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Posted Date: 18 December 2025

doi: 10.20944/preprints202512.1568.v1

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Article

Prevalence of Psychotropic Medications Use Among Lithuanian Elderly Patients Undergoing Arthroplasty: A Cross-Sectional Study

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Abstract

Background and Objectives: Benzodiazepines (BZDs) are among the most widely prescribed psychotropic drugs globally, and Lithuania is no exception. People with osteoarthritis (OA) often experience chronic pain before arthroplasty, which can cause insomnia, anxiety, and mood disturbances, sometimes leading to BZDs or Z drug prescriptions. The use of these medications, particularly over the long term, may adversely affect cognitive function and increase the risk of falls. Cognitive and psychomotor impairments may hinder rehabilitation, delay mobilization, and reduce quality of life after elective arthroplasty. The aim of this study was to evaluate the prevalence of psychotropic drugs among Lithuanian elderly patients undergoing elective arthroplasty. *Materials and Methods:* The study, approved by the Regional Bioethics Committee (No. BE-2-53), was conducted at the Department of Anesthesiology, Hospital of the Lithuanian University of Health Sciences Kaunas Clinics. Data on psychotropic medication use, underlying conditions, and treatment duration were obtained from the Hospital's Information System. Participants were adults aged ≥65 years scheduled for elective arthroplasty with ASA physical status I–III. Data were presented as frequencies (n) and percentages (%). *Results:* A total of 362 participants were enrolled, of whom 223 (61.6%) used psychotropic medications. Most (63.2%) took BZDs, mainly bromazepam (29.1%) and alprazolam (27.4%). The leading indication was sleep disorders (38.1%), most often treated with alprazolam (34%), followed by anxiety disorders (20.2%), typically managed with bromazepam (24.8%). 99% of participants had been receiving BZDs for more than four weeks. *Conclusions:* Over half of Lithuanian OA patients undergoing elective arthroplasty used BZDs, underscoring the need for cautious, evidence-based prescribing – particularly in older adults. Regular medication reviews, adherence to national and EU guidelines, and greater use of non-pharmacological therapies are advised. Future research should examine drivers of chronic BZDs use and evaluate deprescribing and alternative treatments for safer, more sustainable care.

Keywords: psychotropic drug; benzodiazepine; Z drug; prevalence; osteoarthritis; elderly; elective arthroplasty

1. Introduction

Benzodiazepines (BZDs) represent one of the most commonly prescribed categories of psychotropic agents across the globe. Lithuania mirrors this international pattern; according to the Lithuanian State Medicines Control Agency (SMCA), BZDs consumption in 2024 was recorded at 25.58 daily doses per thousand inhabitants per day (DDD/TID) [1].

BZDs exert their pharmacological effects through the potentiation of gamma-aminobutyric acid (GABA), the primary inhibitory neurotransmitter within the central nervous system, thereby reducing neuronal excitability and producing a spectrum of central nervous system effects [2]. Benzodiazepine receptor agonists, commonly known as Z drugs, selectively target the $\alpha 1$ subunit of the GABA type A receptor [2,3]. Both BZDs and Z drugs are extensively prescribed for the management of insomnia, anxiety disorders, seizure control, alcohol withdrawal, and mood disturbances [2,4]. Epidemiological evidence demonstrates that the utilization of these agents increases with age [5,6] and is frequently associated with chronic comorbidities, such as cardiovascular disease, neurodegenerative disorders, and musculoskeletal conditions [7,8]. These considerations underscore the importance of cautious prescribing practices and the necessity for regular monitoring in older adults, particularly given their heightened vulnerability to adverse effects.

Osteoarthritis (OA) is a highly prevalent degenerative joint disease primarily affecting older adults and representing a substantial source of chronic pain, functional impairment, and diminished quality of life. Persistent pain experienced by patients awaiting elective joint replacement surgery can contribute to sleep disturbances, anxiety, and depressive symptoms, which may lead clinicians to prescribe BZDs or Z drugs. Current international and national guidelines advocate for short-term BZD therapy (2–4 weeks) to alleviate acute symptoms under close supervision, while prolonged usage is generally discouraged due to associated risks [9]. Extended therapy beyond four weeks has been correlated with cognitive impairments, including deficits in memory, attention, and psychomotor speed [10,11], as well as an increased risk of falls, fractures [12,13], tolerance, and dependence [14,15]. These adverse outcomes are particularly concerning in older adults with OA, who are inherently vulnerable owing to age-related physiological changes, polypharmacy, and comorbidities.

Historically, Z drugs such as zolpidem, zopiclone, zaleplon, and eszopiclone were regarded as safer alternatives to BZDs, primarily due to perceived lower risks of dependence and cognitive impairment [15]. However, recent systematic reviews and meta-analyses indicate that their safety profiles are comparable, particularly concerning fall risk and cognitive decline [16]. Cognitive and psychomotor impairments within this patient population may adversely affect postoperative rehabilitation, delay early mobilization, and reduce overall quality of life following total joint replacement surgery [17].

Beyond individual clinical implications, the extensive utilization of psychotropic medications among older adults constitutes a notable public health concern. Polypharmacy, inappropriate prescribing practices, and prolonged use of benzodiazepines or Z-drugs contribute to increased healthcare costs, morbidity, and the likelihood of adverse events within this vulnerable demographic. Nevertheless, there exists limited data from Lithuania and other Eastern European nations regarding prescribing patterns in older adults undergoing elective orthopedic procedures. Therefore, acquiring a comprehensive understanding of medication utilization in this population is crucial to inform deprescribing strategies, optimize perioperative management, and enhance postoperative outcomes.

The aim of this study was to assess the prevalence of psychotropic medication use – including benzodiazepines, benzodiazepine receptor agonists, and other anxiolytic or antidepressant agents – among elderly Lithuanian patients undergoing elective joint replacement surgery.

2. Materials and Methods

This single-center, cross-sectional study was approved by the Regional Bioethics Committee of Lithuania (Protocol No. BE-2-53) and conducted in accordance with the principles of the Declaration of Helsinki. The study was conducted at the Department of Anesthesiology, Hospital of the Lithuanian University of Health Sciences, Kauno Clinics, between December 2023 and May 2024. The report follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies.

Data were extracted from the Lithuanian Hospital Information System (HIS) using a standardized data collection protocol. Extracted variables included demographic characteristics (age), clinical parameters (American Society of Anesthesiologists (ASA) physical status), psychotropic medication use, underlying medical conditions, and duration of medication consumption. Data accuracy was verified by random cross-checking of records.

Psychotropic medications were categorized into benzodiazepines, antidepressants, antipsychotics, and hypnotics. The duration of use was classified as short-term (<4 weeks) or long-term (≥4 weeks). The primary outcome was the prevalence of psychotropic medication use among older adults undergoing elective joint replacement surgery. Secondary outcomes included the type, indication, and duration of psychotropic medication use.

The study population comprised patients aged ≥65 years scheduled for elective joint replacement surgery. Inclusion criteria were ASA physical status I–III. Patients undergoing emergency procedures, with ASA physical status ≥IV, or with incomplete medical records were excluded.

Statistical analyses were performed using IBM SPSS Statistics, version 30.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were applied to summarize the data. Categorical variables are presented as frequencies (n) and percentages (%).

3. Results

A total of 362 participants were enrolled in the study, of whom 223 (61.6%) were prescribed psychotropic medications. Among these, the majority (n=141, 63.2%) were taking BZDs. Furthermore, this constitutes 40% of the total sample. Notably, only 15 participants (6.7%) were using Z drugs such as zolpidem. Additionally, 39 participants (17.5%) reported using antidepressants, with the most common class being selective serotonin reuptake inhibitors (SSRIs), used by 21 (9.4%) participants. Other antidepressant classes included serotonin and norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants (TCAs), as well as medications like bupropion, mirtazapine, and trazodone. A total of 23 participants (10.3%) were taking antipsychotic drugs. Detailed medication distribution results are provided in Table 1.

Table 1. Distribution of respondents by medication use.

Medication group	Medications	Participants, n (%)
Benzodiazepines	Alprazolam	61 (27.4)
	Bromazepam	65 (29.1)
	Medazepam	2 (0.9)
	Triazolam	13 (5.8)
Z drugs	Zolpidem	15 (6.7)
Antipsychotics	Quetiapine	23 (10.3)
SSRI	Escitalopram	7 (3.1)
	Sertraline	14 (6.3)
SNRI	Duloxetine	6 (2.7)
TCA	Amitriptyline	3 (1.3)
	Tianeptine	1 (0.4)
Atypical antidepressants	Bupropion	3 (1.3)
Tetracyclic antidepressants	Mirtazapine	4 (1.8)
SARI	Trazodone	1 (0.4)
Antiparkinsonian drugs	Levodopa	5 (2.2)

SSRI – selective serotonin reuptake inhibitor; SNRI – serotonin and norepinephrine reuptake inhibitor; TCA – tricyclic antidepressants; SARI – serotonin antagonist and reuptake inhibitor.

Table 2 provides a comprehensive overview of drug categories by treatment indication. BDZs were predominantly prescribed for sleep disturbances (38.1%) and anxiety (20.2%). Participants

diagnosed with depression were prescribed: antidepressants – 75%, BZDs – 7.7%, antipsychotics – 17.3%. Additionally, Table 3 presents a detailed distribution of BZDs by specific disease. Alprazolam was most frequently prescribed for the treatment of sleep disorders (34%), while bromazepam was most commonly used for anxiety disorders (24.8%). Of the participants diagnosed with depression, only 4 (2.84%) received treatment with BZDs. The findings indicate that 99% of participants had been under medication for a period exceeding four weeks.

Table 2. Distribution of drug groups according to treatment indications.

	BDZ, n (%)	Z drugs, n (%)	Antipsychotics, n (%)	SSRI, n (%)	SNRI, n (%)	Other antidepressants, n (%)	Antiparkinsonian drugs, n (%)
	Participants, n (%)						
Depression	4 (1.8)	0	9 (4)	21 (9.4)	6 (2.7)	12 (5.4)	0
Sleep disorders	85 (38.1)	15 (6.7)	3 (1.3)	0	0	0	0
Anxiety disorders	45 (20.2)	0	7 (3.1)	0	0	0	0
Organic emotionally labile disorder	7 (3.1)	0	1 (0.4)	0	0	0	0
Paranoid schizophrenia	0	0	3 (1.3)	0	0	0	0
Parkinson disease	0	0	0	0	0	0	5 (2.2)

BDZ - benzodiazepine; SSRI – selective serotonin reuptake inhibitor; SNRI – serotonin and norepinephrine reuptake inhibitor.

Table 3. Distribution of BZDs according to treatment indications.

	Alprazolam	Bromazepam	Medazepam	Triazolam
	Participants, n (%)			
Depression	3 (2.13)	1 (0.71)	0	0
Sleep disorders	48 (34)	22 (15.6)	2 (1.42)	13 (9.22)
Anxiety disorders	10 (7.1)	35 (24.8)	0	0
Organic emotionally labile disorder	0	7 (4.96)	0	0

4. Discussion

Building on the need to better understand the use of psychotropic medications in older adults with chronic musculoskeletal conditions, this study was designed as a cross-sectional evaluation of medication prescribing patterns among elderly patients scheduled for elective joint replacement surgery in Lithuania. Data collection focused on the prevalence of benzodiazepines, Z drugs, and other anxiolytic or antidepressant agents. By systematically assessing medication use in this patient population, the study aims to provide insights into current clinical practices, identify potential areas for intervention, and inform strategies to optimize perioperative pharmacological management.

Individuals with OA frequently experience chronic pain, which can contribute to sleep disturbances, anxiety, or mood disorders. BZDs and Z drugs are sometimes prescribed to facilitate sleep onset or to manage pain-related anxiety. Data collected from the Lithuanian HIS indicate that a majority (61.6%) of elderly patients undergoing arthroplasty were prescribed psychotropic medications. Among these, 63.2% were prescribed BZDs, representing 40% of the total sample, while only 6.7% reported using Z drugs, specifically zolpidem. The global use of BZDs remains high. Recent reports [18] indicate that the prevalence of BZDs use across seven European countries - the Czech Republic, Serbia, Estonia, Bulgaria, Croatia, Turkey, and Spain - ranges from 0.7% to 35.5%, with particularly high rates observed in Croatia (~35.5%), Spain (~33.5%), and Serbia (~31.3%).

In comparison with other studies, Ma TT et al. [19] reported no significant global trend in the overall use of BZDs and Z drugs over eleven years, with BZDs consumption decreasing annually by 1.88% and Z drug consumption increasing by 3.28%. On the other hand, data from the Lithuanian SMCA for the years 2019–2024 indicate a substantial 29% reduction in BZDs use, declining from 35.87 to 25.58 defined DDD/TID [1]. In contrast, Z-drug utilization showed no significant increase, with only a slight change from 8.21 to 8.66 DDD/TID [1]. The most pronounced reduction in BZDs use (16%) occurred in 2021, coinciding with the introduction of new legislation imposing stricter prescribing regulations for these medications [1].

The study indicates that the most commonly used BZDs among patients undergoing arthroplasty were bromazepam (29.1%) and alprazolam (27.4%). These results align with findings from a study conducted in Brazil [14], which reported clonazepam, bromazepam, and alprazolam as the most frequently prescribed BZDs. In contrast, a study in Germany [20] identified oxazepam and lorazepam as the predominant BZDs. Similarly, a multinational research encompassing 67 countries [19] found that alprazolam was the most commonly used BZDs; however, this analysis did not account for patient age or specific indications for use [19]. Data from the Lithuanian SMCA [1] indicate that lorazepam is prescribed more frequently, followed by bromazepam and alprazolam. This discrepancy may be explained by the present study's focus on participants aged 65 years or older, whereas the Lithuanian SMCA data reflect overall BZDs use in the general population [1].

Our findings demonstrate that the most common indication for BZDs use was sleep disorders, representing 38.1% of all cases, with alprazolam (34 %) being the most frequently prescribed agent. Anxiety disorders were the second most common indication, representing 20.2% of cases and most often treated with bromazepam (24.8%). In Lithuania, the use of Z drugs remains limited, with only 6.7% of participants receiving them, and these medications are prescribed exclusively for sleep disorders. Consistent with these findings, a study conducted in Germany also reported insomnia as the primary reason for prescribing BZDs and Z drugs [20]. Z drugs, similar to BZDs, are commonly used to manage insomnia and demonstrate comparable effects on sleep duration, number of awakenings, and sleep quality, with analogous safety profiles [16]. However, prolonged use of zolpidem has been associated with psychomotor impairment, and its administration is generally recommended for no longer than 2–8 weeks [21]. Additionally, evidence suggests that Z drugs, including zolpidem and zaleplon, are linked to an increased risk of falls [22]. Adverse effects of BZDs are particularly significant in older adults. Both BZDs and Z-drugs can contribute to falls and syncope, potentially resulting in bone fractures, balance disturbances, gait abnormalities, and visual impairments [21]. The risk of falls is notably higher with continuous BZDs use, particularly for agents with extended half-lives or those administered at higher doses [21].

The majority of participants with depression reported using antidepressants (75%). In contrast, only 7.7% were prescribed BZDs, and 17.3% were receiving antipsychotic treatment. Data from the Lithuanian SMCA indicate a consistent annual increase in antidepressant use, rising from 35.4 DDD/TID in 2018 to 45.1 DDD/TID in 2024 [1]. By comparison, the corresponding values in France and Germany were 57.6 DDD/TID and 64 DDD/TID, respectively [23]. This upward trend suggests that BZDs are being prescribed more judiciously, and patients with depression are increasingly receiving appropriate antidepressant therapy, thereby reducing reliance on BZDs solely for symptom management.

Current guidelines recommend prescribing BZD therapy for the shortest possible duration, starting with the lowest effective dose and generally not exceeding 4 weeks [9]. In the present study, 99% of participants had been receiving BZDs or Z drugs for more than four weeks. Consistent with previous research, a survey conducted in Germany found that long-term BZDs use is more prevalent among older adults and individuals diagnosed with dementia, sleep disorders, or depression [24]. Furthermore, evidence from patients who had used BZDs for six months before knee joint replacement surgery indicates an increased risk of revision procedures, femoral osteosynthesis, and delirium [13]. These findings underscore that prolonged BZDs use in older adults is associated with a higher incidence of adverse outcomes.

Furthermore, from a broader perspective, these findings underscore the importance of enhancing medication review and deprescribing initiatives in perioperative and primary care settings. The implementation of structured medication assessment protocols, the enhancement of clinician education, and the adoption of multidisciplinary approaches—such as collaboration among orthopedic surgeons, anesthesiologists, and geriatricians—may contribute to reducing inappropriate psychotropic medication use. Evidence-based alternatives, including cognitive-behavioral therapy for insomnia, non-benzodiazepine anxiolytics, and non-pharmacological pain management strategies, should be more extensively promoted and integrated into routine clinical practice [25–27].

During our investigation, it was observed that a subset of patients were using BZDs without a valid medical prescription, indicating instances of non-prescribed or illicit use. Due to insufficient and unverifiable information regarding these cases, such individuals were excluded from the final statistical analysis to preserve data accuracy and integrity.

Nevertheless, this exclusion indicates that the actual prevalence of BZD use among elderly individuals awaiting joint replacement surgery may be underestimated. The true consumption rates could be higher when unreported or unauthorized usage is taken into account. This observation underscores the necessity for more comprehensive screening processes and patient education concerning medication use, as well as enhanced collaboration among healthcare professionals to ensure judicious prescribing practices and to mitigate the associated risks of unmonitored benzodiazepine consumption.

This study has several limitations. Firstly, the research design was cross-sectional, thereby preventing the establishment of causal relationships between variables. Secondly, data were obtained from prescription records, which might not fully reflect actual consumption patterns. Furthermore, the study did not account for dosage variations, which could have affected the results. Additionally, the focus was primarily on older adults undergoing elective arthroplasty, potentially limiting the generalizability of the findings to younger populations. Lastly, as the research was conducted within a single country, the applicability of the results to other populations or healthcare systems may be restricted.

5. Conclusions

In conclusion, more than half of patients in Lithuania diagnosed with OA and undergoing elective arthroplasty were found to use BZDs or Z drugs. Although overall BZDs consumption in Lithuania has shown a gradual decline, the issue of long-term use remains a persistent concern. Among elderly individuals with OA, alprazolam and bromazepam were the most commonly prescribed medications, primarily for the management of sleep disturbances and anxiety symptoms. These findings underscore the need for cautious and evidence-based prescribing practices, particularly among older adults who are more vulnerable to the adverse effects of prolonged BZDs use. To address this issue, greater emphasis should be placed on regular medication reviews, adherence to national and European prescribing guidelines, and the integration of non-pharmacological approaches – such as cognitive-behavioral therapy and relaxation techniques – for managing insomnia and anxiety. Moreover, future research should focus on identifying the factors contributing to chronic BZDs use in OA patients undergoing arthroplasty and on evaluating the effectiveness of deprescribing interventions and alternative treatment strategies to promote safer, more sustainable pharmacotherapy.

Author Contributions: All the authors contributed to the conception and design of the study. I.J. collected and organized participants' data. I.J. and A.G. performed data analysis and interpretation. M.K. prepared the first draft of the manuscript. I.J., A.G., and A.M. critically revised and edited the manuscript. A.S., R.J. oversaw all aspects of the research and publication process. All the authors read and approved the final version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Regional Ethical Committee of Lithuania (protocol No. BE-2-53, 11 May 2021).

Informed Consent Statement: In this study, all data were extracted from the Lithuanian Hospital Information System (HIS) and used in an anonymized form. No direct contact with the participants occurred; therefore, individual consent forms were not collected.

Data Availability Statement: The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

BZDs	Benzodiazepines
SMCA	State Medicines Control Agency
DDD/TID	Daily doses per thousand inhabitants per day
GABA	Gamma-aminobutyric acid
OA	Osteoarthritis

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