

CLINICAL INVESTIGATION

Prevalence of Depression in Older Adults and the Potential Protective Role of Volunteering: Findings From the LongROAD Study

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ABSTRACT

Background: As the US population continues to age, depression and other mental health issues have become a significant challenge for healthy aging. Few studies, however, have examined the prevalence of depression in community-dwelling older adults in the United States.

Methods: Baseline data from the Longitudinal Research on Aging Drivers study were analyzed to examine the prevalence and correlates of depression in a multisite sample of community-dwelling adults aged 65–79 years who were enrolled and assessed between July 2015 and March 2017. The Patient-Reported Outcomes Measurement Information System (PROMIS) depression scale was used to determine the depression status.

Results: Of the 2990 study participants, 186 (6.2%) had depression at the time of assessment. Elevated prevalence of depression was found in those who were 65–69 years of age (7.9%); were women (7.2%); were not married (8.1%); had attained an education of high school or less (8.3%); or had annual household incomes less than \$50,000 (10.7%). Older adults with a positive history of depression or chronic medical conditions (e.g., diabetes mellitus and anxiety) had a significantly higher prevalence of depression whereas those engaged in volunteering activities had a significantly lower prevalence of depression. With adjustment for demographic characteristics and comorbidities, volunteering was associated with a 43% reduction in the odds of depression (adjusted odds ratio: 0.57, 95% confidence interval 0.40–0.81).

Conclusions: The point prevalence of depression in this multisite sample of community-dwelling older adults in the United States was 6.2%, which varied significantly with demographic characteristics and comorbid conditions. Engagement in volunteering activities might help older adults to reduce their risk of depression.

See accompanying Editor's Note

Summary

- Key points
 - The point prevalence of depression in community-dwelling adults aged 65–79 years was 6.2%.
 - Older adults who had a negative history of depression or had annual household incomes of \$50,000 or greater were at significantly decreased odds of depression.
 - Volunteering was associated with a 43% reduction in the odds of depression.
- Why does this paper matter?
 - This paper matters because it helps strengthen the existing research literature regarding the epidemiology and prevention of depression in older adults.
 - Specifically, it provides empirical data on the prevalence of depression among community-dwelling older adults in the United States, and the potential role of volunteering in mitigating the risk of depression among older adults.

1 | Introduction

The demographic shift toward an aging global population is significant, with the World Health Organization estimating over 1 billion individuals aged 60 and above, a number projected to reach 1.4 billion by 2023 [1]. Accompanying this demographic trend are public health challenges, such as increasing prevalence of depression due to comorbid medical conditions and inadequate social support [2]. Globally, depression among older adults is a serious concern, with reported prevalence ranging from 8% to 81% owing to differences in study populations, measurement methods, and diagnostic criteria [2, 3]. In the United States, the 12-month prevalence of major depressive disorder among community-dwelling older adults has been reported to be 2%–4% [4–6], and the point prevalence of overall depression (based on symptoms of major or minor depression) is 11%–18% [5, 7].

Factors contributing to depression are multifaceted, encompassing health status, social isolation, and life transitions. Chronic illnesses prevalent in older adults, such as heart disease, diabetes, and arthritis, often accompany depressive symptoms due to chronic pain, disability, and diminished quality of life [8, 9]. Cognitive impairments and neurodegenerative diseases further aggravate this scenario [10, 11]. Social isolation, stemming from the loss of a spouse, friends, or through reduced mobility, intensifies feelings of loneliness and susceptibility to depression [12, 13]. Additionally, major life transitions such as retirement and bereavement can be possible triggers [14]. Economic stress, often stemming from fixed incomes or escalating medical expenses, also contributes to depression among older adults [15]. As they transition into retirement, many older individuals rely on savings or pensions that may not adequately cover their living and healthcare costs. This financial uncertainty can lead to persistent stress, anxiety, and consequently, depression [16]. Additionally, gender differences play a crucial role in the prevalence of depression among older adults. Research consistently shows that older women are more likely to experience

depression than their male counterparts [17]. This discrepancy can be attributed to a combination of biological, social, and psychological factors [18].

The study of depression in older adults is supported by several theoretical frameworks that highlight the interplay between aging, mental health, and social determinants of health. Socioemotional selectivity theory, posited by Carstensen, emphasizes the changes in goal orientation as individuals age [19]. The theory suggests that with increasing age, people prioritize emotionally meaningful goals and relationships, which can influence their mental health [19, 20]. This theory underpins the examination of how social connections—or the lack thereof—may influence depressive symptoms in older adults. Additionally, the biopsychosocial model provides a comprehensive approach to understanding mental health by integrating biological, psychological, and social factors [21]. This model is particularly pertinent to our study as it acknowledges how chronic physical health conditions (biological), coping mechanisms (psychological), and socioeconomic status (social) interact to influence depression outcomes in older adults [21, 22]. Moreover, activity theory posits that staying active and engaged improves quality of life in older adults and decreases the likelihood of depression [23]. According to this theory, engagement in activities such as volunteering or community work can provide older adults with a sense of purpose and achievement, thereby potentially mitigating feelings of depression [24].

Two recent meta-analyses [2, 3] revealed that previous studies of depression among older adults were conducted mostly in clinical settings involving patients with chronic medical conditions. Estimated prevalence of depression among community-dwelling older adults in the United States is limited primarily to secondary data from national surveys, such as the Health and Retirement Study and the National Survey on Drug Use and Health [6, 7]. Due to substantial methodological differences in sampling design, data collection, specific measures used, and operational definitions, estimated prevalences of depression from these surveys are not directly comparable [25]. Using data from the Longitudinal Research on Aging Drivers (LongROAD) study, we examined the prevalence of depression and the mitigating role of volunteering in a multisite sample of relatively healthy community-dwelling older adults in the United States.

2 | Methods

The LongROAD study was a multisite prospective cohort study of 2990 active drivers aged 65–79 years without significant cognitive impairment, who were enrolled between July 2015 and March 2017 from primary care clinics or healthcare systems across five study sites: Ann Arbor, MI; Baltimore, MD; Cooperstown, NY; Denver, CO; and San Diego, CA. The Institutional Review Board at each site approved the study. Following informed consent, participants underwent baseline assessments using standardized research protocols, including questionnaires, medical record abstraction, functional tests (e.g., grip strength), and a comprehensive review of current medications. The design and research protocol for the LongROAD study is described in detail elsewhere [26].

TABLE 1 | Prevalence of depression in older adult drivers by demographic characteristics, the Longitudinal Research on Aging Drivers (LongROAD) study.

Characteristic	No. of drivers	No. of drivers with depression (%)	<i>p</i>
Overall	2990	186 (6.2)	
Age, years			0.0062
65–69	1137	90 (7.9)	
70–74	939	46 (4.9)	
≥ 75	645	33 (5.1)	
Gender			0.0135
Male	1299	67 (5.2)	
Female	1422	102 (7.2)	
Race/ethnicity			0.2226
White, Non-Hispanic	2329	141 (6.1)	
Black, Non-Hispanic	206	12 (5.8)	
Hispanic	71	3 (4.2)	
Other	115	13 (11.3)	
Marital status			0.0003
Currently married	1708	87 (5.1)	
Not married	1013	82 (8.1)	
Education level			0.0052
Highschool graduate and below	303	25 (8.3)	
Some college and college level degree	1306	91 (7.0)	
Master, professional, and doctoral degree	1112	53 (4.8)	
Annual household income			< 0.0001
< \$50,000	740	79 (10.7)	
\$50,000–\$79,999	685	39 (5.7)	
\$80,000 or more	1296	51 (3.9)	
History of depression			< 0.0001

(Continues)

TABLE 1 | (Continued)

Characteristic	No. of drivers	No. of drivers with depression (%)	<i>p</i>
Yes	584	100 (17.1)	
No	2297	83 (3.6)	
Diabetes mellitus			0.0007
Yes	446	40 (9.0)	
No	2269	127 (5.6)	
Anxiety disorder			< 0.0001
Yes	307	47 (15.3)	
No	2409	122 (5.1)	
Alcohol use disorder			0.0061
Yes	75	9 (12.0)	
No	2642	159 (6.02)	
Post-traumatic stress disorder			< 0.0001
Yes	89	23 (25.8)	
No	2773	157 (5.66)	
Volunteering			< 0.0001
Yes	1262	52 (4.1)	
No	1456	117 (8.0)	
Urbanicity			0.8235
Urban	1970	126 (6.4)	
Suburban	379	23 (6.1)	
Rural	372	20 (5.4)	
Site			0.4277
Denver CO	559	33 (5.9)	
Cooperstown NY	553	30 (5.4)	
Baltimore MD	571	41 (7.2)	
Ann Arbor MI	579	38 (6.6)	
San Diego CA	459	27 (5.9)	

The primary outcome of this cross-sectional analysis was depression status. The prevalence reported in this paper refers to the *point* prevalence of depression [27], that is, the proportion of study participants who were experiencing depression at the time of baseline assessment. Depression status was determined using the Patient-Reported Outcomes Measurement Information System (PROMIS) Short Form v1.0 Depression 4a instrument, a validated measure for current depression status based on depressive symptoms [28]. A PROMIS Depression *T*-score,

calculated for each participant, served as the metric for assessment. A score of 55 or higher indicated the presence of clinical depression, while a score below 55 suggested the absence of clinical depression [28, 29].

Several covariates were analyzed, including age (categorized into 65–69, 70–74, and ≥ 75 years), gender, race and ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, and other), marital status (currently married and not married), education level (high school graduate and below, some college, and college-level degree, master, professional and doctoral degree), annual household income (<\$50,000, \$50,000–\$79,999, and $\geq$ \$80,000), diabetes, anxiety disorder, volunteering status, urbanicity (urban, suburban, and rural), and study site (Denver, Cooperstown, Baltimore, Ann Arbor, and San Diego).

3 | Results

Of the 2990 the study participants, 186 (6.2%) reported symptoms that met the threshold for clinical depression. The prevalence of depression varied significantly with sociodemographic characteristics and comorbid conditions (Table 1). Specifically, significantly elevated prevalence of depression was observed in participants who were 65–69 years of age (7.9%), who were female (7.2%), who were not currently married (8.1%), who had attained a high school education or less (8.3%), or who had an annual household income of less than \$50,000 (10.7%). Substantially increased prevalences of depression were found among those with a positive history of depression (17.1%), or with comorbid conditions such as diabetes mellitus, anxiety disorder, alcohol use disorder or post-traumatic stress disorder (Table 1). The prevalence of depression was significantly lower in study participants who volunteered than those who did not (4.1% vs. 8.0%; $p < 0.0001$) (Table 1). The association of volunteering with a decreased prevalence of depression existed among those with and without a positive history of depression

(Figure 1). The prevalence of depression was similar across residential locations and study sites (Table 1).

Multivariable logistic regression modeling was applied to assess the adjusted odds ratios (aORs) and 95% confidence intervals (CIs) of depression according to sociodemographic characteristics and comorbid conditions (Table 2). Compared to participants aged 65–69 years, those aged 70–74 years had significantly lower odds of depression (aOR = 0.65; 95% CI 0.44–0.96). Annual household income was inversely associated with the odds of depression; compared to participants with annual household income less than \$50,000, the odds of depression decreased by 47% for those with annual household income between \$50,000 and \$79,999 (aOR = 0.53; 95% CI 0.34–0.82), and by 59% for those with annual household income of \$80,000 or more (aOR = 0.41; 95% CI 0.25–0.64). Post-traumatic stress disorder was the only comorbid condition that was associated with a significantly increased odds of depression (aOR = 2.70; 95% CI 1.49–4.76). Those with a positive history of depression had significantly higher odds of being currently depressed than those without a history of depression (aOR = 4.35; 95% CI 3.03–6.25). Of note, volunteering was associated with 43% decreased odds of depression (aOR = 0.57; 95% CI 0.40–0.81) (Table 2).

4 | Discussion

Results of this study indicate that the point prevalence of depression in community dwelling older adults in the United States is 6.2%, which is generally consistent with other studies of major depressive disorder in similar population groups [4–6]. The prevalence of depression varies markedly with sociodemographic characteristics and comorbid conditions. Older adults in the age group of 65–69 years have the highest prevalence of depression. This age group often faces

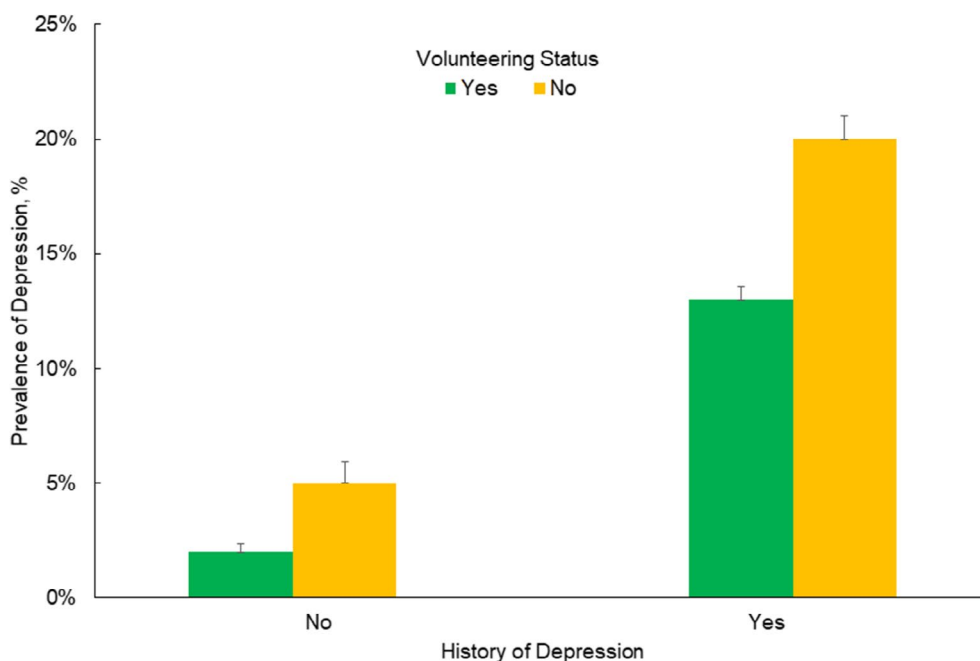


FIGURE 1 | Prevalence and standard error of depression by history of depression and volunteering status in older adult drivers, the Longitudinal Research on Aging Drivers (LongROAD) study.

TABLE 2 | Adjusted odds ratio (ORs) and 95% confidence intervals (CIs) of depression in older adult drivers by risk markers, the Longitudinal Research on Aging Drivers (LongROAD) study.

Risk marker	Adjusted OR	95% CI
Age, years		
65–69	1.00	Reference
70–74	0.65	0.44–0.96
≥ 75	0.71	0.46–1.09
Gender		
Male	1.00	Reference
Female	1.05	0.74–1.49
Race/ethnicity		
White, Non-Hispanic	1.00	Reference
Black, Non-Hispanic	0.78	0.40–1.50
Hispanic	0.67	0.20–2.24
Other	2.26	1.19–4.30
Marital status		
Currently married	1.00	Reference
Not married	0.84	0.57–1.23
Education level		
Highschool graduate and below	1.00	Reference
Some college and college level degree	0.89	0.54–1.47
Master, professional, and doctoral degree	0.83	0.46–1.46
Annual household income		
< \$50,000	1.00	Reference
\$50,000–\$79,999	0.53	0.34–0.82
≥ \$80,000	0.41	0.25–0.64
History of depression		
Yes	4.35	3.03–6.25
No	1.00	Reference
Diabetes mellitus		
Yes	1.20	0.81–1.75
No	1.00	Reference
Anxiety disorder		
Yes	1.45	0.96–2.22
No	1.00	Reference
Alcohol use disorder		
Yes	1.64	0.76–3.45

(Continues)

TABLE 2 | (Continued)

Risk marker	Adjusted OR	95% CI
No	1.00	Reference
Post-traumatic stress disorder		
Yes	2.70	1.49–4.76
No	1.00	Reference
Volunteering		
Yes	0.57	0.40–0.81
No	1.00	Reference
Urbanicity		
Urban	1.00	Reference
Suburban	0.91	0.55–1.49
Rural	0.77	0.46–1.31

significant life changes such as retirement or the onset of chronic diseases, which can contribute to depressive symptoms [30]. This finding aligns with other studies indicating that ages 65 and older are often accompanied by factors such as increased physical health issues, cognitive decline, and the loss of social networks, which can exacerbate feelings of isolation and depressive symptoms [31, 32].

If the elevated risk of depression around retirement age is confirmed, the finding may underscore the need for targeted social interventions during this life stage. Developing programs that actively connect new retirees with meaningful activities, such as volunteering, could help mitigate depressive symptoms by fostering social connections, providing structure, and enhancing a sense of purpose.

The study reaffirms the important role of marital status in the prevalence of depression, with individuals who are not currently married showing higher prevalence of depression than their married counterparts. It is well known that social relationships in general and marriage in particular can provide social support and buffer against mental health problems [33].

Our study also confirms that socioeconomic factors, such as educational attainment and annual household income, are significantly correlated with the prevalence of depression among older adults. Consistent with previous research, our findings indicate that individuals with lower educational attainment and lower annual household income have higher odds of experiencing depression [34]. This correlation may be due to several interrelated factors including limited access to healthcare resources, reduced opportunities for social engagement, and higher levels of chronic stress associated with financial insecurity [35]. Additionally, higher income levels appear to exert a protective effect against depression. This protective effect likely stems from better access to quality healthcare, including mental health services, and greater opportunities for engagement in fulfilling and socially valued activities [36].

These activities not only may improve overall well-being but also can provide a buffer against the psychological impacts of aging. The ability to afford leisure and social activities, which is often correlated with higher income, can reduce feelings of isolation and help maintain cognitive and emotional wellbeing [37]. These observations are in line with socioeconomic stability theories, which argue that financial security is crucial for maintaining health during aging [38–41]. The stability provided by sufficient income can mitigate stressors commonly faced by older adults, including worries about basic subsistence, medical care, and the ability to participate in society, all of which can contribute to depressive symptoms.

More importantly, this study adds more evidence supporting the beneficial role of volunteering in mental health outcomes, particularly in potentially reducing the prevalence of depression among older adults. Our study indicates that older adults who engaged in volunteering activities were at significantly lower odds of depression than those who did not, regardless of the history of depression. Volunteering provides meaningful engagement, social interaction, and a sense of purpose, all of which are known to contribute to improving life satisfaction and reducing depression [32, 42]. The health benefit of volunteering may also be attributed to the fulfillment that comes from altruistic activities and the strengthening of social networks [43, 44].

The effectiveness of volunteering in reducing the risk of depression among older adults, if confirmed through controlled clinical trials, could have important implications for practice and policy. Healthcare providers may integrate volunteering into treatment and wellness plans for older adults, especially those with a history of depression and other risk factors. Policymakers could prioritize initiatives that facilitate volunteering among older adults, such as funding support for community-based volunteer programs and incentivizing participation in volunteering activities through tax benefits and transportation services. Inclusivity in policy design is crucial, ensuring that barriers to volunteering, like mobility issues or lack of awareness, are addressed effectively.

This cross-sectional study has three notable limitations. First, the data from the LongROAD study enable us to assess the prevalence and correlates of depression in a multisite sample of community-dwelling older adults, but do not allow us to establish causality. Specifically, the relationship between volunteering and reduced risk of depression is likely bidirectional as it is possible that individuals with depressive symptoms may volunteer less due to symptoms such as low energy, fatigue, social withdrawal, loss of motivation, and self-devaluation [45]. Second, the study participants were not a nationally representative sample, thus the findings may not be directly generalizable to the general older adult population in the United States. Given that the study sample consisted of active drivers without significant cognitive impairment and were overrepresented by non-Hispanic White and those from higher socioeconomic status [26], the reported prevalence of depression is likely biased toward underestimation. Finally, our finding that volunteering is associated with a reduction in the prevalence of depression among community-dwelling older adults should be interpreted in the context of PROMIS-based symptom identification rather than clinical diagnosis [46]. The PROMIS Short Form v1.0 Depression 4a instrument is not intended to diagnose clinical

depressive syndromes, such as major depressive disorder, which typically require a more comprehensive assessment of symptoms, duration, and impact [46]. While volunteering may enhance mental health and well-being for those experiencing mild depressive symptoms or those at heightened risk of depression, it is likely inadequate to address the medical needs of individuals with more severe, recurrent, or chronic depressive disorders. Future research should further explore the roles of intensity, frequency, and context of volunteering, as well as its differential effects across the spectrum of depressive symptoms.

5 | Conclusion

This study provides valuable empirical data for understanding the prevalence and correlates of depression in community-dwelling older adults. Our findings underscore the important role of sociodemographic and medical factors play in the prevalence of depression at the late phase of lifespan. Specifically, economic hardship and the stress associated with inadequate income can contribute significantly to mental distress, reinforcing the need for policies that bolster financial security for older adults. This study also provides additional evidence for the potential protective role of volunteering in mitigating the risk of depression among older adults. Those who engage in volunteering activities are at a significantly lower risk of depression than those who do not, irrespective of the history of depression. If the causal relationship between volunteering and a reduced risk of depression is established by further research, intervention programs that facilitate volunteering activities in older adults should be developed and implemented.

Author Contributions

Yitao Xi: study concept and design, literature review, data analysis and interpretation, and manuscript drafting. **Thelma J. Mielenz:** methodology, data analysis and interpretation, and critical revision of manuscript for important intellectual content. **Howard F. Andrews, Marian E. Betz, Carolyn DiGuseppi, David W. Eby, Linda L. Hill, Vanya Jones, Barbara H. Lang, Lisa J. Molnar, David Strogatz:** methodology, acquisition of data, and critical revision of manuscript for important intellectual content. **Guohua Li:** methodology, study concept and design, data analysis and interpretation, and manuscript drafting and critical revision.

Disclosure

The sponsor did not play a role in design or conduct of this study; collection, management, analysis, or interpretation of data; or preparation of this manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

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Editor's Note

The important study by Xi et al. deserves wide attention. In addition to reminding us that older people with chronic illness, prior depression, and sociodemographic disadvantage are more likely to be depressed, they find a potential protective effect of volunteering—even in people with a history of depression. Interestingly, their data show that the period around "normal" retirement age—the mid- to late-60's—is one of higher depression prevalence. In the early days of geriatrics in the United States, retirement was recognized as a developmental stage fraught with potential risks—loss of purpose, personal value, and meaning, all experiences that reside in the penumbra of depression. Retirement is still a defining life event, but its timing has now spread widely across the age span. Xi et al. point us once again to the value of "work" in all its forms—especially the work of serving others long beyond the last paycheck.

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