Racial Differences in Sleep Medication Use:

A Cross-Sectional Study of the Johnston County Osteoarthritis Project

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Abstract

BACKGROUND—Little is known about racial differences in the use of sleep medications.

OBJECTIVES—To compare sleep medication use among African Americans and whites with self-reported current sleep problems.

METHODS—Participants were 1910 individuals (69% female, 34% African American, 66% white) from the Johnston County Osteoarthritis Project. We examined racial differences in self-reported current use of prescription, nonprescription, herbal, and other medications for sleep. Multivariable logistic regression models controlled for age, sex, education, health insurance, symptomatic hip or knee osteoarthritis, depressive symptoms, obesity, fair or poor general health, and self-reported annual days of sleep problems. Models were conducted separately for the whole sample and for men and women.

RESULTS—Among participants with current sleep problems, 31% were using one or more types of sleep medication: 17% prescription, 12% nonprescription, 1% herbal, and 3% other products. African Americans were less likely than whites to be using any sleep medication (25% vs 35%; p < 0.001), prescription sleep medication (14% vs 19%; p = 0.003), and nonprescription sleep medication (10% vs 13%; p = 0.048). These racial differences persisted in multivariable models. In sex-stratified analyses, there were significant racial differences in sleep medication use only among women.

CONCLUSIONS—African Americans were less likely than whites to report current use of prescription and nonprescription sleep medications; these results appeared to be largely driven by racial differences among women. Additional research should study possible underlying factors and determine whether these racial differences impact clinical outcomes.

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Keywords

race; sex; sleep medication

Sleep disturbances are increasingly common among adults, with a national survey showing that 54% of US adults report at least one symptom of insomnia a few nights a week or more and 33% report at least one symptom almost every night.[1] Difficulties with sleep can have a major impact on pain, quality of life, vocational performance, personal relationships, morbidity, and healthcare use.[1-4] Both prescription and nonprescription drugs are available to treat sleep problems, but relatively little has been reported regarding patient characteristics associated with use of sleep medications. Prior research indicates that there are sex- and age-related differences in physician prescribing practices and/or patient preferences for use of some types of sleep medications, but very little is known about racial differences.[5-8] Among patients with sleep difficulties in the National Ambulatory Medical Care Survey (1996–2001), healthcare visits by whites were more likely to be associated with prescriptions for sleep medications than visits by nonwhites, but that study included only individuals who were seeking care for sleep difficulty and may not necessarily reflect patterns in the general population.[7] Another study of adults in a metropolitan statistical area sample, not restricted to those with current sleep problems, reported that African Americans had lower use of prescription and nonprescription sleep medications than whites.[9] Because prior research has shown racial differences in drug use in general, further examination of racial differences in sleep medication use is warranted.[10-12] Our primary objective was to compare the use of prescription and nonprescription sleep medications among African Americans and whites with self-reported current sleep problems.

Methods

This study was conducted in compliance with the institutional review boards of the University of North Carolina, Chapel Hill; and the Durham Veterans Affairs Medical Center.

SUBJECTS

A cross-sectional sample was composed of individuals enrolled in the Johnston County Osteoarthritis Project, an ongoing study of the occurrence of knee and hip osteoarthritis in a rural, biracial population of North Carolina. Details of this study have been reported.[13] Briefly, this study involved civilian, noninstitutionalized adults aged 45 years and older who resided in 6 townships in Johnston County. Participants were recruited by probability sampling, with oversampling of African Americans. The sample for this analysis included individuals who had participated in either the first follow-up of the study conducted between 1999 and 2004 (n = 1733) or had been newly enrolled in 2003 or 2004 (n = 1015). New individuals were enrolled to enrich the sample for African Americans and younger individuals who were deliberately targeted for inclusion. As such, the newly enrolled participants were younger (mean age 65.8 y and 59.3 y in first follow-up and newly enrolled subsample, respectively) and more likely to be African American (28% vs 40%). For these analyses, 49 participants did not complete the sleep problem and sleep medication questions and were excluded, leaving 2699 (98% of the total sample of 2748: 1703 participants from the first follow-up and 996 from the newly enrolled group).

SLEEP PROBLEM QUESTIONS

We examined the use of sleep medications among the subsample of participants who reported having a current sleep problem. Questions about sleep problems were adapted from the Medical Outcomes Study sleep questionnaire.[14] The validity and reliability of the Medical Outcomes

Study sleep items have been established in a nationally representative sample of US adults.[15] Participants were asked, "Have you ever been troubled by any of the following problems?" These included trouble falling asleep, waking up during the night, waking up early and not being able to fall asleep again, falling asleep during the day, not getting enough sleep, and not feeling rested upon awakening in the morning. If participants indicated that they had ever been troubled by any of these 6 sleep problems, they were further asked whether they "currently have" that sleep problem. We considered participants to have a current sleep problem if they indicated that they reported one or more of these sleep problems at the time of the survey. Additional details regarding the prevalence of specific sleep problems have been reported.[16]

We were also interested in assessing the frequency of participants' current sleep problems as an indicator of severity, since this may be associated with the use of sleep medications. Participants were asked the frequency (number of times per week) of each of the 6 sleep problems. If they had the sleep problem less than once per week, they were asked how many times per month; if less than once per month, they were asked how many times per year. From these data, we computed the annual frequency (total number of days per year) that participants reported being troubled by each of the sleep problems. Because of the similarity among some of the sleep questions, leading to possible problems with multicollinearity in multivariable models, we combined these items into 2 broader categories: insomnia (comprising trouble falling asleep, waking during the night, waking early) and insufficient sleep (comprising falling asleep during the day, not getting enough sleep, not feeling rested). The insomnia and insufficient sleep categories and their component questions were based on previous definitions of sleep disturbances.[17] For each participant, we calculated the mean annual days of sleep problems in these 2 categories.

SLEEP MEDICATION QUESTIONS

Participants were asked whether they were currently taking each of the following to help them sleep: prescription any, nonprescription (over-the-counter) medications, herbal medications, and other medications. (No specific examples of other sleep medications were provided to participants, but participants were permitted to report any drug they were taking to help them sleep.) We examined each of these categories separately and also created a composite variable indicating whether participants were taking any of these types of medication.

DEMOGRAPHIC AND CLINICAL CHARACTERISTICS

In addition to self-reported race (African American vs white), we also examined the following 10 participant characteristics as covariates because they have been associated with race, sleep problems, and/or medication use in some previous research: age, sex, education (≥12 vs <12 y), having any type of health insurance (yes or no), obesity (defined as body mass index [BMI] ≥30), depressive symptoms (defined as a Center for Epidemiologic Studies Depression Scale score ≥16), self-rated health compared with other people the same age ("Compared to other people of your age, how would you say your health is?"; categorized as excellent or good vs fair or poor), symptomatic hip or knee osteoarthritis, mean annual days of insomnia, and mean annual days of insufficient sleep (as described above).[17-23] Height without shoes was measured in centimeters and weight was measured in kilograms using a balance beam scale; BMI was calculated as kilograms per square meter. All participants underwent posteroanterior radiography of both knees with weight-bearing, using the SynaFlex positioning frame (Synarc Inc., San Francisco, CA). Supine anterior—posterior pelvis films were obtained for all men and women 50 years of age and older. All radiographs were read for Kellgren—Lawrence (K-L) score by a single bone and joint radiologist (JBR), without regard to a participant's clinical status. Previous assessment showed interrater and intrarater reliability of the radiologist to be high (weighted κ = 0.9).[24] Radio-graphic knee or hip osteoarthritis was defined as a K-L grade 2 or greater in at least one knee or hip. Participants were asked, "On most days, do you have

pain, aching, or stiffness in your… right/left hip/knee?" We defined symptomatic hip or knee osteoarthritis as the presence of both radiographic osteoarthritis and joint symptoms in the same joint.

ANALYSES

Because few participants reported using herbal and other sleep medications, we did not analyze these categories separately. χ^2 Tests were used to examine bivariate associations of participant race with the use of any type of sleep medication, prescription sleep medication, or nonprescription sleep medication. Next, we conducted multiple logistic regression models examining the association of race with use of any type of sleep medication, prescription sleep medication, and nonprescription sleep medication, controlling for the 10 covariates described above. Because prior research has shown that there are differences in medication use in general according to sex, we examined whether racial differences in sleep medication use varied according to sex.[25] While a cross-product term of the interaction of race and sex was not statistically significant in multivariable logistic models (p values = 0.12–0.25), there can be still meaningful additive interactions between variables.[26] We therefore conducted the analyses described above separately for men and women. To further explore the nature of potential interactions of race and sex, we examined associations between sex and sleep medication use among African American and white participants separately. All statistical analyses were performed using SAS PC, Version 9 (SAS Inc., Cary, NC). Any cases with missing data for variable(s) in a statistical model were deleted from that analysis. Missing data were minimal (Table 1 footnote).

Results

Among the sample of 2699 participants, 1910 (71%) reported having current sleep problems and were included in these analyses. Of those reporting current problems, 58% reported symptoms of both insomnia and insufficient sleep, 21% reported symptoms of insomnia only, and 21% reported symptoms of insufficient sleep only. Demographic and clinical characteristics of the study sample are presented in Table 1. Among this sample, 31% (n = 597) were using any type of sleep medication, 17% (n = 332) were using prescription sleep medications, 12% (n = 236) were using nonprescription sleep medications, 1% (n = 28) were using herbal sleep medications, and 3% (n = 56) were using other sleep medications. Some participants (n = 50) indicated using more than one category of sleep medication. Among those using other sleep medications, the most commonly reported were pain and arthritis drugs (n = 21), antidepressants (n = 6), antianxiety medications (n = 5), and muscle relaxants (n = 4).

African Americans in our study were significantly older, had a higher proportion of females, had a lower proportion of high school graduates and individuals with health insurance, and were more likely to be obese and to report depressive symptoms and fair or poor general health (Table 1). African Americans on average reported fewer days of insomnia symptoms and more days of insufficient sleep symptoms compared with whites, but neither of these differences was statistically significant. African Americans were less likely than whites to be using any type of sleep medication (p < 0.001), prescription sleep medication (p = 0.003), and nonprescription sleep medication (p = 0.048).

In a multivariable model including the 10 covariates (Table 2), African Americans were significantly less likely to report current use of any type of sleep medication. The following groups were significantly more likely to report current use of any sleep medication: females, those with health insurance, those with greater mean annual days of insomnia, and those with symptomatic hip or knee osteoarthritis, more depressive symptoms, and fair or poor general health.

African Americans were significantly less likely to report using prescription sleep medications when all other covariates were controlled for (Table 2). The following were significantly more likely to report using prescription sleep medications: females, those with health insurance, those with greater mean annual days of insomnia and insufficient sleep, and those with symptomatic hip or knee osteoarthritis, depressive symptoms, and fair or poor health; participants 55–64 years of age were less likely than those 45–54 years of age to report using prescription sleep medication.

African Americans were also significantly less likely to report using nonprescription sleep medications in the multivariable model (Table 2). The only other factor significantly associated with use of nonprescription sleep medication was greater number of days of insomnia; depression was of borderline significance (p = 0.052).

Among women in the sample, significantly lower proportions of African Americans than whites reported using any type of sleep medication (26% vs 38%, respectively; p < 0.001), prescription sleep medication (14% vs 21%, respectively; p = 0.002), and nonprescription sleep medication (11% vs 15%, respectively; p = 0.031). In multivariable models controlling for the 9 other covariates (Table 3), African American women were significantly less likely than white women to report using any type of sleep medication, prescription sleep medication, and nonprescription sleep medication Among men there were no significant racial differences in use of any type of sleep medication (African American 22%, white 27%), prescription sleep medication (African American 12%, white 15%), or non-prescription sleep medication (African American 10%, white 11%). In multivariable models controlling for the 9 other covariates (Table 4), African American men had lower odds compared with white men of reporting use of any type of sleep medication, prescription sleep medication, and nonprescription sleep medication, but none of these racial differences was statistically significant.

Among African Americans in the sample, there were no significant differences by sex in use of any type of sleep medication (males 22%, females 26%), prescription sleep medication (males 12%, females 14%), or nonprescription sleep medication (males 10%, females 11%). There were also no significant differences by sex in sleep medication use among African Americans in multivariable models controlling for other covariates. Among whites in the sample, significantly lower proportions of males than females reported using any type of sleep medication (27% vs 38%, respectively; p < 0.001), prescription sleep medication (15% vs 21%, respectively; p = 0.005), and nonprescription sleep medication (11% vs 15%, respectively; p = 0.036). In multivariable models controlling for the 9 other covariates, white women were significantly more likely than white men to report using any type of sleep medication (OR 1.68, 95% CI 1.29 to 2.21), prescription sleep medication (OR 1.55, 95% CI 1.11 to 2.17), and nonprescription sleep medication (OR 1.53, 95% CI 1.05 to 2.23).

Discussion

This study examined the association of race with the use of sleep medications among individuals in a community sample. Of the total sample, a relatively high proportion (71%) reported having some type of current sleep problem. Among those with self-reported sleep problems, 31% reported current use of some type of sleep medication. African Americans were less likely than whites to be taking any type of sleep medication, including prescription or nonprescription, even when controlling for important demographic and clinical characteristics and annual frequency of sleep problems. These racial differences are consistent with findings from previous studies among patients seeking treatment for sleep problems and a general sample of adults not selected for having sleep problems.[7,9] However, we also found that these racial differences were significant among women but not among men.

There are many possible factors that could underlie racial differences in sleep medication use. First, prior research has shown that African Americans use fewer medications in general than whites[12]; other research indicates that even when studies include patients who are diagnosed with specific conditions, African Americans are less likely than whites to take or be prescribed drugs for that illness.[27,28] Second, there may be racial differences in prescription drug insurance, which could influence the availability or out-of-pocket cost of medications used for treating sleep problems. However, previous research has shown that some racial differences in medication use persist when adjusting for prescription drug insurance, and income appears to be a more important contributing factor.[29] Third, patient preferences may contribute to these racial differences. While racial differences in the perception of sleep medications have not been previously examined, racial differences in the willingness to use other treatments have. For example, one study found that African Americans were less likely than whites to perceive use of antidepressants as acceptable.[30]

Stratified analyses also showed that racial differences in sleep medication use were significant for women but not for men. The larger sample size among women may have made it more likely to observe a statistically significant racial difference in this group compared with men. However, the magnitude of the racial difference in sleep medication use was clearly larger for women than for men. Specifically, white women had greater use of sleep medication (38%) than any of the other race/sex groups (22–27%). Further, there were significant differences by sex in sleep medication use among whites but not among African Americans. These results suggest that the observed overall differences by race and sex in sleep medication use were strongly driven by use in white women.

Symptomatic hip or knee osteoarthritis, depressive symptoms, fair/poor self-reported health, and female sex were also associated in multivariable models with greater likelihood of using sleep medications. These results extend the findings of prior research, in which each of these variables has been associated with the presence of sleep problems and/or greater odds of sleep medication use.[5,9,17,18,20,21] These factors may be associated with greater severity of sleep problems, leading to greater likelihood of medication use. Although we controlled for mean annual days of sleep insomnia and insufficient sleep, there may be other aspects of severity that we did not capture. In these models, insomnia symptoms (ie, trouble with falling or staying asleep) had a slightly stronger association with use of sleep medications than did symptoms of insufficient sleep (ie, feeling sleepy or unrefreshed during the day).

This study is one of the few to report the prevalence of sleep medication use among individuals with current sleep problems. The prevalence of prescription drug use in this study was much lower than in the National Ambulatory Medical Care Survey (17% vs 63%), probably because the ambulatory care survey included only patients who were currently seeking physician care for sleep problems, whereas our study involved a more general community sample that may have included individuals with less severe sleep problems.[7]

Strengths of this research include the large, community sample, use of multiple sleep questions, and inclusion of key covariates that have been associated with sleep problems and/or medication use in previous studies. There are some limitations related to data on sleep problems. First, there is generally a lack of consensus on how to define and identify sleep problems, particularly in large-scale epidemiologic studies. Second, we did not measure all aspects of sleep problem severity, such as how long it takes individuals to fall asleep or how many times they wake up at night. Third, participants were asked whether they had any current sleep problems, but we did not specify a time-frame, and participants may have differed in their interpretation of the term *current*. Fourth, since we assessed the use of sleep medications only among participants who reported having current sleep problems, we may have excluded individuals who had sleep problems that were well controlled by current medication use (and

therefore did not report current sleep problems). However, there were only 84 individuals (3% of total sample) who reported using sleep medications but did not report current sleep problems. We chose to focus only on those who reported current sleep problems because this approach includes a cleaner sample of individuals for whom there is a clear indication to consider the use of sleep medications. Inclusion of individuals who did not report current sleep problems but did report taking sleep medications would likely have supported (or even strengthened) the observed racial differences, since among those who did not report current sleep problems, the proportion of those who reported taking sleep medications was higher among whites than African Americans (13% vs 4%, respectively). Fifth, sleep medication use was assessed by participant self-report, and pharmacy records were not available. However, our analyses were restricted to current (not historical) medication use, which should minimize inaccuracies in self-reporting. This study was also limited to white and African American participants and those over age 45 years (including a sample enriched for younger individuals in this age range). This may limit the generalizability of the findings, and additional study is needed among other racial and ethnic groups as well as other age groups.

Conclusions

In summary, among this sample of individuals with self-reported sleep problems, African Americans were less likely than their white counterparts to be using prescription and nonprescription sleep medications, even when we controlled for other important demographic and clinical covariates. However, these results appeared to be largely driven by racial differences among women. Additional research should examine possible reasons for these differences in sleep medication use, including racial differences in sleep patterns and perceptions of sleep problem severity, physician prescribing patterns, patient preferences for nonpharmacologic therapies, acceptability of using sleep medications, and willingness to pay for sleep medications. Research should also examine whether racial differences in sleep medication use have any impact on short- or long-term clinical outcomes of sleep problems.

Acknowledgements

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Table 1

Selected Characteristics of Participants

Characteristic	Total Sample (N = 1910)	African American (n = 652)	White (n = 1258)
Age, %[a]			
45–54 y	43	36	47
55–64 y	33	35	32
≥65 y	24	29	21
Female, %[a]	69	72	68
High school graduate, %[a]	69	62	73
Health insurance, %[a]	93	89	94
Days of insomnia, mean ±SD	165 ± 139	158 ± 139	169 ± 139
Days of insufficent sleep, mean ±SD	172 ± 136	178 ± 132	169 ± 138
Symptomatic hip or knee osteoarthritis, %	30	33	29
Obese, %[a,b]	48	58	43
Depressive symptoms, %[a,c]	16	21	14
Fair or poor general health, %[a]	32	39	29
Any type of sleep medication use, %[a]	31	25	35
Prescription sleep medication use, %[a]	17	14	19
Nonprescription sleep medication use, %[a]	12	10	13

Missing data: 15 for age, 1 for sex and general health, 7 for prescription or nonprescription medication use, 10 for annual days of sleep problems.

[a] Significantly different according to race (p < 0.05).

[b] Body mass index ≥30.

[c] Center for Epidemiologic Studies Depression Scale ≥16.

Table 2

Overall Modeled Associations of Race and Other Participant Characteristics

Characteristic	Sleep Medication, OR (95% CI)		
	Any Type[a]	Prescription[a]	Nonprescription[a]
African American	0.56 (0.44 to 0.70)[a]	0.60 (0.45 to 0.79)[a]	0.69 (0.51 to 0.95)[a]
Age, y			
45–54	1.00	1.00	1.00
55–64	0.83 (0.63 to 1.10)	0.65 (0.46 to 0.91)[a]	0.88 (0.60 to 1.29)
≥65	1.04 (0.78 to 1.38)	0.76 (0.54 to 1.07)	1.21 (0.82 to 1.78)
Female	1.50 (1.20 to 1.90)[a]	1.42 (1.07 to 1.89)[a]	1.36 (0.99 to 1.86)
High school graduate	1.09 (0.86 to 1.38)	0.88 (0.66 to 1.16)	1.10 (0.80 to 1.52)
Health insurance	1.55 (1.01 to 2.40)[a]	2.79 (1.49 to 5.20)[a]	0.84 (0.49 to 1.42)
Mean annual days of insomnia[b]	1.02 (1.01 to 1.03)[a]	1.02 (1.01 to 1.03)[a]	1.01 (1.00 to 1.02)[a]
Mean annual days of insufficient sleep[b]	1.00 (0.99 to 1.01)	1.01 (1.00 to 1.02)[a]	0.99 (0.98 to 1.00)
Symptomatic hip or knee osteoarthritis	1.39 (1.11 to 1.74)[a]	1.35 (1.03 to 1.78)[a]	1.15 (0.85 to 1.56)
Obese[c]	1.01 (0.81 to 1.25)	0.79 (0.61 to 1.03)	1.25 (0.94 to 1.68)
Depressive symptoms[d]	2.23 (1.68 to 2.96)[a]	2.17 (1.58 to 2.97)[a]	1.43 (0.98 to 2.10)
Fair or poor general health	1.50 (1.18 to 1.89)[a]	1.75 (1.32 to 2.32)[a]	1.04 (0.75 to 1.44)

[a]Statistically significant difference (p < 0.05) compared with referent category (for categorical variables) or per unit increase (for continuous variables).

[b]Change in odds of medication use per each 10-day increase.

[c]Body mass index ≥30.

[d]Center for Epidemiologic Studies Depression Scale ≥16.

Table 3

Modeled Associations of Race and Other Participant Characteristics in Females

Characteristic	Sleep Medication, OR (95% CI)		
	Any Type[a]	Prescription[a]	Nonprescription[a]
African American	0.51 (0.39 to 0.66)[a]	0.55 (0.40 to 0.77)[a]	0.63 (0.43 to 0.90)[a]
Age, y			
45–54	1.00	1.00	1.00
55–64	0.86 (0.62 to 1.19)	0.66 (0.45 to 0.98)[a]	0.86 (0.55 to 1.34)
≥65	1.05 (0.76 to 1.47)	0.76 (0.51 to 1.12)	1.29 (0.83 to 2.01)
High school graduate	0.95 (0.72 to 1.25)	0.75 (0.54 to 1.05)	1.06 (0.73 to 1.55)
Health insurance	1.60 (0.96 to 2.65)	3.65 (1.68 to 7.96)[a]	0.75 (0.41 to 1.38)
Mean annual days of insomnia[b]	1.02 (1.01 to 1.03)[a]	1.02 (1.01 to 1.03)[a]	1.01 (1.00 to 1.02)
Mean annual days of insufficient sleep[b]	1.00 (0.99 to 1.01)	1.01 (1.00 to 1.02)[a]	0.99 (0.98 to 1.00)
Symptomatic hip or knee osteoarthritis	1.32 (1.01 to 1.73)[a]	1.31 (0.95 to 1.81)	1.05 (0.73 to 1.51)
Obese[c]	1.11 (0.86 to 1.43)	0.90 (0.66 to 1.22)	1.36 (0.97 to 1.91)
Depressive symptoms[d]	2.18 (1.57 to 3.03)[a]	1.95 (1.35 to 2.83)[a]	1.58 (1.02 to 2.46)[a]
Fair or poor general health	1.37 (1.04 to 1.80)[a]	1.74 (1.26 to 2.42)[a]	0.85 (0.58 to 1.24)

[a] Statistically significant difference (p < 0.05) compared with referent category (for categorical variables) or per unit increase (for continuous variables).

[b] Change in odds of medication use per each 10-day increase.

[c] Body mass index ≥30.

[d] Center for Epidemiologic Studies Depression Scale ≥16.

Table 4

Modeled Associations of Race and Other Participant Characteristics in Males

Characteristic	Sleep Medication, OR (95% CI)		
	Any Type	**Prescription**	**Nonprescription**
African American	0.71 (0.44 to 1.13)	0.73 (0.41 to 1.31)	0.88 (0.47 to 1.66)
Age, y			
45–54	1.00	1.00	1.00
55–64	0.79 (0.58 to 1.80)	0.63 (0.32 to 1.24)	1.00 (0.47 to 2.15)
>65	1.02 (0.78 to 1.38)	0.77 (0.94 to 1.53)	1.14 (0.51 to 2.51)
High school graduate	1.71 (1.07 to 2.74)[a]	1.44 (0.81 to 2.55)	1.42 (0.75 to 2.67)
Health insurance	1.36 (0.58 to 3.15)	1.51 (0.52 to 4.41)	0.95 (0.31 to 2.94)
Mean annual days of insomnia[b]	1.03 (1.01 to 1.04)[a]	1.02 (1.01 to 1.04)[a]	1.02 (1.00 to 1.04)[a]
Mean annual days of insufficient sleep[b]	1.01 (0.99 to 1.02)	1.00 (0.99 to 1.03)	1.00 (0.98 to 1.02)
Symptomatic hip or knee osteoarthritis	1.63 (1.06 to 2.52)[a]	1.53 (0.88 to 2.64)	1.55 (0.87 to 2.78)
Obese[c]	0.81 (0.53 to 1.24)	0.56 (0.32 to 0.96)[a]	1.08 (0.61 to 1.91)
Depressive symptoms[d]	2.50 (1.43 to 4.36)[a]	2.84 (1.52 to 5.26)[a]	1.25 (0.58 to 2.69)
Fair or poor general health	1.96 (1.24 to 3.10)[a]	1.91 (1.09 to 3.35)[a]	1.84 (0.99 to 3.41)

[a] Statistically significant difference (p < 0.05) compared with referent category (for categorical variables) or per unit increase (for continuous variables).

[b] Change in odds of medication use per each 10-day increase.

[c] Body mass index ≥30.

[d] Center for Epidemiologic StudiesDepression Scale ≥16.