Application Fields and Innovative Technologies

Psychotropic-Related Hip Fractures: A Rapid AI-Assisted Systematic Review J. Lake, P. Rani, J. Young, V. Tiase, K. Kallmes, C. Asche. *Gerontechnology* 25(s)

Purpose Falls in older adults cause substantial morbidity, mortality, and increased healthcare costs in North America [1, 2] with most hip fractures fall-related [3]. As populations age, the burden of fragility fractures increases. Psychotropic drugs, including antidepressants and antipsychotics, are widely prescribed despite known risks [4]. This AI-assisted rapid review updates evidence on the association between psychotropic use and hip fracture risk in older adults, providing evidence relevant for clinicians, caregivers and policymakers. **Method** A rapid systematic review was conducted using the Nested Knowledge AI platform,[5] searching PubMed and Embase for observational studies from 1987 to 2025 on hip fracture risk and antidepressant or antipsychotic use in older adults, aged ≥65 years. Study quality was assessed using the Newcastle–Ottawa Scale (NOS). Odds ratios (ORs) as an effect estimate were extracted, and AI-assisted automation enhanced screening, data extraction and evidence synthesis and transparency. **Results and Discussion** The literature search identified 2,972 studies, of which 48 studies (> 500,000 subjects) reported odds ratios for hip fracture risk: antipsychotics (18 studies), antidepressants (12 studies) and both classes (18 studies). Included studies were of moderate (46 studies) to high (2 studies) quality. First-generation (conventional) antipsychotics increased hip fracture odds by 35% to 230% (OR 1.35–3.30), while second-generation (atypical) antipsychotics showed variable effects, ranging from a slight reduction (OR 0.83) to a 300% increase (OR 4.0), suggesting some atypical agents may be less risky than conventional ones. Vulnerable subgroups, including individuals with dementia or nursing home residents, were frequently studied (41 studies). Antidepressant use was consistently associated with a higher hip fracture risk, with ORs ranging from 1.6 to 3.26 (60-26% increase). Overall, first- and second-generation antipsychotics and antidepressants were associated with an increased risk of hip fracture in older adults. Key findings are summarized in Table 1. These findings highlight the need for cautious prescribing, especially in patients at risk for falls or fractures, and support targeted fall prevention strategies. Integrating an AI-enabled platform enhances the rigor, transparency, and efficiency of evidence synthesis. While effective use of the Nested Knowledge AI platform requires an initial investment of time to learn its features which may be harder for older adults and people that are not technology savvy, it enabled faster and more transparent data extraction and synthesis. As familiarity grows, the benefits in efficiency and reproducibility become clear.

References
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Table 1. Summary of evidence: Association between psychotropic use and hip fracture risk in older adults

Drug class name	Odds Ratio (Range)	Number of studies	Participants (N)	NOS score
Antipsychotics (overall)	0.75 - 4.01	36 studies	337,836	5-7
• First-generation (conventional) antipsychotics	1.35 - 3.30	7 studies	75,340	6-7
• Second-generation (atypical) antipsychotics	0.83 - 4.00	6 studies	60,456	6-7
Antidepressants (overall)	1.60 - 3.26	30 studies	162,364	5-7
• Selective Serotonin Reuptake Inhibitor (SSRIs)	1.25 - 3.52	14 studies	154,002	6-7
• Tricyclic antidepressants (TCAs)	1.18 - 2.77	4 studies	30,676	6-7