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Cognition and Incarceration: Cognitive Impairment and Its Associated Outcomes in Older Adults in Jail

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Abstract

OBJECTIVES: To determine prevalence of, and outcomes associated with, a positive screen for cognitive impairment in older adults in jail.

DESIGN: Combined data from cross-sectional (n=185 participants) and longitudinal (n=125 participants) studies.

SETTING: Urban county jail.

PARTICIPANTS: Individuals in jail aged 55 and older (N = 310; mean age 59, range 55–80). Inclusion of individuals aged 55 and older is justified because the criminal justice system defines “geriatric prisoners” as those aged 55 and older.

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Conflict of Interest: Dr. Williams has served as an expert witness and as a court consultant in legal cases related to prison conditions of confinement. These relationships have included the National American Civil Liberties Union; Squire Patton Boggs; the Center for Constitutional Rights; and the Disability Rights Legal Center. No such-organization played a role in the design, recruitment, data collection, analysis, or preparation of this manuscript. No other authors have conflicts of interest to report.

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MEASUREMENTS: Baseline and follow-up assessments of health, psychosocial factors, and cognitive status (using the Montreal Cognitive Assessment (MoCA)); 6-month acute care use and repeat arrest assessed in those followed longitudinally.

RESULTS: Participants were of low socioeconomic status (85% annual income < $15,000) and predominantly non-white (75%). Many (70%) scored less than 25 on the MoCA; those with a low MoCA score were more likely to be nonwhite (81% vs 62%, p<.001) and report fair or poor health (54% vs 41%, p=.04). Over 6 months, a MoCA score of less than 25 was associated with multiple emergency department visits (32% vs 13%, p=.02), hospitalization (35% vs 16%, p=.03), and repeat arrests (45% vs 21%, p=.01).

CONCLUSIONS: Cognitive impairment is prevalent in older adults in jail and is associated with adverse health and criminal justice outcomes. A geriatric approach to jail-based and transitional health care should be developed to assess and address cognitive impairment. Additional research is needed to better assess cognitive impairment and its consequences in this population.

Keywords

cognitive impairment; cognition; jail; criminal justice; vulnerable population

Families, communities, and healthcare systems are increasingly having to care for older adults with cognitive impairment or dementia. Cognitive impairment can lead to poor judgement, behavioral struggles, and difficulty managing everyday life.[1] The number of older adults is increasing rapidly in U.S. jails,[2] but the prevalence of cognitive impairment in older adults in jail and its associated health and criminal justice outcomes are unknown.

Jails are the first prolonged point of contact with health and social service providers for many people. Jails (unlike prisons) house persons awaiting trial or serving short sentences.[3] Although studies have revealed a high prevalence and adverse outcomes of chronic disease and disability in incarcerated older adults,[4,5] studies about cognitive health in this population are rare and have largely focused on severe dementia or been conducted with small samples pre-dominantly outside the United States.[6,7] As a result, little is known about the cognitive health of this population.

This knowledge gap is critical because cognitive impairment may lead to poor outcomes for older adults in the criminal justice system. For example, unidentified cognitive impairment could impair the ability of older adults and their lawyers to engage in fair plea bargaining and sentencing[8] or could hamper their ability to access jail-based healthcare. Outside of jail, cognitive impairment is associated with acute care use (emergency department (ED), hospital).[9,10] Although older adults in jail report 6-month ED use at a rate more than twice the 1-year rate found in similarly aged community-dwelling adults,[5] the association between acute care use and cognitive impairment in this population is unknown.

With a growing population of incarcerated older adults, 2 critical first steps are needed to adequately develop geriatric-centered legal and jail healthcare services: estimate prevalence and outcomes of age-related cognitive impairment in this population using existing screening tools and identify directions for future research to improve detection of cognitive impairment in correctional settings. Therefore, this study was designed to assess the

prevalence of a positive screen for mild cognitive impairment (MCI) using the Montreal Cognitive Assessment (MoCA) in adults aged 55 and older in jail, describes associated baseline and longitudinal health and criminal justice outcomes, and places its findings in the context of emerging literature about cognitive assessment testing in vulnerable populations. The inclusion of participants aged 55 and older is justified because the criminal justice system defines “geriatric prisoners” as those aged 55 and older because a disproportionate percentage of this population has multimorbidity and functional impairment at relatively young ages.[11]

METHODS

Study Design and Sample

This combined cohort study draws on data about older adults collected in 2 waves in a U.S. urban county jail system using the same measures. The first wave was a cross-sectional study conducted between May and November 2012 (N=185). The second wave was a 6-month longitudinal study with baseline interviews conducted between March and June 2015 (N=125). This study included all participants (N=310) from each study who completed a MoCA screen at baseline and granted access to their jail medical records. Those who participated in both study waves (N=27) were removed from the 2012 cohort, and only their 2015 data are included in this study.

Study eligibility for each wave included having been incarcerated for at least 48 hours, being deemed safe to be interviewed according to the Sheriff’s deputy on duty, and speaking English or Spanish. Cantonese speakers were eligible for the 2012 cross-sectional study, but fewer than 5 were enrolled. The 48-hour requirement was used because jail inmates are often in transit or have court appearances within 48 hours of arrest and are not available to participate in a study. Participants that jail medical staff identified as detoxifying from recent alcohol or drug use were not interviewed until detoxification was complete, sometimes as long as 1 week after arrest. The same recruitment strategy was used for both studies. The research consent process, which used a teach-to-goal method to ensure informed and voluntary consent, is discussed in detail elsewhere.[12] All interviews occurred in private rooms.

We also conducted a subanalysis of participants who completed a 6-month follow-up interview (n=101) in the study’s second wave. Interviews for the longitudinal study were conducted at baseline and monthly and included questions about healthcare use and arrest. Community-based interviews (after jail release) were conducted in a private university–affiliated clinical research office near the jail. For those who were not released or were re-incarcerated during the study, follow-up interviews were conducted in the jail.

Consistent with federal regulations governing human subjects research involving prisoners, [13] for each interview, participants in the cross-sectional study received $10, and those in the longitudinal study received $20 to account for the greater time and travel costs incurred in a community study. The Human Research Protection Program at the University of California, San Francisco, approved this study.

Measures

Positive Screen for MCI—Although no cognitive screening tool has been specifically developed or validated for use in the criminal justice population, the MoCA[14] has high sensitivity for the detection of MCI and is widely used in clinical settings, including in vulnerable populations.[15,16] A positive screen in this study was defined as a score of less than 25 (vs the standard 26 thresh-old, which we also report) because a meta-analysis showed that this lower cutoff detects MCI better than the higher cutoff and the Mini-Mental State Examination,[17] and others have suggested that a cutoff of 26 overestimates impairment in select populations.[18,19] Scores were adjusted upward an additional point for participants who reported educational attainment of less than a high school degree. Although no cognitive screening tool has been validated in low-literacy populations, a meta-analysis of clinical studies using the MoCA found that a cutoff of 23 improves the MoCA's specificity. [20] To better account for this emerging literature, we also determined percentages of participants who scored below 23 and who scored below 20, which has been associated with a diagnosis of dementia in some studies.[21]

Performance on Cognitive Domains within the MoCA—The MoCA assesses 6 cognitive domains: executive functioning; visuospatial ability; language; attention, concentration, and working memory; short-term memory; and orientation to time and space. We determined the percentage of participants who scored 0 on each measure of the MoCA to identify which domains are most severely affected in those screening positive.

Sociodemographic Characteristics—Sociodemographic characteristics included self-reported age, race and ethnicity, sex, income, education, military history, and homelessness (spending ≥ 1 nights outside or in a homeless shelter in the last 30 days). Annual income was categorized as above or below $15,000 (approximate eligibility criterion for Medicaid when cohorts were enrolled).

Health Status—Chronic medical conditions were assessed using jail medical record review and self-report with questions from the Health and Retirement Study.[22] Serious mental illness was defined using the Bureau of Justice Statistics definition (any major depressive, mania, or psychotic disorder) [23] and was also determined using a combination of self-report and jail medical record review. Self-rated health was categorized as poor or fair versus excellent, very good, or good. Self-rated health and self-report of medical conditions are validated in older and homeless populations.[24–26] Other measures included recent drug use (using an item from the Drug Abuse Screening Test-10) [27] and problem alcohol use ("hazardous drinking" or having an "active alcohol use disorder" based on responses to the Modified Alcohol Use Disorders Identification Test).[28]

Geriatric Conditions—Geriatric conditions included multimorbidity (having ≥ 2 chronic medical conditions), functional impairment (difficulty with ≥ 1 activities of daily living (ADLs): dressing, bathing, eating, transferring, toileting (e.g. "Because of a health or memory problem, do you have any difficulty bathing or showering?")), recent falls (in the 3 months before arrest), mobility impairment (requiring a cane, walker, wheelchair), and incontinence ("In the last month, have you lost any urine beyond your control?").

Longitudinal Outcomes—Analyses of data from the 101 participants in the longitudinal cohort assessed 6-month healthcare use (ED use, hospitalization, primary care visit) and repeat arrests. ED use was assessed by asking: “Since we last interviewed you, did you visit a hospital emergency room?” at each monthly follow-up visit. Hospitalization (“Did you stay overnight in the hospital?”) and repeat arrests (“Have you been arrested?”) were also assessed at each visit. It was possible to use the ED or be hospitalized while in jail. Study staff prompted participants who missed a monthly follow-up visit at their next interview to report healthcare use and arrests since the last interview. Reports of hospitalization or ED use by incarcerated participants were confirmed using medical record review. For deaths occurring over the six month follow-up period, participant observations were censored at the time of death and included in this subanalysis.

Analysis

Baseline participant sociodemographic characteristics, health and health risk factors, and MoCA results were analyzed using descriptive statistics. Chi-square tests were used to assess the association between baseline factors, longitudinal outcomes, and a positive screen on the MoCA. Analyses were performed using SAS version 9.4 (SAS Institute, Inc., Cary, NC). Study data were collected and managed using REDCap electronic data capture.[29]

RESULTS

Study Sample

The study enrolled 250 participants in the 2012 study wave and 125 in the 2015 study wave. Of these 375 individuals, 27 participated in both studies and were removed from the 2012 cohort, leaving 348 unique participants. Of these, 17 declined to complete the MoCA, and 22 did not grant jail medical record access, resulting in this study’s sample of 310 (185 from the 2012 wave, 125 from the 2015 wave). The 39 nonduplicated excluded participants did not significantly differ from the final study sample according to age, race, educational attainment, income, or self-rated health. An 85% recruitment rate was achieved across the 2 studies. Four participants were not enrolled because they could not provide informed consent through the teach-to-goal process, and 1 was excluded because of a study protocol violation. From the 2015 longitudinal study, 24 participants were lost to follow-up, 99 of 125 completed a 6-month interview (79% retention), and 2 died during follow-up, resulting in longitudinal subanalyses with 101 participants.

Participant Characteristics

Sociodemographic Characteristics—Mean participant age was 59 (range 55–80) (Table 1). Ninety-five percent were male, 75% were nonwhite, and 85% reported an annual income of less than $15,000. Thirty percent did not have a high school degree, 22% had served in the armed forces, and 47% had been homeless in the 30 days before arrest.

Health and Geriatric Conditions—Half of participants rated their health poor or fair (Table 1). Chronic health conditions were common, including hypertension (63%), hepatitis C (49%), and diabetes (17%). Overall, 45% had a serious mental illness, 64% had

multimorbidity, 51% had functional impairment, and 30% had fallen in the 3 months before incarceration.

Positive MoCA Screen

After adjusting for education, 78% of participants scored below the standard cutoff (26), and 70% scored less than 25, the cutoff for MCI used in this study. Forty-nine percent scored less than 23, and 25% had an education-adjusted score of less than 20 (Table 2). Among participants who scored less than 25, the domains most severely affected were executive functioning (e.g., 59% with a positive screen scored 0 on Trailmaking vs 17% of those with a MoCA score of 25–31, p<.001), visuospatial abilities (71% scored 0 on cube drawing vs 38%, p<.001), and short-term memory (46% scored 0 on delayed recall vs 5%, p<.001) (Table 3).

Factors Associated with Positive MoCA Screen

Those with a positive MoCA screen were more likely to be nonwhite (81% vs 62%, p<.001) and in fair or poor health (54% vs 41%, p=.04) and to have hypertension (67% vs 54%, p=.04). A score of less than 25 was not significantly associated with any other baseline factor, including having a high school degree (33% vs 24%, p=.15) or any geriatric condition (e.g., functional impairment, 50% vs 53%, p=.06) (Table 1).

In the 6-month longitudinal subanalysis, a positive MoCA screen was associated with hospitalization (35% vs 16%, p=.03), 2 or more ED visits (33% vs 13%, p=.02), and repeat arrest (45% vs 21%, p=.01) (Table 3).

DISCUSSION

This study is the first, to our knowledge, to estimate the rate of and describe factors associated with a positive screen for MCI in older adults in jail. We found that 78% of participants with an average age of 59 had education-adjusted scores on the MoCA below the standard cutoff for MCI (<26) and that 70% scored below a more conservative cut-off used in this study (<25). Using an even lower cutoff score of 23, which one study suggested improves specificity,[20] 49% of participants screened positive. Twenty-five percent scored less than 20, a threshold associated with dementia in a number of international studies, albeit none conducted with a comparable U.S. population.[21]

This study also found that a positive MoCA screen may indicate unique medical and social vulnerabilities in older adults involved in the criminal justice system. Participants with a positive MoCA screen reported worse overall health[30] and were more likely to use the ED and be hospitalized over just 6 months. These high rates of hospitalization (35%) in particular suggest that a relatively brief and inexpensive screen could help identify older adults at heightened risk of deteriorating health and acute care use after their return to the community. This study also provides preliminary evidence that unaddressed cognitive impairment in this population may contribute to repeat arrest because 45% of those with a positive MoCA screen were arrested again within just 6 months (vs 21% of those who scored in the normal range). Even though a MoCA screen is not diagnostic, the possibility that cognitive impairment in even a small proportion of older adults involved in the criminal

justice system is resulting in repeat arrest warrants greater attention to mitigate the possibility of older adults being punished for behavior that is medical rather than criminogenic in nature. For example, executive dysfunction could result in erratic behavior potentially leading to police interactions, and short-term memory deficits may affect a person's legal defense or ability to adhere to complex court orders (e.g., going to probation appointments).

These findings should be viewed in the context of an underdeveloped literature describing cognitive screening outcomes in comparable U.S. populations and a small number of emerging studies suggesting that cognitive screening may overestimate the prevalence of cognitive impairment in racial and ethnic minorities and those with low educational attainment, possibly because of testing bias.[19,21,31–33] For example, in our study, executive function and short-term memory were among the domains most affected for participants with a positive MoCA screen, and a study of community-dwelling African Americans found disproportionately poor performance on the cube draw, Trailmaking, and delayed free recall tests at rates similar to what were found in this study,[32] yet racial and ethnic disparities in dementia diagnoses are also well established,[34] suggesting that some proportion of the high positive screening rates observed in this study reflect abnormal cognitive health. Similarly, disproportionately low levels of educational attainment may have affected MoCA scores in this study more than the standard education adjustment for MoCA scoring accounts for,[33] although education and associated cognitive activities are known preventive factors against cognitive impairment,[35] supporting a finding of cognitive health disparities in this population.

Additional considerations when interpreting these results include that some participants with MCI may under-report acute care use because of impaired recall. Similarly, the lower rate of positive screens on the MoCA in the longitudinal cohort may suggest that cognitive impairment was a contributing factor for some of the 20% of participants who were lost to follow-up. As a result, this study may underestimate the prevalence of ED use, hospitalization, and repeat arrest of older adults in jail. Finally, this study was conducted in 1 urban jail, highlighting the need for studies in other jail and prison systems to generate more-precise estimates of the risks of acute care use and repeat arrests associated with cognitive impairment in this population.

Between 2002 and 2012, arrests of adults aged 18 to 54 declined by 6% but nearly doubled (up 79%) in adults aged 55 to 64 to exceed 600,000 arrests in 2012.[36] As the criminal justice population ages, many public health professionals, experts, and policymakers question whether we are prepared to assess and meet the complex health and social service needs of this population.[37] This study, the first to screen a large sample of incarcerated older adults for cognitive impairment, shows that cognitive screening tools validated for use in this population are urgently needed to identify age-related cognitive impairment in jails and prisons and distinguish it from the high rates of traumatic brain injury found in incarcerated people of all ages.[38,39] Further research might also build on this study's findings by analyzing factors that mediate the relationship between cognitive impairment and adverse health outcomes such as homelessness and serious mental illness and investigating the reasons for acute care use and repeat arrest in this population.

Overall, our study's findings suggest that screening older adults for cognitive impairment in jail may help to identify a medically vulnerable population at risk of adverse health and criminal justice outcomes after release. The high number of older adults cycling through the criminal justice system at risk of cognitive impairment would benefit from geriatrics-informed clinical and programmatic interventions that assess and address cognitive health and provide case management, patient navigation, and peer mentoring support to protect against avoidable adverse health and criminal justice outcomes. As future research is conducted to validate screening tools for this and other vulnerable geriatric populations, this study shows that geriatrics-informed systems of care for cognitively impaired older adults in jails and better linkages between jails and geriatric care in the community are needed.

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Table 1.

Participant Characteristics According to Baseline Montreal Cognitive Assessment (MoCA) Score

Characteristic	All, N=310	Adjusted MoCA Score		*P*-Value
		<25, n=220	25–31, n=90	
Baseline demographic characteristics				
Age, mean±standard deviation (range)	59.2 ± 7.4 (55–80)	58.9 ± 8.2 (55–80)	59.9 ± 4.9 (55–73)	.19
Race				
Nonwhite	233 (75.2)	177 (80.5)	56 (62.2)	<.001
White	77 (24.8)	43 (19.5)	34 (37.8)	
Education < high school	94 (30.3)	72 (32.7)	22 (24.4)	.15
Income < $15,000	259 (84.9)	184 (85.2)	75 (84.3)	.84
Veteran, served in armed forces	69 (22.4)	44 (20.1)	25 (28.1)	.13
Veteran, saw combat	28 (9)	21 (9.5)	7 (7.8)	.62
Homeless[1]	146 (47.3)	103 (47)	43 (47.8)	.90
Self-rated health poor or fair[2]	155 (50)	118 (53.6)	37 (41.1)	.04
Chronic health conditions				
Hypertension	196 (63.2)	147 (66.8)	49 (54.4)	.04
Diabetes	52 (16.8)	38 (17.4)	14 (15.6)	.70
Cancer (excluding minor skin cancer)	20 (6.5)	12 (5.5)	8 (8.9)	.26
Chronic lung disease	48 (15.7)	32 (14.8)	16 (17.8)	.52
Heart attack, coronary heart disease, angina pectoris, congestive heart disease	55 (17.8)	37 (16.9)	18 (20)	.52
Stroke	28 (9.1)	21 (9.6)	7 (7.8)	.61
Arthritis or rheumatism	143 (46.3)	102 (46.6)	41 (45.6)	.87
Human immunodeficiency virus, acquired immunodeficiency syndrome	18 (5.8)	13 (5.9)	5 (5.6)	.91
Hepatitis C	150 (48.7)	111 (50.9)	39 (43.3)	.23
Geriatric donditions				
Multimorbidity[3]	198 (63.9)	141 (64.1)	57 (63.3)	.90
Recent fall[4]	93 (30)	68 (30.9)	25 (27.8)	.58
Urinary incontinence[5]	78 (25.4)	56 (25.7)	22 (24.7)	.86
Mobility impairment [6]	113 (36.5)	82 (37.3)	31 (34.4)	.64

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Characteristic	All, N=310	Adjusted MoCA Score <25, n=220	Adjusted MoCA Score 25–31, n=90	*P*-Value
Functional impairment[7]	158 (51)	110 (50)	48 (53.3)	.59
Serious mental illness[8]	138 (44.5)	99 (45)	39 (43.3)	.79
Behavioral health problems				
Problem alcohol use[9]	132 (42.7)	95 (43.4)	37 (41.1)	.71
Recent drug use[10]	156 (51)	106 (48.9)	50 (56.2)	.24

[1] Spending ≥ 1 nights on the street or in a homeless shelter in the 30 days before incarceration.

[2] Response of “poor” or “fair” to the question: “In general, would you say your health is excellent, very good, good, fair, or poor?”

[3] ≥2 of the above-listed chronic medical conditions.

[4] Self-report of a fall in the last month.

[5] Response of “yes” to the question: “In the last month, have you lost any urine beyond your control?”

[6] Requiring a mobility assistive device (cane, walker, wheelchair).

[7] Self-report of difficulty with ≥1 activities of daily living (dressing, bathing, eating, transferring, toileting).

[8] Any major depressive, mania, or psychotic disorder using the Bureau of Justice Statistics’ definition.

[9] Positive screen for “hazardous drinking” or having an “active alcohol use disorder” using the 3-item Modified Alcohol Use Disorders Identification Test.

[10] Any “moderate,” “substantial,” or “severe” drug use using the Drug Abuse Screening Test-10.

Table 2.

Distribution of Education-Adjusted Montreal Cognitive Assessment (MoCA) Scores (N=310)

Adjusted MoCA Score	n (%)	Cumulative n (%)
10	1 (0.3)	1 (0.3)
11	1 (0.3)	2 (0.6)
12	5 (1.6)	7 (2.3)
13	2 (0.6)	9 (2.9)
14	5 (1.6)	14 (4.5)
15	6 (1.9)	20 (6.4)
16	12 (3.9)	32 (10.3)
17	12 (3.9)	44 (14.2)
18	16 (5.2)	60 (19.3)
19	18 (5.8)	78 (25.2)
20	21 (6.8)	99 (31.9)
21	23 (7.4)	122 (39.3)
22	30 (9.7)	152 (49.0)
23	34 (11.0)	186 (60.0)
24	34 (11.0)	220 (71.0)
25	22 (7.1)	242 (78.1)
26	25 (8.1)	267 (86.1)
27	13 (4.2)	280 (90.3)
28	16 (5.2)	296 (95.5)
29	8 (2.6)	304 (98.1)
30	5 (1.6)	309 (99.7)
31	1 (0.3)	310 (100.0

Table 3.

Participants Scoring 0 on Montreal Cognitive Assessment (MoCA) Measures Grouped According to Cognitive Domain (n=185)

		Adjusted MoCA Score		
Cognitive Domain	**All, N=185**	**<25, n=142 n (%)**	**25–31, n=43**	***P*-Value**
Executive functioning				
Trails	91 (49.5)	84 (59.2)	7 (16.7)	<.001
Letter B Words	97 (53)	88 (62.4)	9 (21.4)	<.001
Verbal Abstraction	20 (10.8)	20 (14)	0 (0)	.009
Visuospatial abilities				
Cube	115 (63.2)	99 (70.7)	16 (38.1)	<.001
Clock	4 (2.2)	4 (2.8)	0 (0)	.26
Language				
Animal	1 (0.5)	1 (0.7)	0 (0)	.58
Sentence Repetition	21 (11.3)	19 (13.3)	2 (4.7)	.12
Attention, concentration, and working memory				
Digit Span Forward	16 (8.7)	12 (8.5)	4 (9.3)	.86
Digit Span Backward	48 (25.8)	45 (31.5)	3 (7)	.001
Letter A Tapping	33 (17.7)	32 (22.4)	1 (2.3)	.002
Serial 7 Subtractions	27 (14.5)	27 (18.9)	0 (0)	.002
Short-term Memory	68 (36.6)	66 (46.2)	2 (4.7)	<.001
Orientation to time and space	0 (0)	0 (0)	0 (0)	x

Table 4.

6-Month Longitudinal Outcomes for the 2015 Cohort According to Montreal Cognitive Assessment (MoCA) Score (N=101)

		Adjusted MoCA Score		
Longitudinal Outcomes	**All, N=101**	**<25, n=40**	**25–31, n=61**	***P*-Value**
≥1 ED visits in 6 months	46 (45.5)	20 (50)	26 (42.6)	.47
≥2 ED visits	21 (20.8)	13 (32.5)	8 (13.1)	.02
Any hospitalization	24 (23.8)	14 (35)	10 (16.4)	.03
Never saw primary care provider	53 (52.5)	17 (42.5)	36 (59)	.10
Ever arrested after baseline	31 (30.7)	18 (45)	13 (21.3)	.01

ED=emergency department.