



Impact of coexisting overactive bladder in Medicare patients with osteoporosis

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ARTICLE INFO

Keywords:

Overactive bladder
Osteoporosis
Healthcare resource utilization
Fractures
Costs

ABSTRACT

Background: Osteoporosis and overactive bladder (OAB) are prevalent conditions in older adults and are independent risk factors for falls and fractures. A paucity of evidence exists examining the impact of coexisting OAB in patients with osteoporosis.

Objective: To examine the impact of OAB on healthcare resource utilization (HRU), clinical outcomes, and healthcare costs among older adult patients with osteoporosis.

Methods: This retrospective analysis compared patients with osteoporosis with and without OAB. Patients with an osteoporosis diagnosis, enrolled in a Medicare Advantage plan, and aged 65–89 inclusive were eligible. Incident OAB among patients with prevalent osteoporosis was identified. A comparison group of patients with osteoporosis but no evidence of OAB was propensity score matched on baseline characteristics. Fall and/or fracture outcomes, HRU and healthcare costs were evaluated during 12 months of follow-up. Bivariate comparisons of outcomes were conducted. Ordinary least squared regression was used to examine the relationship between OAB and total healthcare costs.

Results: After matching, 5,526 patients in each group were included. Patients with osteoporosis and OAB demonstrated greater all-cause HRU across all encounter types compared to patients without OAB (all P values < 0.001). Patients with osteoporosis and OAB had a greater frequency of any fall/fracture (17.7% vs. 14.9%, $P < 0.001$). Patients with osteoporosis and OAB had 35% greater all-cause total healthcare costs than patients without OAB ($P < 0.001$).

Conclusions: Patients with OAB and osteoporosis had significantly greater all-cause HRU and costs. Falls and fractures were significantly more common in patients with osteoporosis and OAB compared to patients with osteoporosis without OAB.

1. Background

Older individuals are often affected by a number of chronic medical conditions. Osteoporosis is one such condition impacting older women in particular due to hormonal changes after menopause. (Parker-Autry, Burgio, & Richter, 2012; Robinson, Toozs-Hobson, & Cardozo, 2013) Falls and fall-related injuries (e.g., fractures) are a concern in patients with osteoporosis. Fractures occurring in patients with osteoporosis have been shown to result in increased mortality, decreased health-related quality of life, and considerable healthcare resource utilization

and costs. (Blume and Curtis, 2011; Guillemin et al., 2013; Haentjens et al., 2010)

Patients with overactive bladder (OAB) are also at increased risk for falls and fractures. (Brown et al., 2000; Chiarelli, Mackenzie, & Osmotherly, 2009; Darkow, Fontes, & Williamson, 2005; Gosch, Talasz, Nicholas, Kammerlander, & Lechleitner, 2015; Tromp, Smit, Deeg, Bouter, & Lips, 1998) OAB has been defined by the International Urogynecological Association (IUGA)/International Continence Society (ICS) as “urinary urgency, usually accompanied by frequency and nocturia, with or without urgency urinary incontinence, in the absence

Abbreviations: CI, confidence interval; CPT, current procedural terminology; DE, dual eligibility; DXA, dual-energy x-ray absorptiometry; ED, emergency department; HRU, healthcare resource utilization; ICD-9-CM, international classification of diseases ninth revision clinical modification; IQR, interquartile range; LIS, low income subsidy; OAB, overactive bladder; OLS, ordinary least squares regression; OP, osteoporosis; SD, standard deviation; SDiff, standardized difference; UTI, urinary tract infection

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<https://doi.org/10.1016/j.archger.2017.11.005>

Received 23 August 2017; Received in revised form 9 November 2017; Accepted 13 November 2017

Available online 21 November 2017

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of urinary tract infection (UTI) or other obvious pathology” (Haylen et al., 2010) A recent study reported a 54% increased odds of falling in the presence of urgency urinary incontinence. (Chiarelli et al., 2009) A study by Brown et al. (2000) reported that women with weekly urgency incontinence had a 26% greater risk of sustaining a fall and a 34% increased risk of non-spine fracture, with more frequent incontinence attributed to increased risks of falls and fractures. (Brown et al., 2000)

While the prevalence of urinary incontinence among women with osteoporosis has been reported to be as high as 67%, relatively little is known on the impact of OAB in patients with osteoporosis. (Thayer, Stolshek, Gomez Rey, & Seare, 2014) The high prevalence of coexisting urinary incontinence and osteoporosis, overlapping risk factors for both conditions, and the risk of falls and/or fractures associated with both osteoporosis and OAB underscore the importance of understanding the impact of coexisting OAB in patients with osteoporosis. The purpose of this study was to examine the impact of OAB on healthcare resource utilization, clinical outcomes, and healthcare costs among patients with osteoporosis.

2. Methods

2.1. Study design

This was a retrospective, historical cohort study using administrative claims data collected from 1 January 2009 through 30 September 2015. Patients with osteoporosis and OAB were matched to patients with osteoporosis without evidence of OAB, and the two groups were compared to determine the impact of coexisting OAB on utilization, clinical outcomes and costs.

Patients enrolled in a Medicare Advantage Prescription Drug health plan were identified based on International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code of 733.0 x on ≥ 1 inpatient or ≥ 2 outpatient medical claims between 1 January 2010 and 30 September 2014. Additionally, patients with ≥ 1 prescription claim for an osteoporosis medication (bisphosphonates, calcitonin, teriparatide, denosumab or raloxifene) and ≥ 1 outpatient claim for osteoporosis were included. Patients with OAB were identified based on the presence of ≥ 1 inpatient or outpatient claim for an OAB symptom (ICD-9-CM: 596.5 (other functional disorders of the bladder), 596.51 (hypertonicity of bladder), 788.3 (urinary incontinence, unspecified), 788.31 (urge incontinence), 788.33 (mixed incontinence), 788.41 (urinary frequency), 788.43 (nocturia), 788.63 (urgency of urination), 788.91 (functional urinary incontinence)) or ≥ 1 prescription claim for a medication to treat OAB (darifenacin, fesoterodine, oxybutynin, solifenacin, tolterodine, trospium, mirabegron). The date of the first observed diagnosis code or medication claim associated with OAB served as the study index date. All patients identified with OAB were required to have a diagnosis of osteoporosis before diagnosis of OAB. For the comparison group of osteoporosis patients without OAB, patients must not have had any indication of OAB (diagnoses or medication claims) at any time during health plan enrollment. For these patients, a pseudo-index date was randomly created to approximate the distribution of the index date in the OAB group. (Harvey, Drzayich, & Mosley, 2012) All patients had ≥ 12 months of pre- and post-index continuous health plan enrollment and were ≥ 65 years and < 90 years at index. Patients were excluded if there were diagnosis or procedure codes indicative of Paget's disease, malignant neoplasms, renal or hepatic insufficiency, transplant, neurogenic bladder, or an indication of trauma.

2.2. Study measures

2.2.1. Healthcare resource utilization

Healthcare resource utilization, including office encounters, outpatient visits, inpatient admissions (acute and non-acute), and emergency department (ED) visits, was measured and reported for all-cause

and osteoporosis-related encounters. Office encounters were identified based on evaluation and management current procedural terminology (CPT) codes. Outpatient visits were defined as any claim where the place of treatment was outpatient and includes evaluation and management, procedures, imaging, tests, and durable medical equipment. Acute inpatient admissions were defined as admission and stay in an acute care hospital facility where as a non-acute inpatient admission was defined as a stay in a skilled nursing facility or hospice. Any ED visit was measured and reported based on revenue, place of treatment and/or CPT codes. An encounter was defined as osteoporosis-related if there was a diagnosis for osteoporosis in the primary diagnosis position, an indication of a fall/fracture not associated with a coded trauma (e.g., car accident) in any claims position, or procedures related to osteoporosis screening (e.g., bone mineral density screening). The number and proportion of patients with ≥ 1 visit by place of service (office encounter, outpatient visits, inpatient admissions, ED visits) and the total number of events by place of service were measured and reported separately. For inpatient admissions, the average total length of stay was measured. Pharmacy utilization was reported as the total number of medications (all-cause) and total number of medications used to treat osteoporosis (osteoporosis-related).

2.2.2. Clinical outcomes

Falls were measured using ICD-9-CM external cause of injury codes. In addition, as a proxy for falls, diagnoses and procedures for dislocations were identified. Fractures were identified based on diagnosis and procedure codes. The broad fracture definition included all fracture sites, and fractures were further classified as osteoporosis-related if they were associated with certain anatomic sites or considered related to fragility (vertebrae, ribs, pelvis, clavicle, scapula, humerus, radius/ulna, wrist, hip, femur, patella, and tibia/fibula). (Burge et al., 2007; Hopkins et al., 2016; Viswanathan et al., 2012) The number and proportion of patients with an indication of ≥ 1 fall or broad fracture (fall/fracture) was measured.

2.2.3. Healthcare costs

Total, medical, and pharmacy costs were calculated for inpatient admissions (acute and non-acute), ED visits, office encounters, and outpatient visits for all-cause and osteoporosis-related encounters. Osteoporosis-related costs were defined as expenditures associated with osteoporosis-related medical or pharmacy claims, as defined previously. Total costs were calculated as the sum of medical and pharmacy costs. All costs were adjusted to 2010 dollars using the Bureau of Labor and Statistics Consumer Price Index medical component.

2.2.4. Demographic and clinical characteristics

Demographic and enrollment characteristics, including age, sex, race/ethnicity, geographic region, and plan benefit type (health maintenance organization, preferred provider organization, etc.), were measured based on information included in the enrollment file. The Charlson Comorbidity Index based on the Quan enhanced ICD-9 set, Elixhauser comorbidities, and RxRisk-V conditions were determined to provide measures of comorbidity and medical condition burden. (Elixhauser, Steiner, Harris, & Coffey, 1998; Fishman et al., 2003; Quan et al., 2005; Sales et al., 2003) The following osteoporosis-related treatment characteristics were measured: number and type of medication treatments for osteoporosis, cumulative day's supply for osteoporosis medication treatments, and history of bone mass density screening. Baseline risk factors for falls and fractures were also measured: benzodiazepines, barbiturates, sedative hypnotics, antidepressants, antipsychotics, anticonvulsants, opioids, anti-hypertensives, oral or inhaled glucocorticoids, and proton pump inhibitors or conditions that consisted of Parkinson's disease, dementia, hypertension, diabetes, and rheumatoid arthritis in addition to smoking, obesity, and alcohol abuse/dependence.

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