



## Regular Research Article

# Psychiatric Presentations and Medication Use in Older Adults With Intellectual and Developmental Disabilities

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## ABSTRACT

**Objective:** Adults with intellectual and developmental disabilities (IDD) are living longer, yet research about the medical and psychiatric needs of older adults still lags behind that of younger individuals with IDD. The aim of this study was to assess age-related differences in the mental health presentations of adults with IDD. **Methods:** Fully deidentified data for adults 30 years and older were extracted from the START (Systemic, Therapeutic, Assessment, Resources, and Treatment) Information Reporting System, a deidentified database housed at the Center for START Services. Caregivers and START team documents reported psychiatric diagnoses, service use, recent stressors, and challenging behaviors. *t* Tests, Mann Whitney *U* tests,  $\chi^2$  tests, and multinomial logistic regression models were used to compare the two age groups, 30–49 years ( $n = 1,188$ ) versus 50 years and older ( $n = 464$ ). **Results:** Older adults had more medical conditions, fewer reported psychiatric conditions, and were more likely to be taking more psychiatric medications compared to younger adults, after adjusting for demographic variables, disability level, and number of recent stressors. **Conclusion:** Although older individuals reported fewer psychiatric diagnoses, they were more likely to take higher numbers of psychiatric medications and have more medical conditions. Clinicians and researchers ought to devote more attention to the healthcare needs of older adults with IDD, a vulnerable group exposed to polypharmacy and at risk of adverse events. (Am J Geriatr Psychiatry 2022; 30:65–77)

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## HIGHLIGHTS

- **What is the primary question addressed by this study?**

This study examines whether there are age-associated differences in psychiatric diagnoses, medications, and service use between older adults and middle-aged adults with intellectual and developmental disabilities.

- **What is the main finding of this study?**

Older adults, age 50 and over with intellectual and developmental disabilities, are more likely to take higher numbers of psychiatric medications and have fewer psychiatric diagnoses than younger adults with intellectual and developmental disabilities. Older adults also have fewer psychiatric hospitalizations and emergency department visits than younger adults.

- **What is the meaning of the finding?**

Older adults with intellectual and developmental disabilities may benefit from regular reviews of psychiatric medication use to minimize risks of polypharmacy.

## OBJECTIVE

Individuals with intellectual and developmental disabilities (IDD) experience high rates of psychiatric illness, with several studies indicating higher risk compared to individuals without IDD.<sup>1–4</sup> In general, individuals with IDD face more morbidity and mortality compared to typically developing populations, yet their life expectancy has increased over the past decade.<sup>5</sup> As a result, there is a necessity to expand research and training to meet the unique needs of older individuals in this population.<sup>6–8</sup> Results from investigations of the prevalence of psychiatric illness in older adults with IDD are conflicting. Studies contrasting rates for older adults with IDD with those for the general population have sometimes reported a higher prevalence for individuals with IDD,<sup>9,10</sup> while other studies have not found a difference between older individuals with IDD and those without.<sup>11,12</sup> One study found increased risk in all psychiatric diagnostic categories for older individuals with IDD, compared to the general population, with the exception of substance use related disorders.<sup>9</sup> A number of factors likely contribute to these conflicting findings, including differences in sampling (i.e., population based or clinical), diagnostic criteria or nosology used (i.e., DSM or ICD codes), diagnostic methods used (i.e., screens followed by direct assessment or diagnoses of record), and the experience of the professionals conducting the evaluation.<sup>1,9</sup>

Information on risk factors for development of psychiatric disorder in adults with IDD remains somewhat limited. Advanced age and presence of physical disability have been found to be associated with psychiatric illness in individuals with IDD in some investigations,<sup>7,11</sup> while other studies have found attenuated odds of psychotic, affective, and anxiety disorders in oldest age groups compared to youngest age groups.<sup>9</sup> The overall contribution of medical conditions to mental health has received some attention, but the relationship to age has not been thoroughly examined.<sup>13,14</sup>

Much of the focus of the mental health literature on adults with IDD has been on externalizing behaviors (i.e., aggression, self-injurious behavior, destructive and disruptive behavior). Aggression and other externalizing behaviors may represent a diagnostically nonspecific manifestation of distress among individuals with IDD who have few ways to express this distress, and externalizing behaviors are seen in association with many different psychiatric disorders.<sup>9</sup> As with psychiatric disorder prevalence, reports vary as to whether or not challenging behaviors occur more or less often in older adults with IDD compared to younger individuals.<sup>1,15–18</sup> Cooper et al. 2009,<sup>19</sup> reported a point prevalence rate of 9.8 for aggression separate from psychiatric illness in a large population-based sample; however, age was not associated with higher rates. Another population-based investigation of over 33,000 adults with ID found 25% of the sample had histories of challenging behavior at study entry.<sup>18</sup> The rate of new antipsychotic medication use was significantly higher in older individuals

and people with challenging behavior, autism spectrum disorder, and dementia.

Other research also suggests a relationship between psychotropics, challenging behaviors, and mental illness. Psychiatric medications, particularly antipsychotics, are commonly prescribed to individuals with IDD, including a substantial subset who does not carry diagnoses of psychotic illness, or in some cases, any psychiatric illness.<sup>18,20–22</sup> In terms of age and psychotropics, in a population-based investigation, Gomes and colleagues found that adults with IDD older than 45 were more likely to be prescribed antipsychotics in the absence of a reported psychiatric diagnosis than younger individuals.<sup>21</sup> In addition to antipsychotics, there is some evidence that older adults with IDD may also be prescribed antidepressants more often than younger counterparts.<sup>22</sup>

Given these concerns and the aging of the population with IDD, there is need for more research exploring factors associated with psychiatric and behavioral outcomes in older people with IDD. The aim of the present investigation was to examine age-related differences in the psychiatric profile of adults with IDD who receive services in a specialized crisis prevention and intervention mental health program. Younger individuals (age 30–49 years) were contrasted to older individuals (age 50 and above) with regard to their psychiatric diagnoses, medication use, emergency department visits and hospitalizations, as well as measures of psychopathology and stressors.

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## METHODS

### Data Source

Data from this study are from the START Information reporting System at the University of New Hampshire Institute on Disability UCED. The START (Systemic, Therapeutic, Assessment, Resources, and Treatment) program is a community-based linkage model that promotes the provision of community services, natural supports, and mental health treatment to people with IDD and co-occurring mental health needs. Individuals are referred to START from a variety of sources, including emergency responders, local providers, hospitals, emergency departments,

and case managers. Criteria for referral to START require a diagnosis of an IDD along with a diagnosed mental health condition and/or challenging behavior. START services are provided in multiple states across the US and data for this study are from eight of these states. More information about START can be found here: <https://www.centerforstartservices.org>.

### Sampling, Inclusion Criteria and Data Collection Procedures

Data were provided by the Center for START Services at the University of New Hampshire Institute on Disability UCED. The START model is evidence informed and relies on data to evaluate outcomes associated with the model and provide feedback to stakeholders. To capture such information, START data are collected and reported by participant programs into an online database, the START Information Reporting System (SIRS). All information entered and extracted from SIRS is fully deidentified. The governing body's institutional review board approved this study.

SIRS data from the Northeast, Southeast, Southwest, and Midwest regions of the US were examined in this study. Clinical characteristics reported in SIRS were captured via chart review by the START coordinator at intake. This included participants' living situation, level of intellectual disability (classified as no ID, mild, moderate, and severe/profound ID), presence of psychiatric and medical conditions (lifetime prevalence), hospitalizations, medications, and incarcerations. In addition, START coordinators administered the Aberrant Behaviors Checklist (ABC) and the Recent Stressors Questionnaire at entry into START. The ABC is an informant-rated instrument that assesses behaviors related to irritability, hyperactivity, lethargy, inappropriate speech, and stereotypies in individuals with IDD; it measures 58 items and is widely cited and psychometrically sound.<sup>23</sup> The Recent Stressors Questionnaire, developed within the START program, queries potential stressors, such as change in day program or move to a new living situation, over the past 6 months.

### Statistical Analysis

We compared the frequency or mean (SD) of the above clinical and demographic variables by age of

TABLE 1. Demographic Characteristics of START Individuals With IDD, Stratified by Age

Participant Characteristics at Intake	Combined (n = 1,652)	30-49 years old (n = 1,188)	50+ years old (n = 464)	Test Statistic	df	p Value
	Mean (SD) or %					
Age	43.6 (10.3)	38.2 (5.7)	57.4 (5.7)	t = -61.63	849.77	<0.0001
Male	57%	58%	55%	$\chi^2 = 1.36$	1	0.24
Race						
White	79%	77%	83%	$\chi^2 = 5.81$	2	0.06
Black / African-American	19%	20%	15%			
Multiracial and other races	2%	3%	2%			
Hispanic/Latino	9%	10%	7%	$\chi^2 = 2.25$	1	0.14
Current living situation						
Independent Living	16%	15%	19%	$\chi^2 = 24.72$	4	<0.0001
Community-based group home	38%	36%	42%			
Family setting	33%	36%	23%			
Institution/Hospital	5%	5%	5%			
Other	9%	8%	11%			
Disability level						
None	9%	10%	9%	$\chi^2 = 3.01$	3	0.39
Mild	51%	51%	50%			
Moderate	28%	28%	28%			
Severe/Profound	12%	11%	14%			

Notes: Test statistics refer to t-test (t) and Chi-square test ( $\chi^2$ ).

the participant (50 years and older versus 30–49 years) for descriptive purposes, using either a  $\chi^2$  test, t test, or Mann Whitney U test. We chose age group as the independent variable to assess how age group predicts outcomes, such as medical conditions. Next, three multinomial logistic regression models were used to examine the association between age (50 years and older versus 30–49 years) and the following outcomes of interest: number of psychiatric disorders (2–3 or 4+ relative to 1), number of medical conditions (1, 2–3, 4+ relative to 0), and number of psychiatric medications (1, 2–3, 4–5, 6+ relative to 0). These three models were each adjusted for sex, race and ethnicity, living situation, disability level, and number of recent stressors. p Values for regression models were calculated using two-tailed Wald z-test. All statistical analyses were performed using R version 4.0.3.<sup>27</sup>

## RESULTS

### Descriptive Statistics

A total of 1,652 individuals from START met inclusion criteria. Table 1 lists the demographic characteristics of the individuals stratified by age. The sample’s mean age was 43.6 years, and over 55 percent were male. Roughly three-quarters of the sample

were between the ages of 30 and 49 (n = 1,188), and over one quarter were 50 and older (n = 464). The two age groups did not significantly differ by sex or level of ID, though there were fewer Black/African-American individuals in the older sample. The types of living situation differed significantly between age groups, largely driven by a greater proportion of older adults living in a community-based home relative to the younger adults, and a greater frequency of younger adults living in family settings compared to older adults.

Table 2 details clinical variables, including ABC scores on entry to the program, psychiatric hospitalizations, and psychiatric medication use. Older individuals endorsed similar counts of recent stressors as their younger counterparts, yet the older cohort had lower scores on the hyperactivity/noncompliance and irritability/agitation subscales of the ABC. Older individuals were less likely to have experienced psychiatric hospitalization, emergency department visits, and incarceration in the past five years. There were no significant differences in the number of psychiatric medications prescribed to the different age groups. Over 50% of individuals in both age groups were prescribed four or more psychiatric medications, and almost one third of the older group were prescribed six or more psychiatric medications. Antidepressants, mood stabilizers, and atypical antipsychotics were the most commonly

**TABLE 2. Clinical Variables, Recent Stressors, and Service Use of START Individuals With IDD, Stratified by Age**

Participant Characteristics at Intake	30–49 years old (n = 1,188)	50+ years old (n = 464)	Test Statistic	df	p Value
	Mean (SD) or %				
ABC					
Hyperactivity/Noncompliance	16.5 (10.7)	14.6 (10.4)	t = 2.748	610.90	0.01
Inappropriate Speech	3.6 (3.4)	3.6 (3.6)	t = 0.01	561.39	0.99
Irritability/Agitation	18.4 (10.6)	16.9 (11.1)	t = 2.09	575.83	0.04
Lethargy/Social Withdrawal	11 (9.3)	10.8 (9.3)	t = 0.35	603.89	0.73
Stereotypic Behavior	3.4 (4.4)	3.6 (4.3)	t = -0.68	604.35	0.50
Number of recent stressors	8.3 (7.3)	8.3 (7.8)	U = 278,607	—	0.73
Number of psychiatric hospitalizations, past year	2 (2)	1.7 (1.2)	U = 23,634	—	0.35
Psychiatric hospitalizations, past 5 years	31%	26%	$\chi^2 = 3.52$	1	0.07
Number of ED visits, past year	1.2 (5.2)	0.7 (2)	U = 293,975	—	0.01
ED visit, past 5 years	38%	31%	$\chi^2 = 0.89$	1	0.07
Jailed, past 5 years	7%	3%	$\chi^2 = 6.50$	1	0.02
Number of psychiatric medications					
0	5%	2%	$\chi^2 = 5.79$	4	0.22
1	6%	4%			
2-3	27%	28%			
4-5	33%	36%			
6+	29%	30%			

Notes: Test statistics refer to t test (t), Chi-square test ( $\chi^2$ ), and Mann–Whitney U test (U).

**TABLE 3. Psychiatric Conditions of START Individuals With IDD at Intake, Stratified by Age**

Psychiatric Conditions at Intake*	30–49 years Frequency (%) (n = 1,188)	50+ years Frequency (%) (n = 464)	Test Statistic	df	p Value
Major depressive disorder	21%	24%	$\chi^2 = 1.75$	1	0.19
Bipolar and related disorders	20%	20%	$\chi^2 = 0.00$	1	1.00
Schizophrenia	11%	17%	$\chi^2 = 14.07$	1	<0.01
Disruptive impulse control disorders	17%	13%	$\chi^2 = 4.11$	1	0.04
Schizoaffective disorder	12%	12%	$\chi^2 = 0.00$	1	0.97
Generalized anxiety disorder	7%	11%	$\chi^2 = 6.65$	1	0.01
Depressive disorders (other)	12%	10%	$\chi^2 = 1.70$	1	0.20
Anxiety disorder (other)	9%	9%	$\chi^2 = 0.01$	1	0.92
Obsessive compulsive disorder	8%	9%	$\chi^2 = 0.73$	1	0.39
Borderline personality disorder	11%	8%	$\chi^2 = 3.93$	1	0.05
Schizophrenia Spectrum Disorder	5%	7%	$\chi^2 = 1.13$	1	0.29
Other psychiatric disorder	9%	6%	$\chi^2 = 2.20$	1	0.14
Autism spectrum disorder	15%	5%	$\chi^2 = 32.42$	1	<0.01
Post-traumatic stress disorder	7%	5%	$\chi^2 = 3.60$	1	0.06
Intermittent Explosive Disorder	5%	4%	$\chi^2 = 1.29$	1	0.26
Substance use disorder	2%	3%	$\chi^2 = 0.40$	1	0.53
Attention deficit hyperactivity disorder	11%	2%	$\chi^2 = 40.44$	1	<0.01
Delusional disorder	1%	2%	$\chi^2 = 0.91$	1	0.35
Traumatic brain injury	1%	2%	$\chi^2 = 1.59$	1	0.21
Adjustment disorder	3%	2%	$\chi^2 = 0.65$	1	0.43
Neurocognitive disorder	1%	2%	$\chi^2 = 3.60$	1	0.06
Conduct disorder	1%	1%	$\chi^2 = 0.24$	1	0.63
Number of psychiatric diagnoses					<0.01
1	42%	50%	$\chi^2 = 12.02$	2	
2-3	49%	44%			
4+	9%	6%			

Notes: Test statistics refers to Chi-square test ( $\chi^2$ ). Frequency of psychiatric conditions were based on lifetime prevalence estimates.

\*The following psychiatric conditions were present in <1% of all individuals or one of the age groups and were therefore omitted from this table: antisocial personality disorder, Alzheimer's disease, disruptive mood dysregulation disorder, histrionic personality disorder, narcissistic personality disorder, oppositional defiant disorder, panic disorder, paranoid personality disorder, Parkinson's disease, reactive attachment disorder, separation anxiety, schizotypal personality disorder, skin-picking disorder, social anxiety disorder, specific phobia, stereotypic movement disorder, tic disorder.

prescribed. Almost two thirds of individuals were prescribed a mood stabilizer, and over half the individuals were prescribed an antidepressant and atypical antipsychotic. Older adults were significantly more likely to be prescribed antianxiety medications, while younger adults were more likely to be prescribed stimulants. Other differences in medication classes between age groups were negligible (Supplementary Table 1). The frequencies of medication types, stratified by the presence of psychiatric diagnoses, are summarized in Supplementary Table 2.

Over half the total sample reported two or more psychiatric diagnoses, as reported in Table 3, though older individuals reported fewer psychiatric diagnoses. The older individuals were less likely to have a lifetime prevalence of autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), disruptive impulse control disorders, and borderline personality disorders, yet more likely to have reported diagnoses of schizophrenia and generalized anxiety disorder (GAD). There were no age-related differences in the lifetime prevalence of other psychiatric conditions. Among the total

study population, white individuals were more likely to receive diagnoses of major depressive disorder, depressive disorders (other), GAD, and post-traumatic stress disorder compared to Black/African-American or other/Multiracial individuals (Supplementary Tables 3 and 4). Conversely, schizophrenia and schizoaffective disorders were more likely to be diagnosed among individuals who were Black/African-American or another race/Multiracial.

In contrast to psychiatric diagnoses, older individuals had more medical diagnoses than younger individuals (Table 4). In particular, older adults were significantly more likely to have gastrointestinal, endocrine, cardiovascular, hematological/oncological conditions, eye disorders, ear/nose/throat conditions, and musculoskeletal disorders, compared to the younger cohort.

**Multinomial Logistic Regression Models**

After adjusting for confounders, older adults, compared to younger adults, had significantly fewer psychiatric disorders (Table 5). Specifically, older adults

**TABLE 4. Medical Conditions of START Individuals With IDD at Intake, Stratified by Age**

Medical Conditions at Intake	30–49 years Frequency (%) (n = 1,188)	50+ years Frequency (%) (n = 464)	Test Statistic	df	p Value
Neurologic	28%	32%	$\chi^2 = 2.34$	1	0.13
Gastrointestinal	19%	30%	$\chi^2 = 23.28$	1	<0.01
Endocrine	20%	27%	$\chi^2 = 9.76$	1	<0.01
Cardiovascular	18%	27%	$\chi^2 = 14.77$	1	<0.01
Other	13%	14%	$\chi^2 = 0.21$	1	0.65
Hematology/Oncology	4%	8%	$\chi^2 = 10.92$	1	<0.01
Pulmonary disorders	6%	8%	$\chi^2 = 2.10$	1	0.15
Ear/Nose/Throat	4%	8%	$\chi^2 = 3.09$	1	0.08
Musculoskeletal disorders	4%	7%	$\chi^2 = 6.11$	1	0.02
Immunology/Allergy	7%	6%	$\chi^2 = 1.56$	1	0.22
Genitourinary	5%	6%	$\chi^2 = 1.10$	1	0.30
Eye disorders	3%	5%	$\chi^2 = 3.09$	1	<0.01
Obesity	7%	5%	$\chi^2 = 1.27$	1	0.26
Dermatology	4%	4%	$\chi^2 = 0.00$	1	1.00
Sleep disorder	5%	3%	$\chi^2 = 1.61$	1	0.21
Dental/Oral	2%	3%	$\chi^2 = 0.88$	1	0.35
Nutritional disorders	4%	3%	$\chi^2 = 0.21$	1	0.66
GYN/Pregnancy	2%	2%	$\chi^2 = 0.00$	1	1.00
Hepatic/Biliary	1%	2%	$\chi^2 = 1.23$	1	0.27
Infectious disease	1%	2%	$\chi^2 = 2.64$	1	0.11
Number of medical diagnoses					
0	27%	18%			
1	30%	25%	$\chi^2 = 30.76$	3	<0.01
2-3	30%	39%			
4+	13%	18%			

Notes: Test statistics refers to Chi-square test ( $\chi^2$ ).

**TABLE 5. Multinomial Logistic Regression Model for Association Between Age (50+ Yrs Versus 30–49 Yrs) and Number of Psychiatric Disorders at Intake**

	Number of Psychiatric Disorders			
	2–3 (vs 1) Relative Risk Ratio (95% CI)	2–3 (vs 1) z-value; p-value	4+ (vs 1) Relative Risk Ratio (95% CI)	4+ (vs 1) z-value; p value
Age (ref: 30–49 years)				
50+ years	0.69 (0.41, 0.96)	z = –2.68; p = 0.01	0.42 (–0.14, 0.97)	z = –3.07; p <0.01
Sex (ref: female)				
Male	0.93 (0.68, 1.18)	z = –0.61; p = 0.54	0.72 (0.28, 1.16)	z = –1.46; p = 0.14
Race (ref: white)				
Black/African-American	0.82 (0.49, 1.14)	z = –1.22; p = 0.22	1.05 (0.47, 1.62)	z = 0.16; p = 0.87
Other/Multiracial	0.45 (–0.45, 1.34)	z = –1.77; p = 0.08	1.47 (0.25, 2.69)	z = 0.62; p = 0.54
Ethnicity (ref: non-Hispanic)				
Hispanic	1.37 (0.90, 1.85)	z = 1.30; p = 0.19	1.43 (0.61, 2.25)	z = 0.86; p = 0.39
Living situation (ref: indep. living)				
Community-based group home	1.64 (1.26, 2.01)	z = 2.57; p = 0.01	1.29 (0.67, 1.91)	z = 0.80; p = 0.42
Family setting	1.02 (0.64, 1.40)	z = 0.09; p = 0.93	0.62 (–0.04, 1.29)	z = –1.40; p = 0.16
Institution/Hospital	1.41 (0.77, 2.05)	z = 1.06; p = 0.29	0.96 (–0.24, 2.15)	z = –0.07; p = 0.95
Other	1.81 (1.26, 2.37)	z = 2.11; p = 0.03	1.56 (0.67, 2.44)	z = 0.98; p = 0.33
Disability level (ref: none)				
Mild	0.38 (–0.13, 0.90)	z = –3.67; p <0.01	0.39 (–0.35, 1.13)	z = –2.48; p = 0.01
Moderate	0.29 (–0.25, 0.82)	z = –4.55; p <0.01	0.20 (–0.62, 1.030)	z = –3.75; p <0.01
Severe/Profound	0.28 (–0.32, 0.88)	z = –4.17; p <0.01	0.14 (–0.97, 1.24)	z = –3.56; p <0.01
Number of recent stressors	1.02 (1.00, 1.03)	z = 1.89; p = 0.06	1.05 (1.02, 1.08)	z = 3.25; p <0.01

Notes: p-values calculated using Wald two-tailed z-test.

were 31% less likely to have two to three psychiatric disorders (RR = 0.69, 95% confidence interval [CI]: 0.41–0.96,  $p = 0.01$ ) and 58% less likely to have four psychiatric disorders (RR = 0.42, 95% CI: –0.14 to 0.97,  $p < 0.001$ ), compared to younger adults. Disability level was significantly associated with the number of psychiatric disorders, with mild, moderate, and severe or profound levels of disability associated with having fewer psychiatric disorders, relative to no ID. Conversely, each additional recent stressor was associated with having more psychiatric disorders.

Older adults were significantly more likely to have two to three (RR = 1.87, 95% CI: 1.48–2.25;  $p < 0.001$ ) or four or more (RR = 2.12, 95% CI 1.67–2.57,  $p < 0.001$ ) medical conditions, relative to younger adults, even after adjusting for covariates (Table 6 and 6b). Older adults were also more likely to have one medical condition compared to none, though this was not statistically significant (RR = 1.33, 95% CI: 0.93–1.73;  $p = 0.16$ ). Increasing number of recent stressors was also significantly associated with a greater number of medical conditions, and males were less likely to have four or more medical conditions relative to females.

There was also some evidence of a positive association between older age and number of psychiatric

medications (Table 7a and 7b). Older individuals were more likely to be taking one psychiatric medication (RR = 2.03, 95% CI: 0.79–3.27,  $p = 0.26$ ), two to three psychiatric medications (RR = 3.02, 95% CI: 1.93–4.11,  $p = 0.05$ ), four to five medications (RR = 3.11, 95% CI: 2.02–4.20,  $p = 0.04$ ), and six or more psychiatric medications (RR = 2.56, 95% CI 1.47–3.65,  $p = 0.09$ ), all relative to taking no psychiatric medications, though the statistical significance of these associations differed across the number of psychiatric medications. These associations again accounted for demographic characteristics as well as disability level and number of recent stressors. As seen in the previous two models, increasing number of recent stressors was also associated with taking four or more medications. Lastly, increasing disability was associated with a greater number of psychiatric medications, though this finding was not statistically significant.

## CONCLUSION

In the present study, all individuals whose profiles were reviewed had significant behavioral health needs, as this is the basic rationale for a referral to the

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**TABLE 6A. Multinomial Logistic Regression Models for Association Between Age (50+ Yrs Versus 30–49 Yrs) and Number of Medical Conditions at Intake**

	Number of Medical Conditions			
	1 (vs 0) Relative Risk Ratio (95% CI)	1 (vs 0) z-value; p-value	2–3 (vs 0) Relative Risk Ratio (95% CI)	2-3 (vs. 0) z-value; p value
Age (ref: 30–49 years)				
50+ years	1.33 (0.93, 1.73)	z = 1.41; p = 0.16	1.87 (1.48, 2.25)	z = 3.19; p <0.001
Sex (ref: female)				
Male	0.91 (0.58, 1.25)	z = –0.52; p = 0.6	0.86 (0.53, 1.19)	z = –0.89; p = 0.37
Race (ref: white)				
Black/African-American	0.71 (0.28, 1.13)	z = –1.6; p = 0.11	0.78 (0.37, 1.20)	z = –1.17; p = 0.24
Other/Multiracial	0.92 (-0.1, 1.94)	z = –0.16; p = 0.88	0.85 (-0.20, 1.90)	z = –0.30; p = 0.76
Ethnicity (ref: non-Hispanic)				
Hispanic	1.05 (0.46, 1.64)	z = 0.16; p = 0.87	0.81 (0.20, 1.42)	z = –0.69; p = 0.49
Living situation (ref: indep. living)				
Community-based group home	1.26 (0.76, 1.76)	z = 0.92; p = 0.36	1.48 (0.98, 1.97)	z = 1.55; p = 0.12
Family setting	0.96 (0.48, 1.45)	z = –0.15; p = 0.88	0.93 (0.44, 1.42)	z = –0.30; p = 0.76
Institution/Hospital	1.69 (0.79, 2.59)	z = 1.15; p = 0.25	1.79 (0.90, 2.67)	z = 1.29; p = 0.2
Other	1.14 (0.38, 1.91)	z = 0.35; p = 0.73	1.3 (0.54, 2.05)	z = 0.68; p = 0.5
Disability level (ref: none)				
Mild	0.55 (-0.06, 1.17)	z = –1.89; p = 0.06	0.86 (0.21, 1.52)	z = –0.44; p = 0.66
Moderate	0.85 (0.20, 1.51)	z = –0.47; p = 0.64	1.20 (0.51, 1.89)	z = 0.51; p = 0.61
Severe/Profound	0.59 (-0.18, 1.37)	z = –1.32; p = 0.19	1.41 (0.63, 2.19)	z = 0.87; p = 0.39
Number of Recent Stressors	1.05 (1.03, 1.07)	z = 3.94; p <0.001	1.06 (1.04, 1.08)	z = 4.71; p <0.001

Notes: p-values calculated using Wald two-tailed z-test.

**TABLE 6B. Multinomial Logistic Regression Models for Association Between Age (50+ Yrs Versus 30–49 Yrs) and Number of Medical Conditions at Intake**

	Number of Medical Conditions	
	4+ (vs 0) Relative Risk Ratio (95% CI)	4+ (vs 0) z-value; p value
Age (ref: 30–49 years)		
50+ years	2.12 (1.67, 2.57)	z = 3.3; p <0.001
Sex (ref: female)		
Male	0.56 (0.16, 0.96)	z = –2.87; p <0.001
Race (ref: white)		
Black/African-American	0.86 (0.36, 1.36)	z = –0.59; p = 0.56
Other/Multiracial	0.43 (–1.24, 2.09)	z = –1.01; p = 0.31
Ethnicity (ref: non-Hispanic)		
Hispanic	0.75 (–0.05, 1.55)	z = –0.71; p = 0.48
Living situation (ref: indep. living)		
Community-based group home	1.39 (0.82, 1.96)	z = 1.12; p = 0.26
Family setting	0.47 (–0.15, 1.09)	z = –2.40; p = 0.02
Institution/Hospital	1.65 (0.62, 2.67)	z = 0.96; p = 0.34
Other	2.13 (1.33, 2.92)	z = 1.86; p = 0.06
Disability level (ref: none)		
Mild	0.58 (-0.14, 1.30)	z = –1.49; p = 0.14
Moderate	0.72 (–0.06, 1.49)	z = –0.84; p = 0.4
Severe/Profound	0.98 (0.09, 1.86)	z = –0.05; p = 0.96
Number of Recent Stressors	1.08 (1.05, 1.11)	z = 5.45; p <0.001

Notes: p-values calculated using Wald two-tailed z-test.



**TABLE 7A. Multinomial Logistic Regression Models for Association Between Age (50+ Versus 30–49 Yrs) and Number of Psychiatric Medications at Intake**

	Number of Psychiatric Medications			
	1 (vs 0) Relative Risk Ratio (95% CI)	1 (vs 0) z-value; p value	2-3 (vs 0) Relative Risk Ratio (95% CI)	2-3 (vs. 0) z-value; p value
Age (ref: 30–49 years)				
50+ years	2.03 (0.79, 3.27)	z = 1.12; p = 0.26	3.02 (1.93, 4.11)	z = 1.98; p = 0.05
Sex (ref: female)				
Male	1.08 (0.21, 1.95)	z = 0.17; p = 0.86	1.06 (0.32, 1.80)	z = 0.16; p = 0.88
Race (ref: white)				
Black/African-American	0.96 (–0.32, 2.24)	z = –0.07; p = 0.95	1.38 (0.33, 2.42)	z = 0.60; p = 0.55
Other/Multiracial	0.69 (–1.09, 2.47)	z = –0.41; p = 0.68	0.22 (–1.34, 1.78)	z = –1.90; p = 0.06
Ethnicity (ref: non-Hispanic)				
Hispanic	0.93 (–0.49, 2.34)	z = –0.11; p = 0.92	0.68 (–0.55, 1.90)	z = –0.63; p = 0.53
Living situation (ref: indep. living)				
Community-based group home	0.73 (–0.62, 2.09)	z = –0.45; p = 0.65	0.83 (–0.28, 1.95)	z = 0.38; p = 0.71
Family setting	1.62 (0.25, 2.98)	z = 0.69; p = 0.49	1.25 (0.09, 2.41)	z = –1.05; p = 0.29
Institution/Hospital	0.42 (–1.73, 2.57)	z = –0.79; p = 0.43	0.42 (–1.20, 2.04)	z = 0.40; p = 0.69
Other	4.85 (2.45, 7.24)	z = 1.29; p = 0.20	1.59 (–0.66, 3.84)	z = –0.63; p = 0.53
Disability level (ref: none)				
Mild	2.81 (1.39, 4.23)	z = 1.43; p = 0.15	2.27 (1.11, 3.42)	z = 1.39; p = 0.16
Moderate	1.02 (–0.55, 2.6)	z = 0.03; p = 0.98	2.00 (0.77, 3.22)	z = 1.11; p = 0.27
Severe/Profound	2.53 (0.80, 4.27)	z = 1.05; p = 0.29	1.86 (0.43, 3.29)	z = 0.85; p = 0.39
Number of recent stressors	1.04 (0.98, 1.11)	z = 1.22; p = 0.22	1.02 (0.96, 1.08)	z = 0.65; p = 0.51

Notes: p-values calculated using Wald two-tailed z-test.

**TABLE 7B. Multinomial Logistic Regression Models for Association Between Age (50+ Versus 30–49 Yrs) and Number of Psychiatric Medications at Intake**

	Number of Psychiatric Medications			
	4-5 (vs 0) Relative Risk Ratio (95% CI)	4-5 (vs 0) z-value; p value	6+ (vs 0) Relative Risk Ratio (95% CI)	6+ (vs 0) z-value; p value
Age (ref: 30-49 years)				
50+ years	3.11 (2.02, 4.20)	z = 2.05; p = 0.04	2.56 (1.47, 3.65)	z = 1.69; p = 0.09
Sex (ref: female)				
Male	1.06 (0.33, 1.79)	z = 0.16; p = 0.87	1.21 (0.48, 1.95)	z = 0.51; p = 0.61
Race (ref: white)				
Black/African-American	1.48 (0.44, 2.51)	z = 0.74; p = 0.46	1.17 (0.13, 2.22)	z = 0.30; p = 0.76
Other/Multiracial	0.16 (–1.41, 1.74)	z = –2.26; p = 0.02	0.25 (–1.28, 1.78)	z = –1.79; p = 0.07
Ethnicity (ref: non-Hispanic)				
Hispanic	1.02 (–0.17, 2.22)	z = 0.04; p = 0.97	0.74 (–0.47, 1.96)	z = –0.48; p = 0.63
Living situation (ref: indep. living)				
Community-based group home	0.97 (–0.14, 2.07)	z = –0.06; p = 0.95	0.84 (–0.27, 1.95)	z = –0.30; p = 0.76
Family setting	1.19 (0.03, 2.34)	z = 0.29; p = 0.77	0.94 (–0.21, 2.10)	z = –0.10; p = 0.92
Institution/Hospital	0.47 (–1.14, 2.07)	z = –0.93; p = 0.35	0.39 (–1.23, 2.02)	z = –1.13; p = 0.26
Other	2.37 (0.14, 4.59)	z = 0.76; p = 0.45	2.24 (0.01, 4.47)	z = 0.71; p = 0.48
Disability level (ref: none)				
Mild	2.02 (0.89, 3.15)	z = 1.22; p = 0.22	3.19 (2.02, 4.36)	z = 1.94; p = 0.05
Moderate	1.71 (0.51, 2.92)	z = 0.88; p = 0.38	2.92 (1.68, 4.16)	z = 1.69; p = 0.09
Severe/Profound	1.47 (0.07, 2.88)	z = 0.54; p = 0.59	2.32 (0.87, 3.77)	z = 1.14; p = 0.25
Number of recent stressors	1.06 (1.01, 1.12)	z = 2.07; p = 0.04	1.08 (1.02, 1.13)	z = 2.52; p = 0.01

Notes: p-values calculated using Wald two-tailed z-test.

START program. Rates of lifetime psychiatric diagnoses, psychiatric hospitalization, emergency service use, and incarceration occurred less often among the group aged 50 and older. Older individuals also had lower scores on the irritability subscale of the ABC, measuring primarily externalizing behaviors.

The findings noted above are similar to some prior research of individuals with IDD.<sup>24,25</sup> Axmon et al. explored psychiatric service events for nearly 8,000 adults with IDD aged 55 and older contrasting these with a comparable group from the general population.<sup>24</sup> People with IDD had more psychiatric encounters in general, and when psychiatrically hospitalized, stayed longer than individuals without IDD. However, with increasing age (65 and older), the effect for more psychiatric morbidity was “attenuated.” The authors speculated that hospitalizations were often prompted by externalizing behaviors with or without an acute psychiatric event for the individuals with IDD.

Schizophrenia and GAD were reported more often for individuals age 50 and older. The reasons for these differences could not be determined from the data available in the current study. However, historically there may have been a tendency to diagnose people with schizophrenia and other psychotic disorders, when they actually met criteria for ASD or for other IDD.<sup>26</sup> Some authors have speculated that individuals with IDD may be misdiagnosed as having psychotic disorders because of their cognitive impairments or atypical thinking styles. It is possible that some individuals had been diagnosed with schizophrenia and no longer meet criteria, though we do not have that data. It is unclear why older adults presented with GAD more often than younger adults in the present investigation. This is in contrast to what Lever and Geurts found in their study comparing psychiatric symptoms and diagnoses among different age groups of adults with ASD: adults aged 55–79 years were less likely to meet diagnostic criteria for social phobia among other psychiatric disorders, though their study was limited to people with ASD and not IDD in general.<sup>28</sup> Our results align with findings in the general population, in that, besides dementia, anxiety disorders are among the most prevalent psychiatric syndromes identified in older adults in community samples.<sup>29,30</sup>

Older individuals may less often be identified as having ASD and ADHD than younger individuals for

a number of reasons. Importantly, ASD and ADHD have traditionally been conceptualized of as childhood disorders. In particular, the finding that ASD is less prevalent in older adults may reflect prior lack of awareness of the condition and shifting diagnostic criteria rather than actual decline in prevalence across the lifespan. When researchers have applied modern tools and criteria in the assessment of adults, adult rates are more similar to the higher rates now identified among youth.<sup>31</sup> Indeed, many older adults with ASD could be misdiagnosed or undiagnosed as having the disorder.<sup>26</sup>

It was not surprising that older individuals appear to present with both lower scores on the ABC irritability subscale (likely reflecting less severe aggression) and a lower rate of emergency department visits and psychiatric hospitalizations. Aggressive and disruptive behaviors are often drivers of emergency mental health service use.<sup>32</sup> We also found that individuals with more severe ID were less likely to be labeled with psychiatric diagnoses than those without ID. This may be due, in part, to the fact that diagnostic criteria for many psychiatric syndromes rely on patients’ self-report about their internal states. Related to this, it has been recognized that communication difficulties and lack of assessment tools adapted for people with IDD contribute to challenges in making accurate psychiatric diagnoses.<sup>33</sup>

Stressful events may also contribute to psychiatric outcomes in the population. In the current study, the frequency of reported recent stressors was associated with a relative increase in the likelihood of being prescribed more medications. Numerous studies have identified a relationship between stressful events and psychiatric illness in people with IDD, as well as a tendency to employ significant rates of polypharmacy in the treatment of people with IDD seen for psychiatric care.<sup>34,35</sup>

Our finding of a positive association between increased age and medication use is also consistent with data from previous studies.<sup>18,20,21</sup> Older individuals may take high numbers of psychiatric medications because prescribers may be hesitant to remove medications over time, even when ongoing efficacy has not been established. Indeed, other studies have found that once psychotropics – particularly antipsychotics – are prescribed, they are unlikely to be withdrawn over time.<sup>22,34</sup> The combination of a high number of

psychiatric medications, chronic health conditions, and challenges in neurocognitive function in older individuals with IDD puts them at risk of side effects, drug-drug interactions, falls, and delirium with potential severe consequences.<sup>36–38</sup> Older people in the present investigation had more medical problems. Prior research has established associations between medical problems, medication side effects and need for inpatient psychiatric care.<sup>39</sup> Individuals with IDD in emergency behavioral health related respite care have also been described with polypharmacy and high rates of suspected adverse drug events.<sup>40</sup> More efforts to provide continued education about the complexities of prescribing for older adults with IDD may be helpful, and might include guidance for carrying out necessary drug reductions and discontinuation. It has been suggested that multidisciplinary assessment and use of multiple treatment modalities are an important part of improved psychotropic use in adults with IDD.<sup>41</sup> Fewer prescription medications could mean fewer side effects; lower healthcare costs; and improved well-being, functional ability, and overall health.

Within the total study population, we found that schizophrenia and schizoaffective disorder were more likely to be diagnosed among individuals who were Black/African-American or another race/Multi-racial, and major depression, other depressive disorders, GAD, and post-traumatic stress disorder were more likely to be diagnosed among white individuals. Although we did not find a difference in bipolar disorder diagnoses among races, the racial disparity in psychotic disorder diagnoses is similar to that found in the general population and likely reflects clinician bias and differential access to care.

A limitation of our study is that psychiatric diagnoses were based on chart review on intake to the START program. The diagnoses were not made by a clinician interview or standardized assessment and thus may not reflect true disorders (e.g., the prevalence of ASD may not truly be lower in older adults with IDD). Moreover, individuals may have received a diagnosis of schizophrenia at one point, yet their symptoms were not persistent and prominent, and thus they could have been misdiagnosed. Our data were also limited in that we do not know how many individuals had diagnoses of schizophrenia yet no longer meet criteria. Similarly, we do not have data on the indications for prescribed medications, so we cannot comment on whether prescribing reflects

diagnostic biases or systematic errors. Another limitation is that individuals referred to START represent a group at high risk of behavioral health crises, restricting the generalizability of our findings. We used 50 years old as the cut-off for “older adults” because of the highly skewed age distribution in this sample. It is important to note the heterogeneity of psychiatric profiles in this population, however. Future research with larger samples of “older adults” are needed to better understand the needs of this population.

Strengths of our study include the large sample size of more than 1,500 individuals, with racial/ethnic and geographic diversity within the U.S. Our study includes a large number of older adults over the age of 50 with IDD – a group often overlooked in the literature – and highlights age-associated differences in psychiatric diagnoses, prescribed medications, and service use.

Future prospective and population-based studies of older adults with IDD are needed to evaluate how psychiatric illnesses, health issues and medication use evolve with aging. Examination of resilience in older individuals with IDD could help identify ways to mitigate morbidity and mortality and improve quality of life. Other areas of potential research include ways to minimize polypharmacy in adults with IDD through education and multidisciplinary medication reviews, as well as the development of programs to target nutritional supports and exercise to improve psychiatric health.

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## AUTHOR CONTRIBUTIONS

EW contributed to the conception and design of the study, drafted the work, approved the final version to be published, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy and integrity of any part of the work are appropriately investigated and resolved. CH contributed to the conception and design of the study, substantially contributed to the analysis and interpretation of data for the work, drafted and substantially revised the draft critically for important intellectual content, approved the final version to be published, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy and integrity of any part of the work are appropriately investigated and resolved. AK contributed to

the conception and design of the study, substantially contributed to the acquisition of data for the work, revised the draft critically for important intellectual content, approved the final version to be published, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy and integrity of any part of the work are appropriately investigated and resolved. AC, LC, JB, and JBB contributed to the conception and design of the study, revised the draft critically for important intellectual content, approved the final version to be published, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy and integrity of any part of the work are appropriately investigated and resolved.

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## DISCLOSURE

*The authors wish to thank the Center for START Services at the University of New Hampshire Institute on Disability UCED START program network and the individuals it serves.*

*The authors report no conflicts with any product mentioned or concept discussed in this article.*

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## SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.jagp.2021.05.022>.

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