of depressive symptoms (GDS-15 score ≥ 5) among community-living older adults aged ≥65 years who are functionally independent was 11.2% [14]. In China, a multi-center cross-sectional study conducted in Wuhan (Hubei Province) between October 2015 and November 2016 reported a 1-month prevalence of 20.3% for depressive disorders (including major depression, dysthymia, and minor depressive disorder) among community-dwelling older adults aged 65 years and above receiving primary care [15].

3.1.2. Gender differences

Among older adults, women consistently have a higher prevalence of depression than men.In the United States, Zivin et al. [11] reported that among individuals aged 65 years and above, women have a 1.76-fold higher risk of the disease compared to men. In Europe, Melo et al. [12] found that among people aged 65 and above in 27 European countries and Israel, the prevalence of depressive symptoms (EURO-D ≥ 4) was 35.1% for women and 21.5% for men. The risk of elderly women experiencing depressive symptoms in Europe was significantly higher than that among men.

Similar patterns have been observed in Asia. In Singapore, the prevalence of depression among women aged 60 years and above was 5.7%, compared with 2.8% among men [13]. In Japan, Amaike et al. [14] reported gender-related disparities in late-life depressive symptoms: community-dwelling older women had a 0.9-percentage-point higher 3-year prevalence (11.6% vs. 10.7%) and 3.2 cases per 1,000 person-years higher incidence than men. In China, based on a cross-sectional survey covering seven provincial-level administrative divisions, Gao et al. [16] found that among adults aged 60 years and above, the prevalence of depressive symptoms was 17.5% in women and 10.0% in men. Multivariable logistic regression analysis further confirmed that older women had a 1.37-fold higher risk of developing depressive symptoms in comparison to their male peers, highlighting a significant gender disparity in late-life depression prevalence in China.

3.1.3. Age differences

The prevalence of late-life depression rose with increasing age.

Melo et al. [12] based on the cross-sectional data from the 9th wave of the survey in Europe (SHARE-Wave 9) from October 2021 to September 2022, showed that the prevalence of depressive symptoms (EURO-D ≥ 4) among people aged 65 and above in 27 European countries and Israel

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increased with age. Specifically, Prevalence rates were 24.2% (65-74 years), 31.9% (75-84 years), and 43.6% (≥85 years) [12].

Similarly, Fu et al. [17] conducted a cross-sectional study of 1,324 Chinese oldest-old adults aged 80-116 years and confirmed that the prevalence of late-life depression increased with advancing age, with a more pronounced risk in centenarians compared to those aged 80-99 years.

3.1.4. Income gradient

Lower income was consistently associated with a higher risk of depression in later life, and increasing income appeared to confer a protective effect.

Zivin et al. [11] conducted a cross-sectional study among 13,503 non-Hispanic white individuals aged 65 years and above in the United States and England, and found that the odds of significant depressive symptoms (CES-D score ≥4) in those with a household net worth of ≤83,000 US dollars (2002) were 1.64 times higher than those with a net worth of >318,000 US dollars .

Similarly, Brinda et al. [18] used data, which included a nationally representative sample of 14,877 older adults from six large low- and middle-income countries, and found that poverty was significantly positively associated with geriatric depression (cross-national prevalence: 4.7%, 95% CI: 1.9%-11.9%).

Evidence from Asia further supported this gradient. Using six-year longitudinal data from 4,541 adults aged 65 years and older in South Korea, Kim et al. [19] demonstrated that receipt of national pension or specific corporate pension was significantly associated with reduced depressive symptoms. National pension recipients had a 0.734-point reduction in depression screening CESD-11 scores ($p<0.001$) and specific corporate pension recipients had a 0.775-point reduction ($p=0.02$) compared to non-recipients, with the magnitude of improvement positively correlated with pension benefit amounts. In China, Pan et al. [20] found that participation in the New Rural Social Pension (NRSP) scheme was significantly associated with reduced depressive symptoms (CES-D-10 score reduction: -0.310, $p<0.05$). The effect was more pronounced among pension recipients (score reduction: -0.458, $p<0.001$) than contributors.

3.1.5. Early-life famine exposure

Early-life famine exposure has been recognized as an important long-term risk factor for depression in later life.

Guo et al. [21] reported that experience of the 1959-1961 Chinese Great Famine was associated with a significantly elevated risk of depressive symptoms during older adulthood. (coefficient=0.00158, $p<0.001$). This effect was more pronounced among individuals exposed during adolescence (1943-1952 birth cohort) and rural residents. He et al. [22] found that severe exposure to the 1959-1961 Chinese famine during early life was linked to a 79% higher risk of depressive symptoms in middle-aged and older adults(OR=1.79, 95% CI: 1.16-2.74). Furthermore, depressive symptoms served as a partial mediator in the link between severe famine exposure and persistently low cognitive function trajectories (mediation proportion: 20.07% for global cognition, 11.76% for computation, and 10.38% for orientation), suggesting that severe early-life malnutrition may exacerbate cognitive deterioration in the middle and late stages of adulthood through elevated vulnerability to depression [22].

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3.1.6. Chronic physical illness and physical frailty

Multimorbidity and persistent pain substantially exacerbated the burden of depression among older adults.

In the 2019-2022 prospective cohort study conducted by JAGES in Japan, involving 6,929 community-dwelling elderly individuals aged 65 and above who were capable of self-care, it was found that those with insomnia had a significantly increased risk of developing new depressive symptoms (OR for men = 1.82, OR for women = 1.41). Moreover, walking for more than 30 minutes per day could reduce the risk of developing new depression (OR for men = 0.69, OR for women = 0.66) [14].Among older adults in Anhui Province, China, multimorbidity (evidenced by increased hospitalization frequency) and persistent physical pain—especially moderate to severe pain—significantly exacerbated the burden of depressive symptoms. Logistic regression analysis identified these as key risk predictors: compared with those without hospitalization, older adults hospitalized once, twice, or three or more times had 1.885-fold (95% CI: 1.295-2.746), 2.887-fold (95% CI: 1.894-4.400), and 3.627-fold (95% CI: 2.335-5.634) higher risks of depressive symptoms, respectively; moderate pain (OR=2.335, 95% CI: 1.437-3.794) and severe pain (OR=4.020, 95% CI: 1.564-10.337) were also strongly associated with elevated depressive symptom risk [23].

3.1.7. Insufficient social support

Lack of social support markedly increased the risk of late-life depression.

A three-year follow-up study of 6,929 community-dwelling elderly individuals aged 65 and above in Japan [14] showed that men lacking emotional support had a 56% increased risk of developing new depressive symptoms compared to those with emotional support (OR = 0.64), and women lacking instrumental support had a 117% increased risk of developing new depressive symptoms compared to those with instrumental support (OR = 0.46) [14].

In China, Su et al. [24] conducted a cross-sectional survey of 809 empty-nest older adults in Hunan Province (491 rural and 318 urban residents) and found that rural empty-nest older adults had significantly higher depressive symptom scores (Geriatric Depression Scale, GDS: 14.57±5.43) than their urban counterparts (13.18±6.51, $p<0.01$). Additionally, rural residents had lower objective social support scores (7.52±2.64 vs. 8.77±3.10, $p<0.05$), while no significant urban-rural differences were observed in subjective social support, support utilization, or total social support scores ($p>0.05$) [24].

3.2. Interventions to mitigate depressive symptoms in the elderly

In addition to pharmacotherapy, several mainstream non-pharmacological interventions demonstrated efficacy in alleviating depressive symptoms in older adults, including structured psychotherapies, systematic exercise programs, geriatric psychoeducation, and remote technology-based support [25-27].

Psychoeducation showed significant benefits. In northern India, Singh et al. [25] conducted a 4-week randomized controlled trial involving 154 adults aged 60 years and older with mild-to-very severe depression, randomizing them to either a psychoeducation group (n=83, 6-minute 30-second video on depression-related knowledge + treatment as usual) or a placebo group (n=71, 6-minute 10-second video on general elderly information + treatment as usual). Both groups showed significant reductions in Geriatric Depression Scale (GDS-30) scores from baseline to Day 28 (case group:

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20.23±4.72 to 12.92±5.52; control group: 20.58±4.55 to 14.80±5.97; both $p<0.001$), indicating improvements in depressive symptoms with combined psychoeducation and pharmacotherapy [25].

Among psychotherapeutic approaches for chronic, treatment-resistant depression, mindfulness-based cognitive therapy (MBCT) shows potential benefits. In the Netherlands, Cladder-Micus et al. [26] conducted a pragmatic randomized controlled trial involving 106 adult patients (mean age 47.1 years) with chronic depressive episodes (≥12 months) and previous non-response to pharmacotherapy and psychological treatment. Compared to treatment-as-usual (TAU), the group receiving MBCT combined with TAU had a significantly higher remission rate and greater reductions in depressive symptoms among treatment completers at posttreatment [26].

Single-modality multimodal exercise interventions can work well in treating late-life depression. Xu and other researchers [27] carried out a 12-week randomized controlled trial in China, and the trial involved 121 people who lived in communities and were 60 years old and above. All these people were diagnosed with mild to moderate late-life depression. The researchers divided them into two groups in a random way: one was the intervention group and the other was the control group [27]. People in the intervention group received single-modality exercise training, which could be aerobic training, strength training or balance training. Besides the exercise training, they also took corresponding medicine and got standard medical care. People in the control group only got the medicine and standard care without any extra exercise training [27]. After the trial, the intervention group had a clear reduction in the scores of the Hamilton Depression Rating Scale (HAMD-17), and their cognitive function also improved a lot. Among all the training methods, high-frequency aerobic training brought the most obvious benefits, and this kind of training was done 5 times a week [27]. The reduction in their HAMD-17 scores reached 8.6±2.7 points, and the increase in their MMSE scores was 6.8±2.1 points. Both of these two sets of data had the result of $p<0.001$ [27].

In short, we can combine three different methods to make a non-pharmacological intervention strategy for late-life depression, and this strategy is based on solid research evidence and can be widely used in daily practice. The three methods are mindfulness-based cognitive therapy, geriatric psychoeducation and combined exercise programs. The combined exercise programs include aerobic training, resistance training and balance training, and putting these three parts together forms an effective intervention way for late-life depression.

4. Discussion

This review showed that late-life depression has had a very obvious rising trend in recent years, and it also has clear differences in different regions, between different genders and among different age groups. Rural people and women are the groups that are especially easy to suffer from late-life depression, and the chance of having depression will get higher as people grow older. Both the risk factors at the individual level and those at the societal level can lead to late-life depression in the elderly. At the individual level, chronic illnesses, the experience of famine in early life and low income are the main factors that cause this disease. At the societal level, living alone, not getting enough emotional comfort and lacking overall social support will all make the risk of depression rise greatly for the elderly. The combined effect of these various factors may bring an increasing or strengthening influence on the elderly's possibility of getting depressed. When it comes to the ways to intervene in late-life depression, all the current research evidence proves that non-pharmacological intervention methods are effective. Mindfulness-based cognitive therapy, well-organized psychoeducation and multimodal exercise programs have all been proved to bring lasting improvements to the depressive symptoms of the elderly.

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The research on late-life depression that has been done so far shows unbalanced progress between high-income countries and low-income countries. Countries with middle and high income have built large-scale long-term research platforms like SHARE, JAGES and CHARLS, and these platforms make it possible to do long-term research on the changing trends of depression risks. On the other hand, low-income countries mostly do research through single-center cross-sectional surveys. Although such surveys can tell people the prevalence rate of late-life depression, they do not have long-term follow-up data. This makes it hard to find out the key factors causing the disease and to confirm the causal relationships between different factors and depression. Even in the long-term cohort studies that already exist, the time between follow-up checks is often too long, and many people drop out of the studies. What's more, macro-level factors such as the convenience of getting medical care and pension-related policies are almost never included in the research and analysis process. The research on intervention methods for late-life depression also has structural problems and limitations. In developed countries, psychological therapies and other related intervention methods have been evaluated in a systematic way. But the elderly who are over 80 years old, those who have more than one chronic disease at the same time and those with cognitive problems are often excluded from these research studies. This makes the research results less useful in real-life application. In low-income countries, intervention research is usually only small-scale pilot programs, which mainly include health education and family support help. And there is a clear lack of research evidence from randomized controlled trials for these intervention methods.

In China, the research samples of late-life depression are mostly taken from urban people, which means rural residents and the elderly with functional impairments are not fully represented in the research. The large-scale national cross-sectional surveys about this disease are carried out at very long intervals, and community-based depression screening has not been made a regular and institutional work. Because of these problems, many late-life depression cases are easy to be not diagnosed in time. The in-depth long-term follow-up research on the groups of people who were born and experienced famine in their early life is still not enough. At the intervention level, there is a shortage of primary care workers who have received professional training for late-life depression, and the resources of telemedicine for this disease are also insufficient. These two problems further limit the effective carrying out of treatment strategies for late-life depression in our country.

According to all these research findings, three practical and widely applicable action methods are put forward for dealing with late-life depression. First of all, simple and quick screening tools for late-life depression should be added into the regular public health service items. This can help medical workers find, diagnose and intervene in the disease at an early stage, and thus reduce the number of underdiagnosed cases. Secondly, we need to strengthen the long-term cohort research on late-life depression. Such research can help us find out the key risk factors of the disease, make the follow-up of high-risk elderly groups a top priority and make the judgment of causal relationships between factors and depression more accurate. Thirdly, we should expand the research on intervention methods for late-life depression. We need to develop and evaluate suitable intervention strategies for the elderly with different personal characteristics, and by doing so, we can build a more solid research evidence base for the daily management of late-life depression.

5. Conclusion

Mental health among elderly populations has become a major worldwide public health concern. Through a systematic synthesis of recent research, this review demonstrated that late-life depression was increasing and exhibited clear regional, gender, and age disparities. Rural residents and women represented particularly vulnerable groups, and the risk of depression rose with age. Both individual-

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level factors, such as chronic illness, famine exposure, low income, and social-level factors, such as living alone and insufficient emotional and social support contributed to late-life depression, with cumulative effects further amplifying risk. Robust evidence indicated that non-pharmacological interventions, including mindfulness-based cognitive therapy, psychoeducation, and multimodal exercise programs, could achieve sustained symptom improvement lasting at least six months. Future efforts to prevent and manage late-life depression required enhanced collaboration and innovation. It was recommended that depression screening for older adults be integrated into routine healthcare services, that interdisciplinary and cross-regional research be promoted, and that culturally adaptive intervention models be developed and evaluated. Establishing sustainable mental health support systems for older adults was essential to effectively address the challenges posed by population aging.

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