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Association between psychotropic medication polypharmacy and an objective measure of balance impairment among middle-aged adults: Results from the US National Health and Nutrition Examination Survey

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Abstract

Objective: Psychotropic medications (e.g., antidepressants, anxiolytics, neuroleptics) are increasingly prescribed with two or more taken concurrently (polypharmacy), and have been associated with increased risk of falling. This study examined the association between psychotropic medication use and balance impairment using an objective balance measure.

Methods: Data come from participants aged 40+ years in the US National Health and Nutrition Examination Survey (1999/00–2003/04) who completed the Modified Clinical Trial of Sensory Interaction and Balance (mCTSIB) and indicated current medications (N=3,090). Balance impairment was defined as failing the mCTSIB condition #4 (standing on foam surface, eyes closed). Medication use included specific psychotropic classes, a count of psychotropic medications, and a count of non-psychotropic medications taken concurrently. Nested multiple logistic regression assessed relationships between medication use and balance impairment, adjusting for covariates and complex sampling.

Results: One third of participants had balance impairment. After accounting for medical comorbidities, there was no relationship between individual classes of psychotropic medications and balance impairment. After adjusting for all covariates, there was a dose-response relationship between the number of psychotropic medications taken and balance impairment, with every additional medication associated with 35% higher odds (Odds Ratio=1.35; 95% Confidence Interval: 1.07–1.70). In comparison, there was no increase in odds of balance impairment

Compliance with Ethical Standards

Conflicts of Interest: Drs. Bareis, Sando, Mezuk and Cohen have no conflicts of interest to report. The NHANES is approved by the CDC/NCHS IRB/ERB Protocol #98–12 and all participants provided informed consent.

associated with each additional medication taken for participants only taking non-psychotropic medications.

Conclusions: Psychotropic medication polypharmacy is associated with increased odds of balance impairment. Clinicians should exercise caution when prescribing combinations of psychotropic medications, and refer to physical therapy for assessment and treatment if balance impairment is detected.

1. INTRODUCTION

Psychotropic medications (i.e., antidepressants, mood stabilizers, anxiolytics and antipsychotics) are among the most commonly prescribed classes of medications in the US¹. A recent study from the Centers for Disease Control and Prevention (CDC) found that antidepressants were the most frequently prescribed medications among individuals aged 12+ years in the US, and that between 1999 and 2014 antidepressant use increased overall in all age groups². As of 2014, 17% of US adults aged 40–59 years and 20% of US adults aged 60+ years were taking antidepressants³. This increase was due, in part, to a widening array of illnesses treated by antidepressants, which includes not only depression, but also chronic pain⁴ and smoking cessation⁵. Anxiolytics are used to treat anxiety and sleep disorders, and between 2009 and 2012 were taken by almost 8% of middle-aged women and 7% of middle-aged men³. Although mood stabilizers are not as commonly prescribed, they have also seen a substantial increase in all age groups, up more than 4 times from 1988–2012, from 1.4% to 4.1%³. Finally almost 2% of the US population aged 18 years and over filled antipsychotic prescriptions in 2013⁶.

Many individuals take more than one psychotropic medication concurrently, whether in the same or different drug families (i.e., polypharmacy and complex polypharmacy, respectively)⁷. This is a common practice in the treatment of individuals with complex psychiatric disorders such as bipolar disorder, schizophrenia and other psychotic disorders⁸, and severe depression⁹. For example, in a nationally representative sample of adults visiting office-based psychiatrists Mojtabai, et al. found that the most common polypharmacy combinations were antidepressants with anxiolytics¹⁰.

While psychotropic medications are effective treatments for many people, these medications have been associated with numerous adverse effects, including syncope, vision problems, and drowsiness that can impair balance¹¹. Balance involves coordination of input from the vestibular, visual and musculoskeletal systems. If psychotropic medications impair any of these systems poor balance can result¹². An estimated 15% of US adults had a balance or dizziness problem in 2008, a prevalence that increases substantially with age¹³. The CDC noted that from 1999 to 2006, over 75% of adults aged 70 years and older had balance impairment¹⁴. Balance impairment substantially increases an individual's risk of falling¹². Falls are a public health problem leading to morbidity and mortality especially among older adults in the United States, with one in four adults aged 65+ years reporting falling¹⁵. Multiple falls are most common for these older individuals, which lead to increased health care costs and hospitalization. In 2014, almost 29% of community dwelling older adults had

a fall and approximately 38% needed treatment or reduction in movement for at least one day after that fall ¹⁶.

Numerous studies have investigated the relationship between psychotropic medication use and balance impairment. For example, Corbeil et al. found that risperidone increased body sway in a dose response manner among healthy young men ¹⁷. However, the sample size was small (N=12), and did not include women. Sirven, et al., conducted a meta-analysis assessing the impact of antiepileptic drugs (mood-stabilizers) on balance complaints using data from randomized controlled trials of these treatments for epilepsy, and found that antiepileptic drugs were associated with more balance complaints relative to placebo. However, these studies were limited to individuals with epilepsy, and did not objectively measure balance impairment, only self-reported complaints ¹⁸. Williams, et al. reported that antidepressant, benzodiazepine, and combined use of both of these drugs were each associated with falls among middle-aged women; however, this study did not include men and did not examine effects of mood stabilizers or antipsychotics ¹⁹.

Reflecting these findings, the Beers Criteria provides prescribing guidance to clinicians for older adults. These criteria recommend against prescribing many classes of psychotropic medications, particularly benzodiazepines and tricyclic antidepressants due to concerns about falling risk ²⁰. However, the existing literature on psychotropic medications and balance impairment remains limited in many ways: first, most studies have relied on relatively small samples (e.g. ¹⁷), few have examined the full complement of psychotropic medications (e.g. ¹⁹), and most have relied on self-report complaints of balance impairment or falling history rather than objective measures of balance (e.g. ¹⁸).

The goal of this study was to use an objective measure of balance to examine the relationship between psychotropic medication use, including medication polypharmacy, and balance impairment in a nationally-representative sample of middle-aged and older US adults. We tested whether: 1) taking any psychotropic medication was associated with elevated odds of balance impairment and 2) there was a relationship between specific psychotropic medication families (e.g. antidepressants, anxiolytics, mood stabilizers, antipsychotics), psychotropic polypharmacy, and non-psychotropic medication polypharmacy and balance impairment.

2. METHODS

2.1 Sample

Data for these analyses came from the National Health and Nutrition Examination Survey (NHANES). NHANES is an ongoing, nationally-representative, cross-sectional study designed to assess the health and nutrition status of civilian, non-institutionalized individuals of all ages in the United States. Data are released in two-year cycles, with between 9,000 and 12,000 participants in each cycle. Household interviews were conducted in participants' homes using a computer-assisted personal interview system. Unique to this survey is the Mobile Exam Center (MEC), a field office in which a subset of participants undergo multiple examinations, including audiometry, balance, blood pressure, body measurements,

blood and other clinical tests. Further details regarding NHANES study design can be found elsewhere ²¹.

2.1.1 Participants—This analysis is limited to the NHANES cycles from 1999–2000, 2001–2002 and 2003–2004 because these were the only years in which the main outcome of interest, the MEC Modified Clinical Trial of Sensory Interaction and Balance (mCTSIB), was administered. The mCTSIB was only administered to participants aged 40 years and older. Response rates for the overall sample were between 79 and 84%, and between 76 and 80% for the MEC subsample, during these three cycles ²². This analysis was limited to participants age 40 years and over who completed the mCTSIB and provided complete data on medications they were currently taking. With these restrictions, the total analytic sample size was n=3,090.

The NHANES is approved by the CDC/NCHS IRB/ERB Protocol #98–12 and all participants provided informed consent. This analysis used only publicly-available data available at <http://www.cdc.gov/nchs/nhanes/>.

2.2 Measures

2.2.1 Outcome—Performance on the mCTSIB was the outcome of interest. The mCTSIB is an objective measure of balance designed to assess sensory contributions to standing balance ²³. The vestibular, visual and proprioceptive systems are tested via the mCTSIB using four conditions of increasing difficulty: 1) standing on a firm surface with eyes open for 15 seconds, 2) standing on a firm surface with eyes closed for 15 seconds, 3) standing on a foam (soft) surface with eyes open for 30 seconds and 4) standing on a foam (soft) surface with eyes closed for 30 seconds ^{23, 24}. The test was administered by trained NHANES personnel, and participants were assigned a Pass or Fail after an initial test failure and one re-test failure for each condition (i.e., if the participant failed the first test, they were only categorized as a Fail if they failed the re-test as well. If they passed the re-test then they were categorized as a Pass). Failure in the NHANES protocol was defined as either a) opening eyes in the eyes-closed condition, b) moving arms or feet, or c) beginning to fall. Too few individuals failed the mCTSIB conditions 1–3, leading to cell sizes that were too small to generate reliable results. Therefore, we were limited to using results from condition 4 for this study, standing on a foam (soft) surface with eyes closed for 30 seconds ²⁵.

2.2.2 Exposures—The main exposure of interest was the use of psychotropic medications. Data were derived from the NHANES Questionnaire Prescription Medications datasets, which standardize all medications using generic names or families (i.e., anxiolytic, tetracyclic). Medication use was confirmed via pill bottle checks during the household interview ²⁶. For this analysis, all generic names of psychotropic medications were identified and grouped into four families: 1) antidepressants, 2) mood stabilizers, 3) anxiolytics, and 4) antipsychotics using the National Drug Code Directory Pharm Class designation ²⁷. Psychotropic polypharmacy was specified by a count variable indicating whether an individual was taking none, one, two, three or four psychotropic medications concurrently. To assess whether this relationship was specific to psychiatric medications, as opposed to polypharmacy in general, a comparison group was created of individuals who only reported

taking non-psychotropic medications. A count variable indicating number of non-psychotropic medications taken concurrently (none to 20 medications) was created for this comparison.

2.2.3 Covariates—Demographic characteristics included age (in years), sex (female, male), race (categorized as non-Hispanic White, non-Hispanic Black, Hispanic and Other (Indian (American); Alaska Native; Native Hawaiian; Guamanian; Samoan; Other Pacific Islander; Asian Indian; Chinese; Filipino; Japanese; Korean; Vietnamese; Other Asian; Some Other Race)), education (categorized as less than 9th grade, 9–11th grade, high school graduate/General Educational Development (GED), some college/Associate in Arts degree (AA), and college graduate or above), and income quartiles.

Health conditions are a primary confounder of any study of medications and balance. In particular, heart conditions ²⁸, high (or low) blood pressure ²⁹, anemia ³⁰ and poor eyesight ³¹ can impair balance. Psychotropic medications are also taken for a variety of conditions other than psychiatric illnesses (e.g., antidepressants are taken to alleviate pain, mood stabilizers are also used for seizure disorders, and antipsychotics are used to treat symptoms of dementia). To account for this potential confounding, we included covariates for history of any previously identified chronic condition associated with both balance impairment or psychotropic medication use. This list included self-reported pain (i.e., joint pain, neck pain, low back pain, severe headaches or migraines), eyesight difficulties (“Do you have trouble seeing, even when wearing glasses or contact lenses, if you wear them?”), and lifetime history of diagnosis or treatment for diabetes, heart attack, angina, coronary heart disease, congestive heart failure, stroke, thyroid disease, past three months anemia, lifetime and current smoking (“Have you smoked at least 100 cigarettes in your entire life?” and “Do you now smoke cigarettes?”). Body mass index in kg/m² was calculated from measured weight and height while wearing light clothing (categorized as underweight = <18.5; normal weight = 18.5–24.9; overweight = 25.0–29.9; obese = 30 or greater) ³². Blood pressure was calculated as the average reading of systolic and diastolic measures from three measures taken while seated at the MEC (categorized as low/hypotension = < 90/60; normal = 90/60 – 119/79; at risk (pre-hypertension) = 120/80 – 139/89; high (hypertension) = 140/90 or greater) ^{33–35}.

2.3 Analysis

Nested multiple logistic regression models were fit to determine the relative odds of balance impairment for three types of exposures: (1) class of psychotropic medication (antidepressant, anxiolytic, mood stabilizers, and antipsychotics); (2) number of psychotropic medication classes taken concurrently; and, as a negative control, (3) number of non-psychotropic medications taken concurrently. Model 1 was unadjusted bivariate analyses, Model 2 adjusted for chronic health conditions, and Model 3 was fully adjusted for both chronic health conditions and demographic characteristics. Crude and adjusted odds ratios and 95% confidence intervals were estimated.

Analyses were conducted using SAS 9.4 survey procedures accounting for the complex sampling design of NHANES, as well as a special weight to account for the combination of

three cycles of survey data. All p-values refer to two-tailed tests, and p-values less than 0.05 were considered statistically significant.

3. RESULTS

Table 1 describes the demographic characteristics of the sample by mCTSIB performance and medication use. Approximately 51% of participants were taking only non-psychotropic medications, and approximately 13% were taking at least one psychotropic medication. The most common psychotropic medication family was antidepressants (N=263, 10.52%); less than 1% were taking antipsychotics (N=31, 0.87%). One in three participants had balance impairment; the prevalence of impaired balance was similar for those taking only psychotropic medications as compared to those taking only non-psychotropic medications (38.4% vs. 36.5%, respectively; Table 1). Those who failed the mCTSIB were older (61 vs. 54 years) and had a higher prevalence of all health conditions relative to the sample overall.

Those who were taking psychotropic medications were younger (54 vs. 58 years, $p<0.001$), more likely to be female although not significantly so (63% vs. 59%, $p=0.16$), and were more likely to be non-Hispanic White although not significantly different (86% vs. 80%, $p=0.10$) than those taking only non-psychotropic medications. In addition, when comparing the drug groups, blood pressure was lower ($p=0.007$) and those diagnosed with coronary heart disease were fewer ($p=0.0498$) in the only psychotropic drugs group, while those diagnosed with stroke were more ($p=0.02$), pain was greater ($p=0.003$) and having ever been a smoker was greater ($p=0.002$) in the only psychotropic medication group.

Table 2 defines the extent of psychotropic polypharmacy in the sample. As expected, polypharmacy was common among those taking psychotropic medications. Among those taking two or more psychotropic medications, antidepressants were the most common secondary medication family, with 63% of participants taking an antipsychotic, 53% of participants taking a mood stabilizer, and 46% of participants taking anxiolytics also taking an antidepressant. Participants taking antipsychotics were the most likely to be taking more than one psychotropic medication, with almost 40% also taking a mood stabilizer and 28% also taking an anxiolytic.

Figure 1 illustrates the percent of individuals taking psychotropic medications that also had balance impairment. Over 60% of participants taking antipsychotics had balance impairment, the highest of any psychotropic medication group. Mood stabilizers were the second highest, with almost 53% of individuals taking these medications also having balance impairment. Anxiolytics and antidepressants were the two lowest with 44% and 36% of participants taking these medications also having balance impairment respectively.

Table 3 details the results of the nested logistic regression models predicting balance impairment. In unadjusted models, several individual psychotropic medication families were significantly associated with impaired balance. These associations were strongest for antipsychotics (Odds Ratio (OR)=3.31; 95% Confidence Interval (CI): 1.20–9.17) and mood stabilizers (OR=2.44; 95% CI: 0.87–6.82), although the latter were not statistically significant. There was a dose response relationship between number of psychotropic

medications taken concurrently and balance impairment, with every additional medication taken associated with 36% higher odds of balance impairment (OR=1.36; 95% CI: 1.11–1.65). As a comparison, the analysis of non-psychotropic polypharmacy indicated that with every additional medication taken, there was an associated 19% higher odds of balance impairment (OR=1.19; 95% CI: 1.13–1.26).

Adjusting for chronic health conditions reduced the magnitude of the associations for each individual psychotropic medication family and balance impairment to null, except for a moderate association for antipsychotics (OR=3.31; 95% CI: 0.97–11.30). In the fully adjusted model the association between the antipsychotics and balance impairment was reduced to null; in contrast, in this final model there was a modest association between antidepressants and balance impairment (OR=1.38; 95% CI: 0.99–1.92). Even in fully-adjusted models, there was a dose-response relationship between psychotropic polypharmacy, with every additional medication associated with a 35% higher odds of balance impairment (OR=1.35; 95% CI: 1.07–1.70). In comparison, polypharmacy of non-psychotropic medications was not significantly associated with impaired balance in the fully-adjusted model (OR: 1.04; 95% CI: 0.98–1.10).

4. DISCUSSION

The primary finding from this study is that use of any specific family of psychotropic medications is not strongly associated with an objective measure of balance impairment among middle-aged adults. However, we found evidence that psychotropic polypharmacy was associated with balance impairment in a dose-response manner, with each additional medication taken associated with 35% higher odds of balance test failure. In comparison, taking only non-psychotropic polypharmacy was not associated with balance test failure. While balance impairment is just one component of fall risk, this study stands in contrast to prior analyses that had reported an association between psychotropic medications (particularly antidepressants and anxiolytics) and falls, particularly among older adults^{19, 36, 37}. This is one of the largest studies to date to examine psychotropic medication use and an objective measure of balance impairment, and one of the first to examine these relationships among middle-aged adults. Taken together, these findings suggest that psychotropic polypharmacy regimens may be associated with balance impairment above and beyond taking any one psychotropic medication alone or non-psychotropic polypharmacy, even for middle-aged adults.

Psychotropic polypharmacy is a common method for treating psychiatric and other illnesses by both psychiatrists and general practitioners^{38, 39}; this practice reflects care guidelines which encourage augmenting partially successful treatment with additional medications before changing to a new monotherapy regimen^{38, 39}. However, these findings suggest some caution is warranted, particularly for patients with other fall risk factors; practitioners should consider referral to physical therapy for assessment of patients treated with polypharmacy for balance impairment and determination of fall risk.

4.2 Strengths and Limitations

4.2.1 Strengths—These findings should be interpreted in light of study strengths and limitations. This is one of the first studies to test the association between psychotropic medication use and balance using an objective measure of balance impairment with a nationally-representative sample of middle-aged adults. Psychotropic medication use was confirmed via visual inspection of pill bottles in participants' homes. Finally, because of the wealth of health information available in this survey we were able to account for other health conditions that may confound the association between psychotropic medication use and balance.

4.2.2 Limitations—However, there are important limitations to consider. Despite combining all cycles which administered the mCTSIB, psychotropic medication sample sizes were still limited, particularly for some of the less frequently prescribed medication families. Additionally, only participants aged 40 years and over were administered the mCTSIB test, but only participants under age 40 years were administered mental health modules to determine whether they met the criteria for panic disorder, generalized anxiety disorder and depressive disorders during these cycles. Thus, we were unable to determine how many individuals with psychiatric conditions were also taking psychotropic medications in this sample. Additionally, although information on a large number of chronic conditions were assessed in NHANES, epilepsy was not included, which is primarily treated with anti-epileptic medications that can also serve as mood stabilizers¹⁸. The mCTSIB is not the gold standard for assessing balance impairment in clinical settings⁴⁰. In addition, we only used condition 4 in our analysis, therefore we could not determine which of the systems associated with balance (i.e., vision, proprioception (joint position in space) or vestibular) were affected by psychotropic medication polypharmacy. Other factors we could not examine here, such as magnitude of visual impairment and muscle strength, also contribute to balance⁴¹; thus, our findings reflect only part of the relationship between psychotropic medication use and balance impairment.

5. Conclusions

As reflected in the Beers Criteria, balance impairment is a concern in the care for older adults due to their increased fall risk generally, and due to medical complications that persist after a fall¹¹. Our findings suggest that polypharmacy itself may be associated with balance impairment, however, the Beers Criteria address fall risk associated individually with antidepressants, antipsychotics and anxiolytics; mood stabilizers are not included, and the only criteria regarding psychotropic polypharmacy concerns taking multiple antidepressants²⁰. Moreover, our findings suggest that concerns of balance impairment associated with polypharmacy extend to include middle-aged adults as well, not just geriatric care. Future research on this issue is warranted, particularly studies across a complete range of aging, studies of newer psychotropic medications, and studies employing a more comprehensive measure of balance.

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Key Points

- Failing condition 4 of the Modified Clinical Trial of Sensory Interaction and Balance (standing on a soft surface with eyes closed) defined balance impairment.
- This is an objective measure of balance impairment, unlike the self-reported falls from questionnaires or chart reviews commonly used in these analyses.
- Individuals aged 40+ years taking only psychotropic medications had 35% increased odds of balance impairment with every additional psychotropic medication taken (i.e., polypharmacy) compared to taking no medication; individuals taking only non-psychotropic polypharmacy had no increase in balance impairment compared to taking no medication.

Figure 1.

Prevalence of balance impairment in full sample, among adults who only take non-psychotropic medications, and by each psychotropic family among adults who take at least one psychotropic medication. Unweighted N (weighted %).

Balance impairment operationalized as failing mCTSIB condition 4.

Unweighted N (weighted %): Full Sample (31.75%); Non-Psychotropic: only taking non-psychotropic medication (36.53%); Antidepressant (36.39%); Mood Stabilizer (52.75%); Anxiolytic (44.05%); Antipsychotic (60.38%).

Psychotropic medication family sample sizes are not mutually exclusive due to polypharmacy.

Table 1.

Demographic characteristics of participants by medication use.

	Full Sample	Only non-psychotropic medication	Only psychotropic medication	Difference between medication groups
N (%)	3090	1634/3090 (51.22)	348/3090 (13.48)	
Age (M, SE)	54.49 (0.33)	57.66 (0.38)	53.90 (0.72)	p<0.01
Female (N, %)	1522 (51.92)	905 (58.54)	209 (63.40)	p=0.16
Race (N, %)				p=0.10
Non-Hispanic White	1704 (78.47)	970 (80.27)	249 (85.69)	
Non-Hispanic Black	560 (8.88)	302 (8.84)	48 (5.97)	
Hispanic	752 (9.24)	321 (7.62)	41 (4.71)	
Other *	74 (3.41)	41 (3.27)	10 (3.64)	
Education (N, %)				p=0.31
Less than 9 th Grade	463 (6.33)	214 (6.51)	31 (4.96)	
9–11 th Grade	475 (11.95)	233 (11.28)	49 (11.79)	
High school graduate or GED	723 (25.09)	411 (26.50)	83 (23.34)	
Some College or AA	774 (28.66)	411 (27.65)	107 (33.04)	
College Graduate or Above	655 (27.96)	365 (28.07)	78 (26.87)	
Income Quartiles (N, %)				p=0.67
\$0-\$9,999	334 (7.54)	165 (7.59)	41 (8.69)	
\$10,000–\$24,999	876 (20.77)	462 (21.72)	99 (21.79)	
\$25,000–\$44,999	643 (19.23)	339 (18.48)	60 (15.94)	
\$45,000–\$75,000+	1237 (52.45)	668 (52.21)	148 (53.59)	
Balance Impairment (N, %)	1206 (31.75)	716 (36.53)	159 (38.36)	p=0.58
Psychotropic Medication Family				
Antidepressants (N, %)	263 (10.52)	--	263 (78.08)	
Mood Stabilizers (N, %)	46 (1.69)	--	46 (12.51)	
Anxiolytics (N, %)	104 (3.92)	--	104 (29.10)	
Antipsychotics (N, %)	31 (0.87)	--	31 (6.46)	
BMI, kg/m² (N, %)				p=0.62
Underweight (<18.5)	40 (1.22)	17 (0.95)	5 (1.49)	
Normal (18.5–24.9)	817 (29.24)	399 (27.20)	90 (28.54)	
Overweight (25.0–29.9)	1263 (39.13)	673 (39.51)	130 (36.09)	
Obese (30.0+)	970 (30.40)	545 (32.35)	123 (33.88)	
Blood Pressure, Systolic/Diastolic (N, %)				p<0.01
Low (<90/60)	5 (0.13)	3 (0.18)	2 (0.27)	
Normal (90/60–119/79)	993 (38.43)	453 (32.86)	128 (43.30)	
At Risk (120/80–139/89)	1232 (39.03)	657 (40.10)	134 (37.33)	

	Full Sample	Only non-psychotropic medication	Only psychotropic medication	Difference between medication groups
High (140/90 or greater)	860 (22.41)	521 (26.85)	84 (19.10)	
Diabetes (N, %)	406 (9.39)	292 (12.63)	71 (14.54)	p=0.37
Congestive Heart Failure (N, %)	95 (2.40)	69 (3.14)	18 (4.63)	p=0.16
Coronary Heart Disease (N, %)	171 (4.92)	140 (7.82)	24 (5.41)	p<0.05
Angina (N, %)	143 (4.18)	100 (5.47)	32 (7.88)	p=0.15
Heart Attack (N, %)	157 (4.06)	120 (5.71)	27 (6.66)	p=0.51
Stroke (N, %)	94 (2.38)	61 (2.98)	25 (5.50)	p=0.02
Thyroid (N, %)	298 (10.24)	223 (14.38)	49 (14.35)	p=0.99
Anemia (N, %)	73 (2.21)	47 (2.88)	9 (2.37)	p=0.66
Pain (N, %)	1522 (49.87)	870 (52.16)	220 (62.17)	p=0.02
Eyesight (N, %)	685 (19.29)	352 (17.98)	99 (26.06)	p<0.01
Ever Smoker (N, %)	640 (21.24)	257 (16.29)	84 (25.94)	p<0.01

Values are unweighted N (weighted %) and weighted mean (SE) as indicated.

Balance impairment was operationalized as failing mCTSIB condition 4.

* Other includes: Indian (American); Alaska Native; Native Hawaiian; Guamanian; Samoan; Other Pacific Islander; Asian Indian; Chinese; Filipino; Japanese; Korean; Vietnamese; Other Asian; Some Other Race

AA: Associate in Arts degree; BMI: Body Mass Index; GED: General Educational Development; kg/m²: kilograms per meter squared

Table 2.

Extent of psychotropic polypharmacy among participants taking at least one psychotropic medication.

	Antidepressant	Mood Stabilizer	Anxiolytic	Antipsychotic
Antidepressant (N, %)	--	25 (8.50)	46 (17.27)	18 (5.19)
Mood Stabilizer (N, %)	25 (53.06)	--	7 (18.14)	8 (20.27)
Anxiolytic (N, %)	46 (46.34)	7 (7.80)	--	9 (6.27)
Antipsychotic (N, %)	18 (62.78)	8 (39.26)	9 (28.24)	--
No other psychotropic medication families (N, %) *	188 (57.56)	17 (4.87)	53 (14.28)	9 (1.24)

Values are unweighted N (row weighted %)

* unweighted N (column weighted %)

Table 3.

Logistic regression analyses determining odds of balance impairment (mCTSIB condition 4 failure) by psychotropic medication use.

	Outcome: Balance Impairment		
	Model 1: Crude	Model 2: Adjusted ^a	Model 3: Adjusted ^b
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Psychotropic medication Families			
Antidepressant (ref=No)	1.26 (1.01–1.57) *	1.11 (0.82–1.49)	1.38 (0.99–1.92) [‡]
Mood Stabilizer (ref=No)	2.44 (0.87–6.82) [‡]	2.13 (0.75–6.03)	2.32 (0.85–6.35)
Anxiolytic (ref=No)	1.73 (1.05–2.86) *	1.33 (0.82–2.16)	1.43 (0.91–2.24)
Antipsychotic (ref=No)	3.31 (1.20–9.17) *	3.31 (0.97–11.30) [‡]	2.69 (0.79–9.24)
Count of non-psychotropic medications (ref=None)	1.19 (1.13–1.26) **	1.14 (1.08–1.20) **	1.04 (0.98–1.10)
Count of psychotropic medications (ref=None)	1.36 (1.11–1.65) **	1.22 (0.98–1.52) [‡]	1.35 (1.07–1.70) *

[‡]p<0.1

*p<0.05

**p<0.01

Sample sizes for psychotropic medication families are not mutually exclusive due to polypharmacy.

Crude: Unadjusted model.

^a= Adjusting for Covariates: Body Mass Index, Blood Pressure, Diabetes, Congestive Heart Failure, Coronary Heart Disease, Angina, Heart Attack, Stroke, Thyroid problems, Anemia, Ever Smoked, Pain and Eyesight problems

^b= Adjusting for Model 2 and Age, Sex, Race, Education, and Income