Published in final edited form as:

Int J Geriatr Psychiatry. 2017 October ; 32(10): 1141–1149. doi:10.1002/gps.4578.

Disability in prison activities of daily living and likelihood of depression and suicidal ideation in older prisoners

Lisa C. Barry[1], **Dorothy B. Wakefield**[2], **Robert L. Trestman**[3], **Yeates Conwell**[4]

[1]University of Connecticut Health Center, UConn Center on Aging, Farmington, CT, USA

[2]University of Connecticut Health Center, Center for Public Health and Health Policy, Farmington, CT, USA

[3]Correctional Managed Health Care, University of Connecticut Health Center, Farmington, CT, USA

[4]University of Rochester School of Medicine, Rochester, NY, USA

Abstract

Objective: The study objective was to determine if disability in activities of daily living specific to prison, prison activities of daily living (PADLs), is associated with depression and severity of suicidal ideation (SI) in older prisoners, a rapidly growing population at high risk of suicide.

Methods: Cross-sectional design using data from a study of prisoners age ≥50 years (N = 167). Depression was operationalized as a score of ≥15 on the 9-item Physician Health Questionnaire (PHQ-9). SI severity was assessed using the Geriatric Suicide Ideation Scale (GSIS). Participants were considered to have PADL disability if they reported any of the following as "very difficult" or "cannot do:" dropping to the floor for alarms, climbing on/off the top bunk, hearing orders, walking while wearing handcuffs, standing in line for medications, and walking to chow. Associations were examined with bivariate tests and with multivariable logistic and linear regression models, and the interaction term gender × PADL disability was tested.

Results: PADL disability was associated with depression and SI severity. There was no main effect of gender on either depression or SI, yet the association between PADL disability and depression was considerably stronger in male than in female older prisoners.

Conclusions: Identifying older prisoners who have difficulty performing PADLs may help distinguish prisoners who may also be likely to be depressed or experience more severe SI. Furthermore, the association between PADL disability and depression may be particularly salient in older male prisoners. Longitudinal studies are needed as causal inferences are limited by the cross-sectional design.

Correspondence to: Lisa C. Barry, PhD, MPH, LiBarry@uchc.edu.

Results from this research were presented as a poster presentation at the 2015 American Association of Geriatric Psychiatry (AAGP) annual meeting.

Conflict of interest

None declared.

Keywords

depression; suicidal ideation; disability; prisoners; elderly

Objective

For reasons including population aging, more arrests in later age, and prisoners aging "in place" because of minimum sentencing laws, the number of inmates age ≥50 has grown 500% since 1990 (Carson, 2014; Luallen and Cutler, 2017). Whereas suicide is a leading cause of death among incarcerated persons of any age in the U.S., older prisoners have the highest suicide mortality rates of adults in the corrections system; average annual rates are approximately 22 per 100 000 in state prisons and 60 per 100 000 in local jails, respectively (Noonan, 2015).

Inmates are considered "old" in their 50s as ongoing stresses of incarceration and unhealthy lifestyles/inadequate health care outside the corrections system frequently result in accelerated aging (Human Rights Watch, 2012; Ahalt *et al.*, 2013). As those in prison continue to age, it is likely that the number of suicides among older inmates will increase. Yet, what is understood regarding risk factors for depression and suicidal ideation (SI), which are both strong predictors of suicide, may be less applicable to the rapidly growing number of older prisoners.

Disability in basic activities of daily living (BADLs) such as bathing and dressing, which is prevalent in older persons and potentially modifiable (Hill *et al.*, 2002; Hardy *et al.*, 2005), is a well-established predictor of depression (Barry *et al.*, 2013; Ormel *et al.*, 2002) and is emerging as an independent risk factor for suicide in older persons (Conwell *et al.*, 2010; Dennis *et al.*, 2009). In the context of stress process theory (Pearlin *et al.*, 1981), the inability to fulfill expected societal roles for independent living (i.e., needing another's help to perform BADLs) may induce stress and ultimately lead to depression and SI (Russell *et al.*, 2009). In prison there are additional and unique functional activities that are necessary for independence in daily living, termed prison ADLS (PADLS) (Williams *et al.*, 2006). PADLs include functional activities such as dropping to the floor for alarms, walking to the chow hall for meals, standing in line for medications, and climbing on/off the top bunk. Because a fundamental element of disability is difficulty performing activities in one's usual milieu (Verbrugge and Jette, 1994), difficulty performing PADLs may only be considered as disabilities for those older adults who are aging in the specific setting of prison. Experiencing PADL disability, and thus being unable to fulfill expected prisoner "roles," may induce stress largely unique to older prisoners. Hence, PADL disability may be an important risk factor for depression and SI in older prisoners. Moreover, because PADL disability may be modifiable (e.g., housing assignment closer to the chow hall), it may be particularly useful to pursue as a risk factor for suicide.

Targeting suicide prevention efforts towards high-risk groups, such as prisoners, is an important national goal (Prevention, 2014; Konrad et al., 2007), and evidence regarding modifiable factors associated with depression and SI in this growing population is needed. The primary objective of this study was to determine if PADL disability was associated with

depression and SI in older prisoners, even after considering incarceration-related, behavioral, and clinical factors. In addition, given the preponderance of both depression and disability among older women, in general (Whitson *et al.*, 2010; Barry *et al.*, 2008), and the high rates of depression and SI in mixed-age samples of female prisoners (Binswanger *et al.*, 2010; James and Glaze, 2006), we also sought to determine if PADL disability had a differential association with depression and SI according to gender. To achieve our objectives, we used data from a convenience sample of older prisoners from Connecticut's state prisons.

Methods

Participants and procedure

The University of Connecticut Health Center Institutional Review Board and the Connecticut Department of Correction (CTDOC) Research Advisory Committee approved the study. Eligible participants were age ≥50, incarcerated in three CTDOC facilities, English-speaking, and voluntarily consented to participate. Prisoners in administrative segregation were ineligible; the required presence of a custody officer, for safety concerns, would compromise confidentiality. Hospitalized prisoners were also ineligible; per the approved study protocol, interviews had to be completed in professional visit areas, as described below.

Participating facilities provided regularly updated lists of eligible prisoners. Between September 2012 and June 2015, recruitment letters were sent in batches to 453 eligible prisoners. Prisoners interested in participating were asked to write their name, Inmate Number, housing unit, and date on page 2 of the letter and place the completed form in the Mental Health Request Box or Medical Requisition Box, depending on the facility. After retrieving the forms (n =185 throughout the study period), the research assistant (RA) submitted visitation requests to the respective prison to schedule the eligibility screenings. Potential participants were escorted by correctional officers and meetings between potential participants and the RA were conducted privately in professional visit (e.g., attorney visit) areas of each correctional facility. The RA reviewed the study purpose and specified that there were neither incentives for participating nor negative consequences for refusing. Prisoners were also asked to describe the study purpose and procedures, in their own words, to ensure their understanding of the study. A total of 167 of the older prisoners provided written consent. Of the 18 prisoners who submitted a form but did not participate, 1 was non-English speaking, 2 had been relocated to another facility, 4 refused to meet, and 11 decided that they were not interested in participating. Face-to-face interviews occurred immediately thereafter and data including demographics, number of incarcerations, current housing (e.g., single cell no roommate), and in-prison job assignment was collected. Reviews of medical charts (i.e., chronic medical illnesses; current mental illness treatment; hospitalization in the past year) and CTDOC data (i.e., years incarcerated for the current offense; expected sentence length; violent or non-violent offense) were completed within approximately 2 weeks of the interviews.

Measures

Depression

The 9-item Physician Health Questionnaire (PHQ-9) assessed depression (Kroenke *et al.*, 2001). Participants were asked how often in the past 2 weeks they were bothered by problems including "feeling down, depressed, or hopeless," and "feeling tired or having little energy." Symptom frequency is rated from 0 to 3 ("from not at all" to "nearly every day") with scores ranging from 0 to 27. A cutpoint of ≥15 indicates moderate to severe depressive symptoms, often simply referred to as depression (Kroenke *et al.*, 2001).

Suicidal ideation severity and past suicide attempt

The Geriatric Suicide Ideation Scale (GSIS) assessed SI severity (Heisel and Flett, 2006; Heisel and Flett, 2016). Study participants indicated their level of agreement with 31 statements using a 5-point Likert scale, from (1) *strongly disagree* to (5) *strongly agree*. Total scores range from 31 to 165. Higher scores indicate increasing SI severity and Cronbach's alpha = 0.93. Responding *Agree* or *Strongly Agree* to the statement "I have tried ending my life in the past," which is part of the GSIS but not included in instrument scoring, indicated lifetime suicide attempt.

Prison Activities of Daily Living (PADL) disability

A modified version of the Williams PADL Disability Index assessed PADL disability (Williams *et al.*, 2006). Participants rated their level of difficulty performing six activities: dropping to the floor for alarms, climbing on/off the top bunk, hearing orders from staff, walking while wearing handcuffs, standing in line for medications, and walking to chow. Those reporting one or more PADLs as "very difficult" or "cannot do" were considered to have PADL disability. We also assessed BADL disability. Participants rated their level of difficulty for activities such as showering and dressing, where 1 = Not difficult and 4 = Cannot do, even with help (Katz *et al.*, 1963). Those reporting one or more activities as "very difficult" or "cannot do" were considered to have ADL disability.

Additional covariates

Participants rated their eyesight as "Excellent," "Very good," "Fair," or "Poor." Responses were collapsed to form a dichotomous variable of "Poor vision" versus all other responses. Having pain for most days of the month for 3 consecutive months indicated chronic pain (yes versus no). Question 1 from the Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST) determined past use of illicit drugs (e.g., marijuana, cocaine) and alcohol (Humeniuk, 2010). Participants endorsing illicit drug use were asked if they were using drugs at the time of the current incarceration. The CAGE, a 4-question screening test for alcohol dependence (Bush *et al.*, 1987), was administered to participants endorsing alcohol use. The CAGE acronym refers to the four screening questions which ask if you have you ever felt that you should "cut down" on drinking, if others have "annoyed" you by criticizing your drinking, if you have ever felt "guilty" about drinking, and if you have ever had an "eye-opener" drink, that is, a drink first thing in the morning?. Two positive responses indicate alcohol dependence.

Analysis

Descriptive statistics were calculated for participants' characteristics. Bivariate associations between participants' characteristics and the dependent variables, depression and SI severity, were conducted using $\chi 2$ or Fisher's exact tests for categorical variables, and either *t*-tests, Pearson correlation coefficients, or Kruskal– Wallis H tests for continuous variables and count variables. Logistic regression and linear regression models were run for the two dependent variables, depression and SI severity, respectively. The models were sequentially adjusted for variables associated with PADL disability and/or either of the dependent variables in bivariate analyses ($a \leq 0.10$ two-tailed). These variables included demographic and prison-related characteristics (age, gender, job assignment), clinical factors (number of chronic conditions, hospitalizations in the past year, poor vision, chronic pain), behavioral factors (past alcohol abuse, lifetime suicide attempt), and current mental health treatment. We then re-ran the fully adjusted models after including an interaction term for gender × PADL disability, and subsequently conducted gender-stratified analyses. Because of potential collinearity concerns, age and years in prison for current offense were not included together in the multivariable models, nor were poor vision and job assignment. Finally, we included the variables PADL disability and ADL disability in different models. Data were analyzed using SAS version 9.4.

Results

The 167 study participants had an average age of 57 (+7) years (range 50 to 83 years), were primarily male, were racially diverse, with age and race compositions similar to prisoners age ≥50 in the U.S. (ACLU, 2012), and the majority were incarcerated for a violent offense (59.9%) and were repeat offenders (68.9%). There were 93 (55.7%) participants with PADL disability. They were more likely to be women, have more chronic medical conditions, have concurrent ADL disability, and to be receiving mental health treatment (Table 1).

There were 42 (25%) depressed participants, and average GSIS score was 61.8 (+25.0), range 32 to 137. Average GSIS score for depressed participants was 83.6 (+27.9). Neither depression nor SI was associated with any of the demographic or incarceration-related characteristics, with one exception: depressed participants were less likely to have an in-prison job assignment. Depressed (versus non-depressed) participants were more likely to have PADL disability, be receiving current mental health treatment, have more chronic conditions, and to experience each of the other clinical and behavioral factors, with the exception of alcohol abuse and illicit drug use. Average GSIS scores were significantly higher among participants with PADL disability, lifetime suicide attempt, alcohol abuse, poor vision, and chronic pain (results available upon request).

Table 2 presents the results from the multivariable model evaluating the association between PADL disability and depression. In the unadjusted analysis (Model 1), PADL disability was strongly associated with depression (OR =4.75, 95%CI 2.04, 11.08). After controlling for demographics, clinical/behavioral factors, and current mental health treatment (Models 2–4), the association between PADL disability and depression did not change appreciably. Nor did the association change when those with BADL disability were removed from the analysis (OR =3.74, 95%CI 1.22, 11.51). In addition to PADL disability, participants with poor

vision (OR= 2.90, 95%CI 1.17, 7.21) and chronic pain (OR =3.42, 95%CI 1.05, 11.21) were significantly more likely to be depressed, and hospitalization in the past year and lifetime suicide attempt neared statistical significance. When BADL disability was substituted for PADL disability, ADL disability was associated with depression in the unadjusted analyses (OR= 5.65, 95%CI 1.73, 18.39), but findings from the multivariable model did not reach statistical significance (OR = 3.35, 95%CI 0.88 12.79). Because the gender ×PADL disability interaction term reached significance (Wald χ^2 test = 4.77, df = 1, $p = 0.03$), we re-ran the logistic regression models after stratifying by gender. Because of the small number of hospitalizations and few reporting BADL disability, we excluded these factors from the gender-stratified models to achieve model convergence. As shown in Table 3, among older male prisoners, PADL disability was the only factor associated with depression at the $p < 0.05$ level (OR = 6.27, 95%CI 1.69, 23.29), yet poor vision and chronic pain had considerable effect sizes. Among older female prisoners, only lifetime suicide attempt was significantly associated with higher likelihood of depression (OR =5.27, 95%CI 1.25, 22.14).

Table 4 presents the results from the multivariable linear regression model evaluating the association between PADL disability and SI severity. In unadjusted analyses (Model 1), those with (versus without) PADL disability had significantly higher GSIS scores (beta =9.92; SE + 3.85; 95%CI 2.33, 17.52). After controlling for demographics (Model 2) and clinical and behavioral factors (Model 3), GSIS scores were still higher for those with PADL disability, albeit slightly attenuated. Findings were similar even after removing those with comorbid BADL disability from the analysis. After adjusting for current mental health treatment, GSIS scores were still higher for those with PADL disability, but the association did not reach significance (beta =7.30; SE +3.72; 95%CI −0.06, 14.65). The association between PADL disability and GSIS scores did not differ according to gender (*t*-test for interaction =−1.25, df = 1, $p = 0.21$). Finally, GSIS scores were also higher for those with ADL disability, but the association did not reach significance (beta =5.0; SE + 6.65; 95%CI −8.16, 18.12).

Discussion

Older prisoners are the fastest growing segment of the prison population and have high suicide rates compared with younger prisoners. However, although depression and suicidal ideation (SI) are precursors of suicide, little is known regarding which older prisoners may be more likely to experience these outcomes. We found that even after controlling for potentially important confounders including lifetime suicide attempt and recent hospitalizations, prison activities of daily living (PADL) disability was associated with a higher likelihood of depression and SI in older prisoners. Furthermore, the association between PADL disability and depression may be particularly salient in older male prisoners.

Being depressed is not the norm for older prisoners; the majority of our sample did not meet criteria for depression. However, the 25% prevalence is still considerably higher than the approximately 1%–8% prevalence of current depression reported for persons age ≥50 living in the community (CDC, 2008; Byers *et al.*, 2010 Hasin *et al.*, 2005). Similarly, average GSIS scores among this sample of older prisoners (mean = 61.8 +25.0) were substantially

higher than average scores of older community-living persons (mean = 47.6 +19.1) (Heisel and Flett, 2006). These findings suggest that some older prisoners may be particularly vulnerable to experiencing depression and SI, thereby putting them at higher suicide risk. Yet, detecting depression and SI in older prisoners may be especially challenging. In general, older persons are less likely to report depression and suicidal thoughts (Duberstein *et al.*, 1999; Crystal *et al.*, 2003), and symptoms may be misinterpreted by both themselves and clinicians as expected consequences of aging (Park and Unutzer, 2011). For older prisoners, regimented prison schedules may make it even more difficult for others to discern mood changes and may also mask symptoms of flat affect (Fazel *et al.*, 2001). Our findings suggest that identifying older prisoners who have difficulty performing PADLs may distinguish those prisoners with a higher likelihood of being depressed or experiencing more severe SI. Furthermore, the robustness of PADL disability as a correlate of both depression and SI severity is evidenced as the effect size and significance remained strong even after controlling for important potential confounders and after removing those with comorbid BADL disability from the analysis. In contrast, BADL disability was neither associated with depression nor SI severity in the multivariable model. It is possible that those prisoners with BADL disability, a more severe level of disability, may willingly accept their physical limitations. Thus, they may not experience the sadness or despair that may be more likely to occur among those with PADL disability. Future studies should confirm these findings and evaluate disability in BADLs and PADLs as risk factors for worsening depressive symptoms and SI severity in older prisoners.

Consistent with other studies (Fazel *et al.*, 2001; Murdoch *et al.*, 2008; Kingston *et al.*, 2011; Koenig *et al.*, 1995), our results further confirm that non-modifiable incarceration-related variables (e.g., violent offense; repeat offender) are not associated with depression and SI in older prisoners. Rather, variables associated with depression and/or SI included poor vision and chronic pain. It is possible that poor vision, chronic pain, and disability, which are all prevalent in older age, share a common mechanism linking them to negative mental health outcomes. For example, in community-living older persons, endorsing any of these factors is associated with self-perceived loss of role in one's environment and diminished self-worth and self-efficacy (Harris *et al.*, 2003; Bookwala and Lawson, 2011; Brown and Barrett, 2011). Older prisoners with poor vision, pain, and/or PADL disability may find it especially difficult to navigate the often physically and psychologically demanding prison environment and fulfill their expected "roles." Roles may be formal; in the present study, participants reported in-prison job assignments including kitchen duty/food prep, janitorial services, and clothing factory worker. Or, roles may be informal such as serving as "advisors" for younger prisoners (Wangmo *et al.*, 2016). Consistent with other findings (Baidawi *et al.*, 2016), the present showed that having an in-prison job assignment was protective against experiencing depression in older prisoners. However, we found that even among the 80 prisoners who reported having a job assignment, the percentage of depression was higher among those reporting PADL disability (27.5% versus 7.5%; $p = 0.02$). Consequently, worsening difficulty or inability to fulfill these roles as a result of PADL disability may increase older prisoners' likelihood of experiencing depression and SI. Research is needed to explore the mechanism by which these "geriatric" factors may contribute to negative mental health outcomes in older prisoners and to determine if specific accommodations for PADL

disability may modify the relationships. Furthermore, whether or not a prisoner experiences PADL disability and/or negative mental health outcomes may, in part, depend upon his/her perceptions of the prison environment (e.g., fear for safety; concern regarding theft). In future research, we plan to evaluate the effect of unique environmental demands and perceptions on the relationship between disability and negative mental health outcomes in older prisoners.

The number of older female prisoners in the U.S. has grown considerably in the past decade, with more than 15 000 older females under correctional authority (Carson, 2014). Recent national data indicate that a higher percentage of females age ≥50 have self-reported lifetime depressive disorder and report a higher average number of "mental health indicators" (e.g., feeling numb or empty inside; racing thoughts) in the past year than men of the same age (Leigey and Hodge, 2012). In contrast, we found that women prisoners were no more likely than men to experience either current depression or SI. Whereas the lack of a main effect of gender in our study may reflect the specificity of the PHQ-9 versus a more general mental health symptoms scale, it may also reflect the narrowing gender difference in the prevalence of depression found in older community-dwelling populations (Petersson *et al.*, 2014). Notably, however, we found that PADL disability had a differential association with depression in older male and female prisoners. PADL disability was strongly associated with depression in males; within men, those with PADL disability were more than 6 times as likely to be depressed. Lifetime suicide attempt was the only variable associated with depression in women, yet it was non-significant in men. These findings suggest that older male prisoners may be particularly vulnerable to the negative impact of disability on depression noted in community-dwelling samples (Barry *et al.*, 2013; Gayman *et al.*, 2008). Yet, the reasons for this vulnerability remain unclear. One explanation may be the reportedly stronger influence of social support in adjustment to prison life among female versus male prisoners (Jiang and Winfree, 2006). Or, the potentially mediating effect of role-loss or diminished self-efficacy discussed previously may be particularly salient in older male prisoners. Knowledge regarding gender differences in factors associated with depression in older prisoners may inform gender-appropriate interventions. Moreover, it is possible that differential environmental accommodations in the men's and women's facilities diminished the burden of functional impairment among the women. Whereas we did not evaluate the impact of environmental factors on the relationship between PADL disability and depression, we plan to rigorously evaluate prison-level differences in the environment (e.g., physical space; accommodations for disabilities) in future research. In contrast, there was no differential effect of gender in the association between PADL disability and SI. Because high levels of SI rarely occur in the absence of depression (Pfaff and Almeida, 2005), PADL disability may have a similar impact on SI in older male and female prisoners once they reach a particular threshold of depressive symptoms. Studies are needed to confirm these findings.

Several potential limitations are noteworthy. The cross-sectional design limited causal inferences. With a 37% participation rate, our sample may not represent all older prisoners in the US. Institutional-level factors such as needing to be in a specific location for headcount or chow, may have affected participation. Prisoners who could not read the recruitment letter or whose jobs conflicted with the interview schedule may have been less

apt to participate. However, the participation rate should be considered in the context of the unique prison environment, where inherent challenges of conducting research are well documented (Cislo and Trestman, 2013). Prisoners with inpatient psychiatric admissions or those housed in segregation are at higher risk for depression, SI, suicide, and suicide attempts, as compared with the general prison population (Fazel *et al.*, 2008; Bonner, 2006). Yet, as previously explained, prisoners in administrative segregation or currently hospitalized were ineligible. These exclusions, combined with the 37% participation rate, may have resulted in systematic under-sampling of those with depression and SI. We were also unable to include non-English-speaking prisoners. Finally, because one of the three participating correctional facilities housed female prisoners, the proportion of females in our sample is considerably larger than the proportion of female prisoners age ≥50 in the U.S. (34% versus 6%) (ACLU, 2012). However, including older female prisoners provided a rare opportunity to assess gender differences.

Older prisoners are a rapidly growing population at high risk of suicide. Consequently, improved understanding of potentially modifiable factors associated with depression and SI, two strong precursors of suicide, is critical. Our findings suggest that deficits in activities necessary for managing prison life may be linked to depression and to more severe SI in older prisoners. We also found that the relationship between PADL disability and depression to be particularly strong in older male prisoners. Identifying older prisoners with PADL disability may help to determine a critical point of intervention (e.g., onset of PADL disability), and opportunities for prevention (e.g., accommodations for PADL disability) in the lives of older persons who are aging in place in prison. Our findings encourage further research on the effect of PADL disability, and other potentially modifiable factors, on negative mental health outcomes in older prisoners.

Acknowledgements

This work was supported by the American Foundation for Suicide Prevention (L. Barry) under grant number SRG-092-1 and the CDC Injury Control Research Center for Suicide Prevention (Y. Conwell) under grant number R49 CE002093.

References

ACLU. 2012 At America’s expense: the mass incarceration of the elderly In UNION, ACL (ed.). American Civil Liberties Union: New York, New York Retrieved from https://www.aclu.org/criminal-law-reform/report-americas-expense-mass-incarceration-elderly.

Ahalt C, Trestman RL, Rich JD, Greifinger RB, William BA. 2013 Paying the price: the pressing need for quality, cost, and outcomes data to improve correctional health care for older prisoners. J Am Geriatr Soc 61: 2013–2019. [PubMed: 24219203]

Baidawi S, Trotter C, Flynn C. 2016 Prison experiences and psychological distress among older inmates. J Gerontol Soc Work 59: 252–270. [PubMed: 27276386]

Barry LC, Allore HG, Guo Z, Bruce ML, Gill TM. 2008 Higher burden of depression among older women: the effect of onset, persistence, and mortality over time. Arch Gen Psychiatry 65: 172–178. [PubMed: 18250255]

Barry LC, Soulos PR, Murphy TE, Kasl SV, Gill TM. 2013 Association between indicators of disability burden and subsequent depression among older persons. J Gerontol A Biol Sci Med Sci 68: 286–292. [PubMed: 22967459]

Binswanger IA, Merrill JO, Krueger PM, et al. 2010 Gender differences in chronic medical, psychiatric, and substance-dependence disorders among jail inmates. Am J Public Health 100: 476–482. [PubMed: 19696388]

Bonner RL. 2006 Stressful segregation housing and psychosocial vulnerability in prison suicide ideators. Suicide Life Threat Behav 36: 250–254. [PubMed: 16704328]

Bookwala J, Lawson B. 2011 Poor vision, functioning, and depressive symptoms: a test of the activity restriction model. Gerontologist 51: 798–808. [PubMed: 21737397]

Brown RL, Barrett AE. 2011 Visual impairment and quality of life among older adults: an examination of explanations for the relationship. J Gerontol B Psychol Sci Soc Sci 66: 364–373. [PubMed: 21402645]

Bush B, Shaw S, Cleary P, DelBancoTL AMD. 1987 Screening for alcohol abuse using the CAGE questionnaire. Am J Med 82: 231–235. [PubMed: 2880504]

Byers AL, Yaffe K, Covinsky K, Friedman MB, Bruce ML. 2010 High occurrence of mood and anxiety disorders among older adults: The National Comorbidity Survey Replication. Arch Gen Psychiatry 67: 489–496. [PubMed: 20439830]

Carson EA. 2014 Prisoners in 2014. U.S. Department of Justice, Bureau of Justice Statistics; September 2015, NCJ 248955

CDC. 2008 Centers for Disease Control and Prevention and National Association of Chronic Disease Directors. The State of Mental Health and Aging in America. Issue Brief 1: What Do the Data Tell Us? National Association of Chronic Disease Directors: Atlanta, GA.

Cislo AM, Trestman R. 2013 Challenges and solutions for conducting research in correctional settings: the U.S. experience. Int J Law Psychiatry 36: 304–310. [PubMed: 23683885]

Conwell Y, Duverstein PR, Hirsch JK, et al. 2010 Health status and suicide in the second half of life. Int J Geriatr Psychiatry 25: 371–379. [PubMed: 19582758]

Crystal S, Sambamoorthi U, Walkup JT, Akincigil A. 2003 Diagnosis and treatment of depression in the elderly medicare population: predictors, disparities, and trends. J Am Geriatr Soc 51: 1718–1728. [PubMed: 14687349]

Dennis M, Baillon S, Brughta T, et al. 2009 The influence of limitation in activity of daily living and physical health on suicidal ideation: results from a population survey of Great Britain. Soc Psychiatry Psychiatr Epidemiol 44: 608–613. [PubMed: 19139796]

Duberstein PR, Conwell Y, Seidlitz L, et al. 1999 Age and suicidal ideation in older depressed inpatients. Am J Geriatr Psychiatry 7: 289–296. [PubMed: 10521160]

Fazel S, Cartwright J, Norman-Nott A, Hawton K. 2008 Suicide in prisoners: a systematic review of risk factors. J Clin Psychiatry 69: 1721–1731. [PubMed: 19026254]

Fazel S, Hope T, O'Donnell I, Jacoby R. 2001 Hidden psychiatric morbidity in elderly prisoners. Br J Psychiatry 179: 535–539. [PubMed: 11731358]

Gayman MD, Turner RJ, Cui M. 2008 Physical limitations and depressive symptoms: exploring the nature of the association. J Gerontol B Psychol Sci Soc Sci 63: S219–S228. [PubMed: 18689771]

Hill TM, Hardy SE, Williams CS. 2002 Underestimation of disability in community-living older persons. J Am Geriatr Soc 50: 1492–1497. [PubMed: 12383145]

Hardy SE, Dubin JA, Holford TR, Gill TM. 2005 Transitions between states of disability and independence among older persons. Am J Epidemiol 161: 575–584. [PubMed: 15746474]

Harris S, Morley S, Barton SB. 2003 Role loss and emotional adjustment in chronic pain. Pain 105: 363–370. [PubMed: 14499455]

Hasin DS, Goodwin RD, Stinson FS, Grant BF. 2005 Epidemiology of major depressive disorder: results from the National Epidemiologic Survey on Alcoholism and Related Conditions. Arch Gen Psychiatry 62: 1097–1106. [PubMed: 16203955]

Heisel MJ, Flett GL. 2006 The development and initial validation of the geriatric suicide ideation scale. Am J Geriatr Psychiatry 14: 742–751. [PubMed: 16943171]

Heisel MJ, Flett GL. 2016 Investigating the psychometric properties of the Geriatric Suicide Ideation Scale (GSIS) among community-residing older adults. Aging Ment Health 20: 208–221. [PubMed: 26286664]

Human Rights Watch. 2012 Old Behind Bars: The Aging Prison Population in the United States. Human Rights Watch: New York.

Humeniuk R (Ed). 2010 The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST): Manual for Use in Primary Care. WHO Press: Geneva.

James D, Glaze L. 2006 Bureau of Justice Statistics Brief Report: Mental Health Problems of Prison and Jail Inmates; #NCJ 213600. U.S. Department of Justice; Office of Justice Programs.

Jiang S, Winfree LT. 2006 Social support, gender, and inmate adjustment to prison life. The Prison J 86: 32–55.

Katz S, Ford AB, Moskowitz W, Jackson BA, Jaffe MW. 1963 Studies of illness in the aged. The index of ADL: a standardized measure of biological and psychosocial function. JAMA 185: 914–919. [PubMed: 14044222]

Kingston P, Le Mesurier N, Yorston G, Wardle S, Heath L. 2011 Psychiatric morbidity in older prisoners: unrecognized and undertreated. Int Psychogeriatr 23: 1354–1360. [PubMed: 21489341]

Koenig HG, Johnson S, Bellard J, Denker M, Fenlon R. 1995 Depression and anxiety disorder among older male inmates at a federal correctional facility. Psychiatr Serv 46: 399–401. [PubMed: 7788465]

Konrad N, Daigle MS, Daniel AE, et al. 2007 Preventing suicide in prisons, part I. Recommendations from the International Association for Suicide Prevention Task Force on Suicide in Prisons. Crisis 28: 113–121. [PubMed: 17992824]

Kroenke K, Spitzer RL, Williams JB. 2001 The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med 16: 606–613. [PubMed: 11556941]

Leigey ME, Hodge JP. 2012 Gray matters: gender differences in the physical and mental health of older inmates. Women Crim Justice 22: 289–308. doi: 10.1093/geronb/gbv069.

Luallen J, Cutler C. 2017 The growth of older inmate populations: how population aging explains rising age at admission. J Gerontol B Psychol Sci Soc Sci 72: 888–900. [PubMed: 26307485]

Murdoch N, Morris P, Holmes C. 2008 Depression in elderly life sentence prisoners. Int J Geriatr Psychiatry 23: 957–962. [PubMed: 18395886]

Noonan ME. 2015 Prison and jail deaths in custody, 2000–2013—statistical tables. U.S. Department of Justice, Bureau of Justice Statistics.

Ormel J, Rijsdijk FV, Sullivan M, Van Sonderen E, Kempen GIJM. 2002 Temporal and reciprocal relationship between IADL/ADL disability and depressive symptoms in late life. J Gerontol Series B-Psychol Sci Soc Sci 57: P338–P347.

Park M, Unutzer J. 2011 Geriatric depression in primary care. Psychiatr Clin North Am 34: 469–487, ix–x. [PubMed: 21536169]

Pearlin LI, Lieberman MA, Menaghan EG, Mullan JT. 1981 The stress process. J Health Soc Behav 22: 337–356. [PubMed: 7320473]

Petersson S, Mathillas J, Wallin K, et al. 2014 Risk factors for depressive disorders in very old age: a population-based cohort study with a 5-year follow-up. Soc Psychiatry Psychiatr Epidemiol 49: 831–839. [PubMed: 24100915]

Pfaff JJ, Almeida OP. 2005 Detecting suicidal ideation in older patients: identifying risk factors within the general practice setting. Br J Gen Pract 55: 269–273. [PubMed: 15826433]

Prevention, NAAFS. 2014 Research Prioritization Task Force. A prioritized research agenda for suicide prevention: an action plan to save lives National Institute of Mental Health and the Research Prioritization Task Force Rockville, MD.

Ruseell D, Turner RJ, Joiner TE. 2009 Physical disability and suicidal ideation: a community-based study of risk/protective factors for suicidal thoughts. Suicide Life Threat Behav 39: 440–451. [PubMed: 19792985]

Verbrugge LM, Jette AM. 1994 The disablement process. Soc Sci Med 38: 1–14. [PubMed: 8146699]

Wangmo T, Handke V, Bretschneider W, Elger BS. 2016 Prisons should mirror society: the debate on age-segregated housing for older prisoners. Ageing Soc Available on CJO 2015. DOI: 10.1017/S0144686X15001373.

Whitson HE, Landerman LR, Newman AB, et al. 2010 Chronic medical conditions and the sex-based disparity in disability: the Cardiovascular Health Study. J Gerontol A Biol Sci Med Sci 65: 1325–1331. [PubMed: 20675619]

Williams BA, Lindquist K, Sudore RL, et al. 2006 Being old and doing time: functional impairment and adverse experiences of geriatric female prisoners. J Am Geriatr Soc 54: 702–707. [PubMed: 16686886]

Key points

- We found that disability in prison activities of daily living (PADLs) was associated with depression and suicidal ideation severity in prisoners age 50 years and older.
- The association between PADL disability and depression may be particularly salient in older male prisoners.

Table 1

Characteristics of the study sample overall and according to Prison Activities of Daily Living (PADL) disability

Characteristic	Entire sample *N* = 167	No PADL disability *n* = 74	PADL disability *n* = 93	*p*-value
Demographics				
Age, mean (SD)	57.6 (6.9)	57.6 (6.9)	57.6 (6.9)	0.52
Men, *n* (%)	110 (65.9)	61 (82.4)	49 (52.7)	<0.001
Women, *n* (%)	57 (34.1)	13 (17.6)	44 (47.3)	
Race, *n* (%)				0.44
White	93 (55.7)	39 (52.7)	54 (58.1)	
Black	51 (30.5)	22 (29.7)	29 (31.2)	
Hispanic/Other *	23 (13.8)	13 (17.6)	10 (10.8)	
Did not graduate high school, *n* (%)	45 (26.9)	17 (23.0)	28 (30.1)	0.30
Incarceration-related factors				
Violent offense, *n* (%)	100 (59.9)	47 (63.5)	53 (57.0)	0.39
Years in prison for current offense, mean (SD) †	7.8 (8.9)	9.7 (9.6)	6.3 (8.1)	0.02
Years left until expected release, mean (SD) ‡	8.4 (11.5)	6.8 (7.9)	9.6 (13.5)	0.11
Single cell, no roommate	19 (11.4)	8 (10.8)	1 1 (1 1.8)	0.84
Repeat offender, *n* (%)	115 (68.9)	48 (64.9)	67 (72.0)	0.32
In-prison job assignment, *n* (%)	80 (47.9)	53 (60.9)	40 (50.0)	0.16
Clinical and behavioral factors				
Number of chronic conditions, mean (SD) §	1.7 (1.2)	1.5 (1.2)	2.0 (1.2)	0.02
Hospitalization in past year, *n* (%)	7 (3.2)	4 (5.4)	3 (3.2)	0.49
Poor vision, *n* (%)	42 (25.2)	15 (20.3)	27 (29.0)	0.19
Chronic pain, *n* (%)	105 (63.3)	33 (44.6)	72 (78.3)	<0.001
ADL disability, *n* (%)	13 (7.8)	5 (4.0)	8 (19.0)	0.001
Mobility impairment, *n* (%)	21 (12.6)	13 (10.4)	8 (19.0)	0.14
History of alcohol abuse, *n* (%)	84 (50.3)	33 (44.6)	51 (54.8)	0.19
Drug use at time of incarceration, *n* (%)	144 (86.2)	67 (90.5)	77 (82.8)	0.15
Lifetime suicide attempt, *n* (%)	51 (33.1)	24 (32.4)	37 (39.8)	0.33
Treatment				

Characteristic	Entire sample *N* = 167	No PADL disability *n* = 74	PADL disability *n* = 93	*p*-value
Current mental health treatment, *n* (%)[//]	86 (51.8)	25 (33.8)	61 (65.6)	<0.001

PADL, Prison Activities of Daily Living; ADL, Activities of Daily Living.

[*] There were 13 participants coded as Other, with Asian (*n* = 1), Native Hawaiian/Pacific Islander (*n* = 1), American Indian (*n* = 9), and Mixed race (*n* = 2).

[†] Range 0.008 years to 40.2 years.

[‡] Range 0.02 years to 66.6 years.

[§] Chronic conditions, assessed via medical chart review, included hypertension, myocardial infarction, congestive heart failure, stroke, diabetes mellitus, arthritis, hip fracture, chronic lung disease, and cancer.

[//] Current mental health treatment could not be determined for five participants.

Int J Geriatr Psychiatry. Author manuscript; available in PMC 2021 February 05.

Table 2

Association between Prison Activities of Daily Living (PADL) disability and depression

	Model 1 (*N* = 167)		Model 2 (*N* = 167)		Model 3 (*N* = 162)		Model 4 (*N* = 158)	
	OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
PADL disability	4.75	2.04, 11.08‡	4.81	1.99, 11.64‡	3.93	1.43, 10.85‡	3.90	1.38, 11.03‡
Age			0.96	0.90, 1.02	0.95	0.89, 1.02	0.95	0.89, 1.02
Female			0.92	0.41, 2.07	0.70	0.28, 1.75	0.72	0.27, 1.92
Number of chronic conditions					1.28	0.87, 1.86	1.26	0.86, 1.85
Hospitalization past year					5.66	0.89, 36.19*	5.54	0.87, 35.21*
Poor vision					3.55	1.05, 11.28†	2.90	1.17, 7.21†
Chronic pain					3.44	1.17, 12.17†	3.42	1.05, 11.21†
Lifetime suicide attempt					2.27	0.97, 5.29*	2.25	0.94, 5.40*
Current mental health treatment							0.97	0.35, 2.70

OR, odds ratio.

*$p < 0.10$.

†$p < 0.05$.

‡$p < 0.01$.

Table 3

Association between Prison Activities of Daily Living (PADL) disability and depression according to gender

	Men (*n* = 103)		Women (*n* = 55)	
	OR	**95% CI**	**OR**	**95% CI**
PADL disability	6.66	1.80, 24.70‡	0.58	0.09, 3.84
Age	0.93	0.85, 1.03	1.03	0.91, 1.17
Number of chronic conditions	1.34	0.78, 2.28	1.99	0.91, 4.37*
Poor vision	2.92	0.87, 9.81*	1.95	0.43, 8.86
Chronic pain	4.35	0.83, 22.80*	1.40	0.21, 9.32
Lifetime suicide attempt	1.22	0.48, 5.47	5.20	1.21, 22.38†
Current mental health treatment	1.16	0.34, 4.01	0.74	0.06, 8.58

OR, odds ratio.

*$p < 0.10$.

†$p < 0.05$.

‡$p < 0.01$.

Table 4

Association between Prison Activities of Daily Living (PADL) disability and suicidal ideation severity

	Model 1 (*N* = 165)		Model 2 (*N* = 165)		Model 3 (*N* = 164)		Model 4 (*N* = 159)	
	β (SE)	95% CI	β (SE)	95% CI	β (SE)	95% CI	β (SE)	95% CI
PADL disability	9.92 (3.84)‡	2.33, 17.52	10.69 (4.03)‡	2.72, 18.66	7.55 (3.62)†	0.39, 14.71	7.30 (3.72)*	−0.06, 14.65
Age			−0.52 (0.29)*	−1.09, 0.05	−0.22 (0.25)	−0.72, 2.27	−0.22 (0.25)	−0.72, 2.28
Female			3.62 (4.38)	−5.02, 12.27	3.61 (3.70)	−3.70, 10.93	4.54 (3.96)	−3.28, 12.37
Poor vision					8.15 (3.84)†	0.56, 15.74	7.43 (3.87)*	−1.72, 12.02
Chronic pain					1.51 (3.67)	−5.74, 8.75	0.88 (3.73)	−6.48, 8.26
Alcohol abuse					4.90 (3.42)	−1.85, 11.65	5.15 (3.48)	−1.72, 12.02
Lifetime suicide attempt					24.38 (3.54)‡	17.38, 31.37	25.53 (3.68)‡	18.27, 32.79
Current mental health treatment							1.38, 3.83	−6.20, 8.97

SE, standard error.

*$p < 0.10$.

†$p < 0.05$.

‡$p < 0.01$.