
Challenges in defining and improving osteoporosis quality of care

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ABSTRACT

Osteoporosis diagnosis and treatment are commonly overlooked by primary care providers and patients, leading to significant morbidity, mortality and unnecessary health care costs. Fewer than 20% of patients receive screening or treatment for osteoporosis following fragility fractures. In addition, bone density screening of women 65 years and older is low, leading to the under-use of treatments known to reduce the risk of fragility fractures. The American Medical Association (AMA), the Centers for Medicare and Medicaid Services (CMS), and the American College of Rheumatology (ACR) are working to close the gap between current evidence and practices via the development of quality indicators. Obstacles to improving the screening and treatment of osteoporosis are multiple and include barriers at the level of health systems, provider care, and patient factors. In order to overcome these barriers, interventions that can be widely disseminated, cost-effective and influential at multiple levels are needed.

Introduction

Explained in part by the rising burden of managing many concurrent chronic illnesses, osteoporosis prevention and detection are commonly overlooked by primary care providers among the growing population of persons over age 65. Patients often also are unaware of the risks associated with bone loss since osteoporosis is a "silent" disease, and may only become known after a fragility fracture. Even after a fragility fracture, the association of fracture with osteoporosis is often not made by the patient or the physician. The morbidity, mortality and health care costs associated with osteoporosis, however, are rising steadily as the population ages (1). A significant disconnect between evidence and practice highlights the importance of efforts to improve

the care of osteoporosis, diagnosis, and treatment through the improved systematic delivery of care to patients with this chronic condition (2).

What is quality of care in osteoporosis?

The National Committee for Quality Assurance (NCQA) developed a Health Plan Employer Data and Information Set (HEDIS) measure for osteoporosis (3). The HEDIS measure determines the number of women 67 years of age or older that have suffered from a fracture and received either a bone mineral density (BMD) test or prescription treatment for osteoporosis in the 6 months following the fracture. In 2003, based on HEDIS measures, only 18% of fractures (of all types) in this patient population led to BMD testing or pharmacologic treatment, increasing to only 20.1% in 2005 (3, 4). This low rate is in marked contrast to other HEDIS measures, such as beta-blocker therapy following an acute myocardial infarction and breast cancer screening, in which management rates were 96% and 73%, respectively, in 2005 (4).

The American Medical Association (AMA) Physician Consortium for Performance Improvement (PCPI) has led efforts to improve quality of care through the provision of evidence-based clinical performance measures and measurement resources (5). The consortium's effort in osteoporosis included representatives from national and state medical specialty societies, as well as the NCQA, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), and the Centers for Medicare and Medicaid Services (CMS). The PCPI measures for osteoporosis include both accountability measures and quality improvement measures regarding glucocorticoids and other secondary causes of osteoporosis. These measures are now included in the ACR starter set (see the

chapter by Anderson in this volume). Based on the PCPI work, osteoporosis-related measures incorporated into the CMS Physician Quality Reporting Initiative (PQRI) will include communication with the primary provider following a fracture, screening or therapy in women 65 years or older, management following a fracture, pharmacologic therapy for patients with osteoporosis, and counselling concerning calcium supplementation, vitamin D use and exercise (6). Of note, these are the only musculoskeletal disease measures initially adopted into the PQRI measurement set. Osteoporosis represents a somewhat unique musculoskeletal disorder in that process measures and fracture outcomes supersede patient functional status as the most relevant measures of quality of care delivery

What is the current quality of care in osteoporosis?

The current level of osteoporosis quality of care can be measured by means of process measures (osteoporosis screening and treatment) and outcome measures (reduced fracture rates and improved quality of life). As demonstrated by the HEDIS measure performance rates discussed above, there is low use of osteoporosis treatment following a fragility fracture. Most studies that have assessed post-fracture care reveal that, on average, fewer than 20% of patients undergo evaluation for and treatment of osteoporosis in the first two years following a fracture (7-14).

In a large retrospective study of women and men over the ages of 50 and 65, respectively, the overall treatment with bisphosphonates or estrogen was 4.6% in the two years following a fracture (7). In another study the diagnosis of osteoporosis following a hip fracture was seen in only 10-15% of patients in a tertiary care facility and pharmacologic treatment was given to fewer than 6% (15). Post-fracture care has considerable socioeconomic consequences: the national cost of care for fracture in the United States in 2005 was nearly \$17 billion (1, 16). Despite US guideline recommendations and Medicare reimbursement for bone density testing

in women 65 years or older, Medicare paid for only 1.75 million BMDs from an eligible group of over 20 million women in 2000 (7). It has been estimated that the additional testing of one million women in 2001 would result in the prevention of 35,000 fractures over a 3-year period and a net savings for Medicare of \$77.9 million (7).

Current challenges in osteoporosis quality care are similar to challenges in other areas of chronic disease medicine. Beyond post-fracture care, we and others have documented suboptimal rates of osteoporosis prevention (both testing and treatment) for patients on chronic glucocorticoids, among high-risk elders residing in nursing homes, and in home health care settings (17-19).

The under-diagnosis and under-treatment of osteoporosis remain the most prevalent medical errors in osteoporosis (20). Occasional overuse of osteoporosis treatment also exists, as seen in the treatment of pre-menopausal women with low peak bone mass, in whom there is no evidence that prescription therapy will prevent fractures many years later. The finding of a BMD more than 2 standard deviations below the mean BMD of an age-, sex-, and ethnicity-matched reference population in pre-menopausal women with no other significant risk factors for osteoporosis typically indicates low peak bone mass rather than osteoporosis and is associated with a low 5-10 year fracture risk (21). In these women, non-pharmacological intervention and reassurance is recommended. Misuse of treatment also exists, placing patients at risk of having complications, an example being the use of intravenous bisphosphonates in patients with renal insufficiency (22, 23). Efforts aimed at improving quality of care are needed to reverse these problems, both at the health system and provider levels.

What are barriers to osteoporosis quality care improvement?

Suboptimal care in the prevention and treatment of osteoporosis is multi-factorial and includes barriers present in the health care system, provider care, and patient involvement (Table I). De-

spite these challenges, a change in current US health system practices, particularly with respect to chronic diseases such as osteoporosis, is hopefully on the horizon.

Osteoporosis is diagnosed on the basis of a low BMD or the occurrence of a non-traumatic fracture. The use of BMD measurement alone excludes both skeletal and extra-skeletal fracture risk factors, such as bone quality and the liability to fall, yet BMD consistently outperforms other diagnostic schemes, including clinical risk factors. Recently, it has been shown that the use of clinical risk factors combined with BMD better predicts fracture than either entity alone. However, currently there are no guidelines for physicians to quantitatively integrate clinical risk factors; treatment guidelines and quality indicators exist only based on BMD, fracture occurrence and glucocorticoid use.

The link between low bone mineral density and increased fracture risk in women and men is well established, and pay-for-performance measures (P4P) may represent an opportunity to address this issue, at least in part (24, 25). Based on this emerging system of health care reimbursement, physician payments for Medicare billing can be supplemented modestly by appropriate osteoporosis screening and treatment. Even if therapy is initiated when indicated, fewer than half of women continue the use of hormone replacement therapy after one year (26-31). Similar findings are seen with other osteoporosis treatments, such as bisphosphonates, as >50% of women prescribed alendronate did not take the medication appropriately and 35% had discontinued treatment at 6 months based on pharmacy data (28). Similarly, low rates of osteoporosis therapy adherence have been observed for patients on chronic glucocorticoids (19). Adherence to treatment is essential for fracture risk reduction, and optimism exists for improvements with future therapies.

To overcome these extensive barriers to improving osteoporosis care, interventions are needed that can be widely disseminated, influential at multiple

Table I. Selected barriers to high quality osteoporosis care.

System factors (44, 63)	Provider factors (10, 15)	Patient factors (64, 65)
• Static nature of traditional health care processes • Lack of system-wide standard orders • Insufficient coordination of care between subspecialty and primary care providers • Competition among physicians and unwillingness of physicians to assume leadership for a patient's preventive care • The fragmented financing of preventive care	• Seeing fragility fracture events as osteoporosis-defining events • Prioritization of osteoporosis among patients' multiple co-morbidities • Resistance to change of current practices • Lack of awareness of the morbidity, mortality and healthcare costs associated with osteoporosis	• Denial or lack of acceptance of the diagnosis of and risk factors for osteoporosis • Lack of awareness of the available treatment and preventive therapies, in addition to the potential morbidity and mortality of untreated osteoporosis • Adherence to and persistence in treatment

levels, and cost effective. Addressing health system, provider, and patient factors is necessary to resolve the dissociation between osteoporosis prevalence and the screening and treatment of the disease. Herein lies the challenge, as most strategies that have been tried are neither cost-effective nor generalizable.

Are there specific patient groups receiving suboptimal care?

Two special groups provide added evidence of suboptimal osteoporosis care, namely ethnic/racial minorities and men. As with other areas of health care, racial and ethnic disparities in osteoporosis care have been demonstrated (32-37). Despite a lower incidence of osteoporosis in African-American women compared to Caucasian women, fractures in African-American women and men lead to increased disability, longer hospital stays, and higher mortality (38-40). Studies have confirmed that African-American women are less likely than Caucasian women to receive BMD testing and treatment when known to have osteoporosis risk factors (32, 35, 41), and following fractures as well (35).

There is also a growing need for screening and the treatment of osteoporosis in men. Falls resulting in fracture-related, heightened death rates are increasing in both men and women, but have been noted to be consistently higher in men (42). Further research is needed to delineate bone fragility in men, investigate the anti-fracture efficacy of available pharmacologic interventions, and ultimately to establish national recommendations for appropriate testing and treatment thresholds (43). Currently, many questions remain regarding appropriate screening and treatment

guidelines in men, and improvement of quality of care in this area is overdue. At a minimum, physician perception that osteoporosis does not affect women of color or men adds a further barrier to successful diagnostic and therapeutic intervention.

How can osteoporosis quality of care be improved?

Despite the known disparity between the number of older patients who sustain a fragility-type fracture and the number of patients who undergo evaluation for or treatment of osteoporosis, as recommended by current national guidelines, little has been published regarding effective approaches to bridge this "quality chasm" (5, 11). Quality improvement efforts can be classified according to their primary targets: the health system, patients, or providers. Further, effectiveness is influenced by whether intervention only occurs in the setting of a high risk for osteoporosis, or if it also takes place immediately after a fracture.

Attempts have been made to implement osteoporosis care improvement using process re-designs for health care systems, and success has been seen at sites that have demonstrated perseverance and a substantial investment of time (44). The Re-Fracture Intervention Trial (REFIT) used electronic medical record (EMR) reminders to provide patient-specific clinical advice to providers caring for post-fracture patients. This intervention resulted in more than 50% of patients receiving either BMD measurement or osteoporosis treatment compared to 6% in the usual care group (45). This study further demonstrated that one of the major obstacles in osteoporosis care following fractures is primary care recognition of the event (11,

13). System redesign using continuous quality improvement and involving subspecialty consultation also has been proven effective and cost-saving in at least one managed care system (46).

Identification of fracture patients in the immediate post-fracture period may provide a "teachable moment" to reach the health care provider. Several studies have shown limited success in the identification and referral of patients with osteoporosis through the use of reminders and other simple communication measures directed at orthopedists and emergency room physicians, respectively, following hip fractures and wrist fractures (13, 47, 48). Hospital interviews and 6-month follow-up calls doubled osteoporosis management by PCPs, faxed clinician reminders increased BMD testing and treatment 3-fold, and the provision of guidelines and educational materials to PCPs increased BMD testing and discussion with physicians (47, 48). In Sweden, a multi-modal intervention led to significant reductions in secondary falls and fractures after a hip fracture (49). However, other attempts to improve quality of care via more passive provider interventions have met with disappointing results (50-52). In particular, passive interventions such as Continued Medical Education (CME) courses have not led to proven satisfactory improvements in most preventive care (53).

In the absence of a fracture, screening for osteoporosis in appropriate patient populations, (e.g., among chronic glucocorticoids users) is lagging despite a wealth of treatment options proven to decrease fracture risk. The main challenge in improving the screening and treatment of patients who are at risk has been to identify a cost-effective and generalizable way for primary care

providers to incorporate preventive screening into their busy practices. The limited literature addressing direct-to-patient interventions for osteoporosis have reported some benefit. However, most of these studies were limited to single sites or were non-randomized (13, 48, 54-56). In one randomized, controlled study of 1,973 patients and 434 physicians, academic detailing and clinical reminders for physicians, and mailings and automated phone calls to patients resulted in only a 4% absolute increase in osteoporosis management (57). The modest improvements in these studies highlight the need for other approaches such as direct efforts to improve patient-physician communication.

Glucocorticoid-induced osteoporosis (GIOP) is one high-risk state in which approaches based on evidence of implementation approaches are needed. Carefully conducted cluster randomized controlled trials involving multi-modal provider interventions targeting physicians at Harvard University and the community physicians of a large HMO both failed in the primary analyses to improve testing or treatment (58, 59). In the HMO study, however, among those physicians who actually engaged in the intervention, BMD testing increased significantly and a trend towards greater treatment rates was observed (58). One somewhat atypical but interesting study design used one part of Tasmania as an intervention site and a second part of the island as a control site. After providing educational materials and local treatment guidelines to general practitioners and pharmacists, followed by academic detailing, treatment rates for in-patient glucocorticoids users showed significant changes in GIOP treatment from 31% to 57% and in bisphosphonates from 6% to 24% (60). Complex practice re-design strategies have also shown benefit in an uncontrolled study (46).

Conclusion

The prevalence of osteoporosis will continue to increase in the coming years with aging populations (1). Osteoporosis currently accounts for more than 2 million fragility fractures annu-

ally, a number projected to increase as osteoporosis increases (1). National guidelines from the Surgeon General and the US Preventive Services Task Force advocate BMD measurement for all women 65 years and older (61, 62). Despite these guidelines, fewer than one-fourth of women receive BMD evaluation or treatment in the US alone (7). This divergence between recommendations and current care is based on numerous barriers and is presently the focus of multiple national and local efforts to improve quality of care. Improvement of osteoporosis quality care will require that cost-effective, generalizable approaches to osteoporosis screening and treatment be found and implemented.

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