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Patterns and Disparities in Prescribing of Opioids and Benzodiazepines for Older Adults in North Carolina

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Abstract

Background: We characterized real-world prescribing patterns of opioids and benzodiazepines (BZDs) for older adults to explore potential disparities by race and sex and to characterize patterns of co-prescribing.

Methods: A retrospective evaluation was conducted using electronic health data for adults ≥65 years old who presented to one of 15 primary care practices between 2019–2020 (n=25,141). Chronic opioid and BZD users had ≥4 prescriptions in the year prior, with at least one in the last 90 or 180 days, respectively. We compared demographic characteristics between all older adults versus chronic opioid and BZD users. We used logistic regression to identify characteristics (age, sex, race, Medicaid use, falls history) associated with opioid and BZD co-prescribing.

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Results: We identified 833 (3.3%) chronic opioid and 959 chronic BZD users (3.8%) among all older adults seen in these practices. Chronic opioid users were less likely to be Black (12.7% vs. 14.3%) or other non-White race (1.4% vs. 4.3%), but more likely to be women (66.8% vs. 61.3%). A similar trend was observed for BZD users, with less prescribing among Black (5.4% vs. 14.3%) and other race (2.2% vs. 4.3%) older adults and greater prescribing among women (73.6% vs. 61.3%). Co-prescribing was observed among 15% of opioid users and 13% of BZD users. Co-prescribing was largely driven by the presence of relevant co-morbid conditions including chronic pain, anxiety, and insomnia rather than demographic characteristics.

Conclusions: We observed notable disparities in opioid and BZD prescribing by sex and race among older adults in primary care. Future research should explore if such patterns reflect appropriate prescribing or are due to disparities in prescribing driven by biases related to perceived risks for misuse.

Keywords

prescribing; primary care; outpatient; healthcare disparities; pharmacoepidemiology

INTRODUCTION

Disparities in healthcare exist across race and sex in the United States, including the prescribing of opioids and benzodiazepines (BZDs). Women are more likely to be prescribed and fill BZD prescriptions than men, and non-White patients are less likely to be prescribed and fill BZDs compared to White patients.[1–4] Men of all races and Black patients are less likely to be prescribed and fill opioids,[4–6] and co-prescribing of opioid and BZD is more likely among women and less likely among Black patients.[7,8]

Despite concerns around the use of BZD and opioids among older adults due to increased risk of adverse effects, research suggests that the use of these medications is increasingly prevalent in older adults.[9,10] While opioids may be considered appropriate for chronic pain treatment, BZDs, often used in the treatment of insomnia and anxiety, are rarely appropriate for long-term use in older adults. Despite the risks of concurrent use, the proportion of older adults receiving both has more than doubled in the last 15 years.[7]

Pharmacoequity, ensuring that all individuals have access to the appropriate medications required to manage their health needs, regardless of race, sex, age, and other socioeconomic factors, is of great importance.[11] Though literature suggests racial and sex disparities in the prescribing of opioids and BZDs, the effects of race and sex on the prescribing of these medications among older adults specifically remain unknown. Prior research has focused on the broader adult population, with little exploration of whether such patterns hold true among older adults, who have a higher prevalence of co-morbid conditions for which opioids and BZDs may be prescribed, yet are at heightened risk for harms. Furthermore, inadequate pain relief for older adults, particularly Black and Hispanic men, have both short- and long-term implications for pain and physical function.[12] Inadequate prescribing of these medications can limit participation in daily activities and result in other health issues. Recognizing that both underuse and overuse can cause harm in older adults, pharmacoequity maintains that neither skin color nor age or other socioeconomic factors should influence

the provision of these medications. The objectives of this study were to evaluate potential disparities in prescribing of opioids and BZDs among older adults and to identify factors associated with co-prescribing of opioids and BZDs.

METHODS/DESIGN

Design.

We present a comparison of demographic characteristics for older adult chronic opioid and BZD users versus the entire older adult patient population of 15 primary care practices in North Carolina (NC). Analyses were conducted using pre-intervention data from a randomized pragmatic trial funded by the Centers for Disease Control and Prevention (registered at clinicaltrials.gov [NCT04272671]). The objective of that trial was to evaluate the effectiveness of pharmacist-initiated deprescribing recommendations to primary care prescribers for patients aged ≥65 years old who were at risk for falls due to chronic opioid and/or BZD use.[13] Practices were part of the UNC Physician Network of the UNC Health System, a large public academic medical center. Practices were located in 14 of the 100 counties throughout NC, of which 78 are considered rural. Of the 15 clinics included in this analysis, 10 were located in rural counties.

Data Sources.

Adults aged 65 or older who were seen at one of the 15 primary care practices in the year prior to implementation of the pragmatic trial (2019–2020) were included. Data was extracted from the electronic health record (EHR) in the year prior to the intervention. Demographic information included age, sex, race, rurality (based on clinic location), and Medicaid use. We evaluated prior fall history based on self-reported responses to screening questions in the EHR. Clinical characteristics included relevant co-morbid conditions for which opioids and BZDs may be prescribed and were extracted from the problem list in the EMR.

We extracted data on prescription orders to identify patients who were chronic users of opioids and BZDs based on preliminary analyses.[13] Prescription orders included those that originated from a provider at one of the 15 clinics. Chronic opioid use was defined as having at least four prescription orders in the prior year with at least one in the last 90 days. Chronic BZD use was defined as having at least four prescription orders in the prior year, with at least one in the last 180 days. Using data from prescription orders, we calculated each patient's average daily exposure to opioids and BZDs using morphine milligram equivalents (MMEs) and diazepam milligram equivalents (DMEs). High-level exposure was defined as receiving ≥50 MMEs per day for opioids and ≥ 10 DMEs per day for BZDs.

Statistical Analysis.

Demographic characteristics between the overall older adult population and those who were chronic opioid or BZD users were compared based on frequencies and proportions. We calculated the median and IQR for each patient's average daily MMEs or DMEs as well as the proportion of patients with higher-level exposures. Each comparison was conducted for chronic opioid users and chronic BZD users separately. An intersectionality variable was

created to evaluate potential differences in chronic prescribing by race and sex (e.g., White women, Black women, etc.). Two sample z tests were run to compare the proportions of chronic opioid users and non-opioid users as well as chronic BZD users and non-BZD users in each of the intersectional demographic categories.

Finally, we conducted parallel analyses to identify demographic characteristics that might be associated with chronic co-prescribing of both opioids and BZDs. Unadjusted and adjusted odds ratios for factors associated with co-prescribing were obtained using logistic regression. Fully adjusted models including all demographic and clinical characteristics described above. Logistic regression models were subset first to chronic opioid users to identify factors associated with co-prescribing of benzodiazepines among opioid users and then subset to chronic BZD users to identify factors associated with co-prescribing of opioids among BZD users.

RESULTS

We identified 25,120 older adults for this study. (Table 1). Most were under 80 years old (65–69: 29.6%; 70–79: 47.7%; 80–89: 19.5%; 90+: 3.2%), women (61.3%), White (81.9%), and were seen in clinics located in rural counties (59.2%). Fifteen percent of older patients self-reported a fall in the last year.

Among older patients, 3.3% (n=833) had chronic opioid prescriptions, with 20% receiving multiple opioid prescriptions concurrently (Table 1). The median daily MMEs was 13.2, with 12.5% prescribed greater than 50 MMEs per day. The most prescribed opioids were tramadol (36.5%), hydrocodone (28.3%), and oxycodone (26.1%). Chronic opioid users (Figure 1, Table S1) were more likely to be White women (56.2% vs. 49.1%, $p<0.001$) and less likely to be Black men (3.2% vs. 4.9%, $p=0.03$), other race women (1.1% vs. 2.3%, $p=0.02$), or other race men (0.4% vs. 1.43%, $p=0.01$).

Among older patients, 3.8% (n=959) had chronic BZD prescriptions, with 7.9% receiving multiple BZD prescriptions (Table 1). The median daily DMEs was 7.6, with 25.4% being prescribed greater than 10 DMEs per day. The most prescribed BZDs were alprazolam (34.5%), clonazepam (23.3%), and lorazepam (22.8%). Chronic BZD users (Figure 1, Table S1) were more likely to be White women (68.1% vs. 48.6%, $p<0.001$) and less likely to be White men (24.3% vs. 32.9%, $p<0.001$), Black women (4.1% vs. 9.9%, $p<0.001$), or Black men (1.4% vs. 4.9%, $p<0.001$).

Among chronic opioid and BZD users, 15.4% and 13.4%, respectively were co-prescribed both medications. Select factors associated with co-prescribing in adjusted logistic regression models are presented in Figure 2. Full results are presented in Table S2 and S3. Few demographic factors were associated with co-prescribing. However, the directionality of association was relatively consistent across most factors.

Among chronic opioid users, Black race was associated with reduced odds being prescribed BZDs in unadjusted analyses (OR=0.42 [0.20–0.89]) along with prior fall history (OR=1.50 [1.01, 2.23], but both were attenuated in adjusted analyses. Anxiety, major depression,

PTSD, and insomnia were associated with co-prescribing of BZDs in unadjusted and adjusted analyses.

Among chronic BZD users, having a primary care clinic in an urban county was associated with reduced odds of being prescribed opioids in both unadjusted and adjusted analyses (aOR=0.25 [0.13,0.50]). Medicaid use was associated with increased odds of being prescribed opioids in unadjusted analyses [OR=2.40 [1.45, 3.97], but this was attenuated in adjusted analyses. Among chronic BZD users, individuals who were co-prescribed opioids were nearly two times as likely to have fallen in the year prior (aOR=1.90 [1.23, 2.95]). Chronic pain was associated with an increased likelihood of opioid prescribing, along with co-morbid depression and PTSD, in unadjusted and adjusted analyses.

DISCUSSION

Consistent with other studies, our study showed significant differences in the use and prescribing of opioids and BZDs by sex, race, and geographic location.[1–8,14,15] Disparities in prescribing, are of great importance considering that historically marginalized individuals disproportionally experience worse health outcomes and suboptimal care.[11,16,17] Considering the potential for abuse and misuse, it is also critical to recognize that such disparities may also contribute to overprescribing.[18,19]

Race and sex have long played a role in the prescribing of opioids and BZDs. Multiple studies have shown that Black/African American adults are less likely than their counterparts to receive opioids for pain management, even for severe pain.[20] Differences among race and sex are also shared among BZDs prescriptions. Several studies in the U.S. have consistently shown that White women are the most likely to receive BZDs.[1–4] Unlike these findings, one study in Europe revealed no significant differences in BZD use in older adults based on sex.[21] However, these results may not be generalizable due to differences in social constructs between Europe and the U.S.

Our study adds to this literature by demonstrating that similar disparities in prescribing of opioids and BZDs exist in the older adult population, who have a higher prevalence of chronic pain and neuropsychiatric conditions. However, co-prescribing of both opioids and BZDs was more driven by co-morbid conditions, with little evidence of disparities by race and sex. While this may represent ongoing disparities in access to treatment and medications for non-Whites, these disparities may have inadvertently shielded them from the risks associated with BZD and prescription opioid overuse.[4,22] Benefits stemming from healthcare disparities are an atypical outcome but should not overshadow the underlying contributing factors.

Another potential factor contributing to the observed disparities in BZD use in older adults is the historical marketing of tranquilizers to White women in the late 1950s.[23,24] For example, a 1973 study investigating national patterns of psychotherapeutic drug use showed that women used minor tranquilizers – such as diazepam, chlordiazepoxide, and meprobamate – more than twice as often as men.[23] Historically, it has also been more culturally acceptable for women to report “psychic distress” and seek help, while men have tended to use other

substances, such as alcohol and marijuana, to manage anxiety.[23,24] Furthermore, as these drugs entered the market, non-Whites and individuals with lower incomes did not have equal access and were not viewed as sympathetically by healthcare providers, further contributing to disparities over time.[24]

Several limitations should be acknowledged. Most patients were seen in clinics located in rural counties, and thus we were unable to fully evaluate geographic disparities. Residency, specifically living in rural spaces, is a stronger predictor of having an opioid prescription, despite race.[14] However, this geographic distribution of rurality is relatively representative of NC, with most counties being rural. Regardless, further research is warranted to corroborate this phenomenon, recognizing that these findings are complex to interpret.[14] We were also unable to evaluate the influence of individual patient characteristics beyond those listed due to data restrictions, which only allowed us to access to clinic-level summary data for the overall 65+ population. We were also unable to evaluate influences on prescribing based on clinician- or clinic-level characteristics. However, the main strength of our study is that by using data from electronic health records, our findings highlight real-world patterns of medication prescribing for older adults seen in primary care.

CONCLUSIONS

The findings presented in our study combined with the findings of prior research demonstrate that disparities in the prescribing of opioids and BZDs also affect older adults. Whether a result of racism, bias, discrimination, or other prejudiced factors, these findings underscore the need for reform, especially given the higher prevalence of relevant co-morbid conditions in this population and research confirming that there is no difference in the prevalence of pain or other psychiatric symptoms across racial groups, and clinical measures may fail to integrate the differing experiences related to racial weathering.[25,26] Interventions to address these disparities might include training on equitable symptom assessment across patient groups or educational materials for discussing symptom management with input from a diverse group of stakeholders, that is inclusive of older patients and caregivers. Further research is needed to better understand prescriber perspectives on opioid and BZD use across patient groups to identify priority areas for such interventions.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

SPONSOR'S ROLE:

The sponsors of this work had no role in the design, analysis, interpretation, or decision to publish the findings reported in this manuscript.

DISCLOSURES:

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REFERENCES:

1. Maust DT, Lin LA, Blow FC. Benzodiazepine Use and Misuse Among Adults in the United States. Psychiatr Serv. 2019;70(2):97–106. [PubMed: 30554562]
2. Cook B, Creedon T, Wang Y, et al. Examining racial/ethnic differences in patterns of benzodiazepine prescription and misuse. Drug Alcohol Depend. 2018;187:29–34. [PubMed: 29626743]
3. Agarwal SD, Landon BE. Patterns in Outpatient Benzodiazepine Prescribing in the United States. JAMA Netw Open. 2019;2(1):e187399. [PubMed: 30681713]
4. Friedman J, Kim D, Schneberk T, et al. Assessment of Racial/Ethnic and Income Disparities in the Prescription of Opioids and Other Controlled Medications in California. JAMA Intern Med. 2019;179(4):469–476. [PubMed: 30742196]
5. Maciejewski ML, Zepel L, Hale SL, et al. Opioid Prescribing in the 2016 Medicare Fee-for-Service Population. J Am Geriatr Soc. 2021;69(2):485–493. [PubMed: 33216957]
6. Bernard DM, Encinosa W, Cohen J, et al. Patient factors that affect opioid use among adults with and without chronic pain. Res Social Adm Pharm. 2021;17(6):1059–1065. [PubMed: 32859504]
7. Rhee TG. Coprescribing of Benzodiazepines and Opioids in Older Adults: Rates, Correlates, and National Trends. J Gerontol A Biol Sci Med Sci. 2019;74(12):1910–1915. [PubMed: 30561526]
8. Cochran G, Lo-Ciganic WH, Gellad WF, et al. Prescription Opioid Quality Measures Applied Among Pennsylvania Medicaid Enrollees. J Manag Care Spec Pharm. 2018;24(9):875–885. [PubMed: 30156454]
9. Weesie YM, Hek K, Schermer TRJ, et al. Use of Opioids Increases With Age in Older Adults: An Observational Study (2005–2017). Front Pharmacol. 2020;11:648. [PubMed: 32477127]
10. Olfson M, King M, Schoenbaum M. Benzodiazepine use in the United States. JAMA Psychiatry. 2015;72(2):136–142. [PubMed: 25517224]
11. Essien UR, Dusetzina SB, Gellad WF. A Policy Prescription for Reducing Health Disparities-Achieving Pharmacoequity. JAMA. 2021;326(18):1793–1794. [PubMed: 34677579]
12. Baker TA, Vasquez E, Minahan JA. Variability of Pain Outcomes and Physical Activity Among a Diverse Sample of Older Men: Is It More Than Just Race? Gerontol Geriatr Med. 2019;5:2333721419878587.
13. Niznik J, Ferreri SP, Armistead L, et al. A deprescribing medication program to evaluate falls in older adults: methods for a randomized pragmatic clinical trial. Trials. 2022;23(1):256. [PubMed: 35379307]
14. Prunuske JP, St Hill CA, Hager KD, et al. Opioid prescribing patterns for non-malignant chronic pain for rural versus non-rural US adults: a population-based study using 2010 NAMCS data. BMC Health Serv Res. 2014;14:563. [PubMed: 25407745]
15. Morden NE, Chyn D, Wood A, et al. Racial Inequality in Prescription Opioid Receipt - Role of Individual Health Systems. N Engl J Med. 2021;385(4):342–351. [PubMed: 34289277]
16. Kogut SJ. Racial disparities in medication use: imperatives for managed care pharmacy. J Manag Care Spec Pharm. 2020;26(11):1468–1474. [PubMed: 33119445]
17. Wang J, Zuckerman IH, Miller NA, et al. Utilizing new prescription drugs: disparities among non-Hispanic whites, non-Hispanic blacks, and Hispanic whites. Health Serv Res. 2007;42(4):1499–1519. [PubMed: 17610435]
18. Sehgal N, Manchikanti L, Smith HS. Prescription opioid abuse in chronic pain: a review of opioid abuse predictors and strategies to curb opioid abuse. Pain Physician. 2012;15(3 Suppl):ES67–92. [PubMed: 22786463]
19. Chou R, Ballantyne JC, Fanciullo GJ, et al. Research gaps on use of opioids for chronic noncancer pain: findings from a review of the evidence for an American Pain Society and American Academy of Pain Medicine clinical practice guideline. J Pain. 2009;10(2):147–159. [PubMed: 19187891]
20. Mossey JM. Defining racial and ethnic disparities in pain management. Clin Orthop Relat Res. 2011;469(7):1859–1870. [PubMed: 21249483]

21. Lukacisinova A, Fialova D, Peel NM, et al. The prevalence and prescribing patterns of benzodiazepines and Z-drugs in older nursing home residents in different European countries and Israel: retrospective results from the EU SHELTER study. BMC Geriatr. 2021;21(1):277. [PubMed: 33902474]

22. Cook JM, Marshall R, Masci C, et al. Physicians' perspectives on prescribing benzodiazepines for older adults: a qualitative study. J Gen Intern Med. 2007;22(3):303–307. [PubMed: 17356959]

23. Parry HJ, Balter MB, Mellinger GD, et al. National patterns of psychotherapeutic drug use. Arch Gen Psychiatry. 1973;28(6):18–74. [PubMed: 4707987]

24. Radke H The Magic Bullet. 2018(16). https://www.topic.com/the-magic-bullet. Published October 2018. Accessed May 20, 2022.

25. Edwards RR, Doleys DM, Fillingim RB, et al. Ethnic differences in pain tolerance: clinical implications in a chronic pain population. Psychosom Med. 2001;63(2):316–323. [PubMed: 11292281]

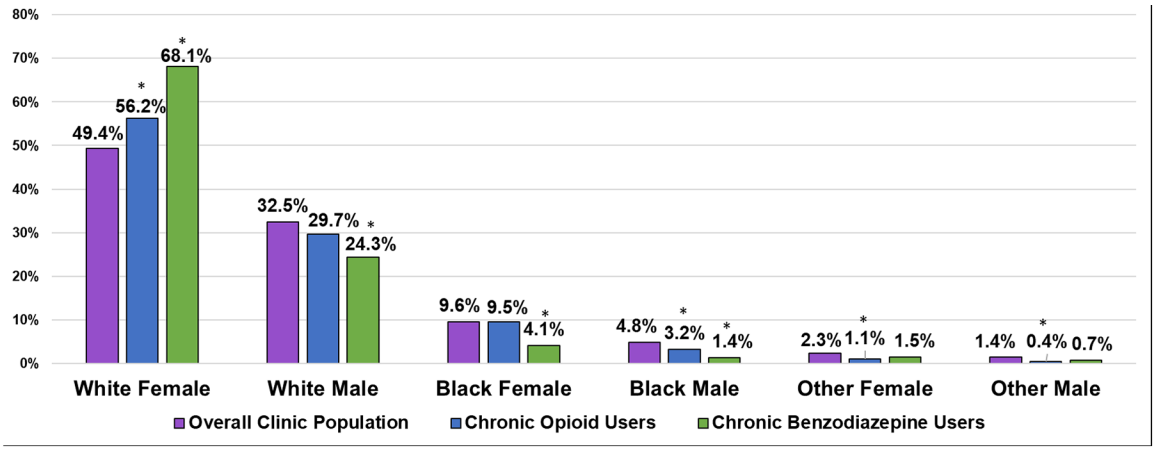
26. Campbell CM, Edwards RR. Ethnic differences in pain and pain management. Pain Manag. 2012;2(3):219–230. [PubMed: 23687518]

KEY POINTS:

- We observed notable disparities in opioid and benzodiazepine use by race and sex among older adults seen in primary care practices across 14 counties in North Carolina.
- White women were significantly more likely to be chronic users of opioids and benzodiazepines when compared to other patient groups.
- More than 10% of older adults who were using opioids or benzodiazepines were prescribed both medications concurrently, despite the known risks for serious adverse events.

WHY DOES THIS MATTER:

In an analysis of data from primary care practices in North Carolina, we identified potential disparities in the prescribing of opioids and benzodiazepines among older adults, with White women being most likely to be chronic users of both classes of medications. Our study confirms that prescribing disparities observed among younger adults in prior research are also present in the older adult population, despite a higher prevalence of co-morbid conditions for which opioids and BZDs may be prescribed. Older adults with co-morbid pain and psychiatric conditions were more likely to be prescribed both opioids and benzodiazepines, regardless of race. Selection of effective pharmacologic therapy to manage these conditions requires careful clinical consideration and monitoring. Although our findings may be interpreted as a protective effect for Black patients in terms of risk for adverse effects, it should be noted that disparities in prescribing may in fact be driven by biases related to differences in the perceived risks for misuse across groups. Our results highlight a clear need for future research to understand what factors contribute to such striking disparities in prescribing of these medications in the older adult population.



Interpretation: Among the overall clinic population, 49.4% were White Women. Among the population of chronic opioid users, 56.2% were White Women. Among the population of chronic benzodiazepine users, 68.1% were White Women.
* Denotes statistically significant difference ($p<0.05$) compared to overall clinic population based on two-sample Z-test.

Figure 1.
Representation Across Medication Cohorts by Race and Sex

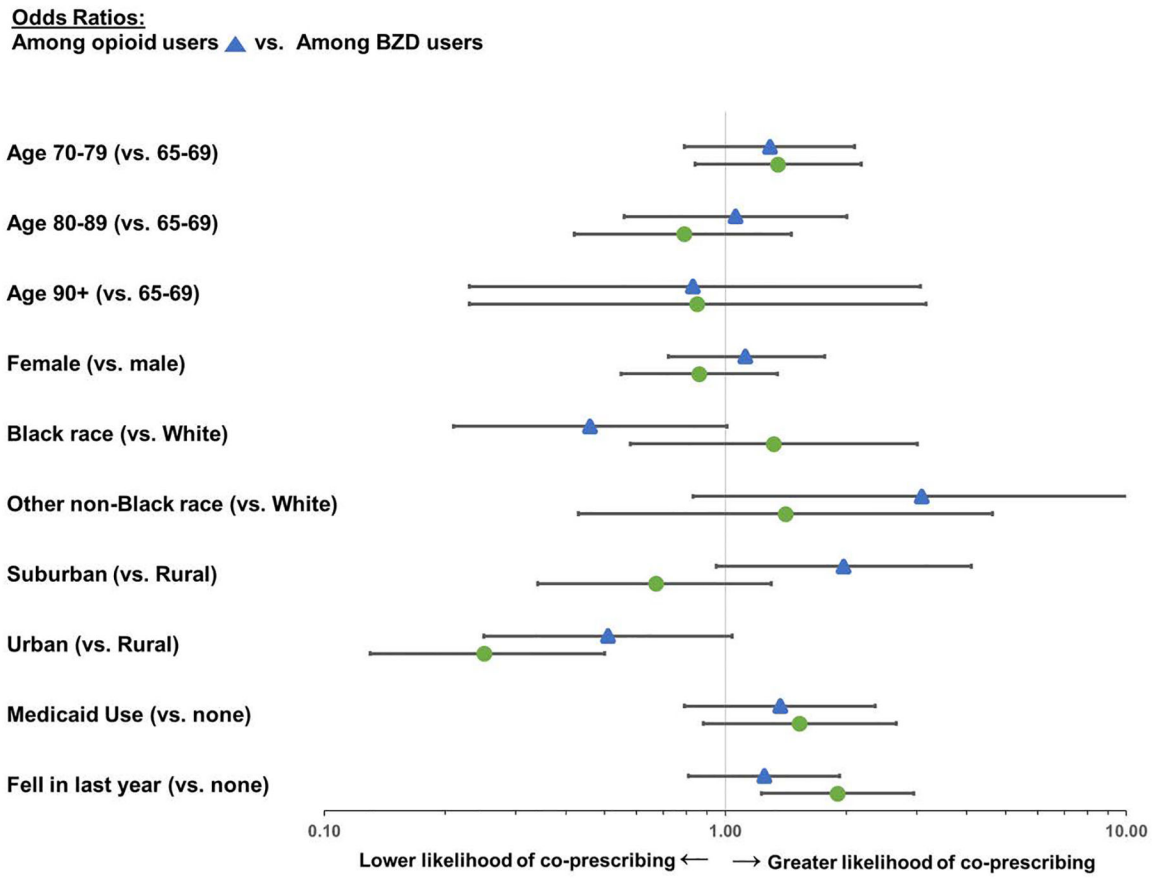


Figure 2.
Factors Associated with Co-Prescribing of Opioids and Benzodiazepines.

Table 1.

Baseline Characteristics for Adults 65+ with Chronic Opioid and or Benzodiazepine Use

	Overall Clinic Population n=25,120	Chronic Opioid Users n=833	Chronic Benzodiazepine Users n=959
Patient Demographics	**n(%)**	**n(%)**	**n(%)**
Age			
65–69	7,425(29.56%)	238 (28.57%)	284 (29.61%)
70–79	11,990 (47.73%)	400 (48.02%)	453 (47.24%)
80–89	4,899 (19.50%)	162 (19.45%)	197 (20.54%)
90+	806 (3.21%)	33 (3.96%)	25 (2.61%)
Sex *			
Male	9,733 (38.75%)	277 (33.3%)	253 (26.38%)
Female	15,385 (61.25%)	556 (66.75%)	706 (73.62%)
Race			
White/Caucasian	20,574 (81.90%)	715 (85.83%)	886 (92.39%)
Black	3,629 (14.45%)	106 (12.73%)	52 (5.42%)
American Indian or Alaska Native	54 (0.21%)	4 (0.48%)	2 (0.21%)
Asian	264 (1.05%)	2 (0.24%)	3 (0.31%)
Native Hawaiian or Pacific Islander	8 (0.03%)	0	0
Other Race	462 (1.84%)	2 (0.24%)	9 (0.94%)
Patient Refused	70 (0.28%)	2 (0.24%)	2 (0.21%)
Unknown	59 (0.23%)	2 (0.24%)	5 (0.52%)
Medicaid	Not available	136 (16.33%)	97 (10.11%)
Clinical Characteristics			
Have you fallen in the last year?			
Yes	3,799 (15.04%)	238 (28.57%)	201 (20.96%)
No	13,992 (55.70%)	434 (52.1%)	552 (57.56%)
Not collected	7,349 (29.26%)	161 (19.32%)	206 (21.48%)
Chronic Pain	Not available	811 (97.36%)	768 (80.08%)
Anxiety	Not available	157 (18.87%)	412 (43.01%)
Major Depression	Not available	250 (30.05%)	296 (30.90%)
Post-traumatic stress disorder	Not available	12 (1.44%)	17 (1.77%)
Insomnia	Not available	145 (17.43%)	256 (26.72%)
Clinics			
Rural	14,882 (59.24%)	668 (80.19%)	627 (65.38%)
Suburban	2,634 (10.49%)	52 (6.24%)	128 (13.35%)
Urban	7,604 (30.27%)	113 (13.57%)	204 (21.27%)
Prescriptions			
High level exposure *+	-	≥50 MMEs/day: 104 (12.48%)	≥10 DMEs/day: 244 (25.44%)

	Overall Clinic Population n=25,120	Chronic Opioid Users n=833	Chronic Benzodiazepine Users n=959
Patient Demographics	**n(%)**	**n(%)**	**n(%)**
Receiving multiple agents	-	168 (20.17%)	76 (7.92%)
Receiving Both Opioids and BZDs	-	128 (15.37%)	128 (13.35%)

* Calculated based on morphine milligram equivalents (MMEs) or diazepam milligram equivalents (DMEs) for opioids and benzodiazepines, respectively.

+ High level exposure for opioids was defined as ≥50 average daily MMEs; High level exposure for benzodiazepines was defined as ≥10 average daily DMEs.