

Male Osteoporosis Knowledge Among Veterans and Their Providers

Melissa McNamara, MD, Julie Paik, MD, Cleopatra Beaton, NP, PhD, and Meika A. Fang, MD

Are male veterans uninformed about osteoporosis and its risk factors, screening, treatment, and prevention? What do their providers know—and can any knowledge gaps be addressed?

Osteoporosis affects about 10 million people in the United States¹—an estimated 20% of whom are men.² The disease is associated with substantial morbidity and mortality, and its clinical complications include diminished quality of life and fractures. About one in three men over the age of 60 will develop an osteoporosis-related fracture at some point in his lifetime, and such fractures frequently lead to considerable morbidity and mortality.³ Although the incidence of hip fracture is lower among men than among women, the one-year mortality rate following hip fractures is 1.5 to two times higher in men than in women.^{4,5}

It is important to uncover and address gaps in knowledge about male osteoporosis—whether those gaps occur in the knowledge of patients, physicians, or both groups. Osteoporosis is underdiagnosed and undertreated,^{1,4-7} and there is evidence that the public is uninformed or misinformed about it.⁵ There also is evi-

dence that educational interventions can be effective: Three randomized clinical trials showed that multifaceted interventions with both physician education and patient education components resulted in modest increases in use of medications for osteoporosis.⁸⁻¹⁰ And while a wealth of information exists in the medical literature regarding the prevention and treatment of female osteoporosis, this is not the case for male osteoporosis. Although a handful of studies have focused either on patient knowledge or physician knowledge of the disease, to our knowledge no study to date has examined the osteoporosis knowledge base of both male patients and the physicians who treat them.

We set out to perform such a comparison. While we hypothesized that male patients would be undereducated about osteoporosis, we believed it was important to establish this fact firmly in order to justify and implement future education efforts targeted at male patients. Armed with this knowledge, education-focused efforts can be targeted accurately to the areas that need the most improvement.

METHODS

Participants

The study was performed at the VA Greater Los Angeles Healthcare System (VAGLAHS) between July 2006 and June 2007. It was approved by the hospital's institutional review board.

Patient participants in the study were recruited from the VAGLAHS's primary care and rheumatology clinics. In the waiting areas of these clinics, clinic staff distributed the survey and a cover letter to patients. The cover letter informed patients that their participation in the study would be strictly voluntary and that their decision to participate or not participate would be anonymous and would not affect their care. Patients also were informed that they could drop off the completed surveys in a locked box in the waiting areas.

The study's provider participants were recruited from among the hospital's attending physicians and internal medicine trainees (such as interns, residents, and fellows) who provide outpatient primary care or rheumatology care. They were recruited at staff meetings, where research staff discussed the study aims. Staff informed the providers that their participation would be strictly voluntary and that their decision to participate or not participate would be anonymous. Interested providers were given the surveys, and they dropped off the completed surveys in a locked box.

The survey

Patients and providers were given different versions of a survey that tested their knowledge of osteoporosis (Figure 1). The patient survey was written at a Flesch-Kincaid grade level of 8.1. Both surveys asked ques-

At the time of this study, **Dr. McNamara** was a fellow in rheumatology in the University of California at Los Angeles (UCLA)-VA Greater Los Angeles Healthcare System (VAGLAHS) program. She is currently in private practice. **Dr. Paik** is chief resident in the Cedars-Sinai Medical Center-VAGLAHS internal medicine program. **Dr. Beaton** is a nurse practitioner and **Dr. Fang** is a staff physician, both in the rheumatology section at VAGLAHS. In addition, Dr. Fang is a clinical professor of medicine at the David Geffen School of Medicine at UCLA.

General knowledge

1. Do osteoporosis and osteoarthritis represent the same or different conditions?
2. Osteoporosis is a disease that affects men or women, both, or neither?
3. Is a man with osteoporosis at increased risk of breaking a bone?
4. Is a woman with osteoporosis at increased risk of breaking a bone?
5. Is osteoporosis in men undertreated, adequately treated, or overtreated?
6. If a person breaks a hip, who (man or woman) would be more likely to die as a result of the break?

Risk factors

7. Does a family history of osteoporosis put a man at risk for osteoporosis?
8. Does a history of rheumatoid arthritis put a man at risk for osteoporosis?
9. Does a history of ankylosing spondylitis put a man at risk for osteoporosis?^a
10. Does a history of osteoarthritis put a man at risk for osteoporosis?
11. Does a history of low testosterone put a man at risk for osteoporosis?
12. Does a history of thyroid disorder put a man at risk for osteoporosis?
13. Does a history of smoking put a man at risk for osteoporosis?
14. Does a history of excessive alcohol intake put a man at risk for osteoporosis?
15. Does a history of fracture, not associated with trauma or a fall, put a man at risk for osteoporosis?
16. Does steroid pill therapy (ex: Prednisone) put a man at risk for osteoporosis?^a
17. Does testosterone therapy put a man at risk for osteoporosis?^a
18. Does antiseizure medication (ex: Dilantin, Phenobarbital) put a man at risk for osteoporosis?^a
19. Do GnRH^b analogs (ex: Lupron) put a man at risk for osteoporosis?^a

Screening

20. Are there tests a man can take to see if he has osteoporosis?
21. Are there tests a woman can take to see if she has osteoporosis?
22. At your institution, when you order a DXA^c scan, which views are obtained?^a

Treatment

23. Is there therapy available for men with osteoporosis?
24. If a man has osteoporosis, should he be taking calcium supplements?
25. Does bisphosphonate therapy (ex: Fosamax, Actonel) for osteoporosis replace the need for adequate daily calcium intake?

Prevention

26. Are there things you can do to help prevent osteoporosis?
27. Does calcium/vitamin D help prevent osteoporosis?
28. Do bisphosphonates (ex: Fosamax, Actonel) help prevent osteoporosis?
29. Does smoking cessation help prevent osteoporosis?
30. Does excessive alcohol intake cessation help prevent osteoporosis?
31. Does exercise help prevent osteoporosis?
32. If a man is taking daily steroid pills (ex: Prednisone), what supplements should he take?^a

Figure 1. Osteoporosis knowledge questionnaire. ^aQuestions asked of providers only. ^bGnRH = gonadotropin-releasing hormone. ^cDXA = dual energy x-ray absorptiometry.

tions concerning osteoporosis general knowledge, risk factors, screening, treatment, and prevention. The provider survey contained all of the questions from the patient survey, along

with additional questions regarding the risks of ankylosing spondylitis, steroid pill therapy, testosterone therapy, antiseizure medication, and gonadotropin-releasing hormone

(GnRH) analogs (such as leuprolide); the need for calcium/vitamin D supplementation with steroid therapy; and the type of dual energy x-ray absorptiometry (DXA) examination

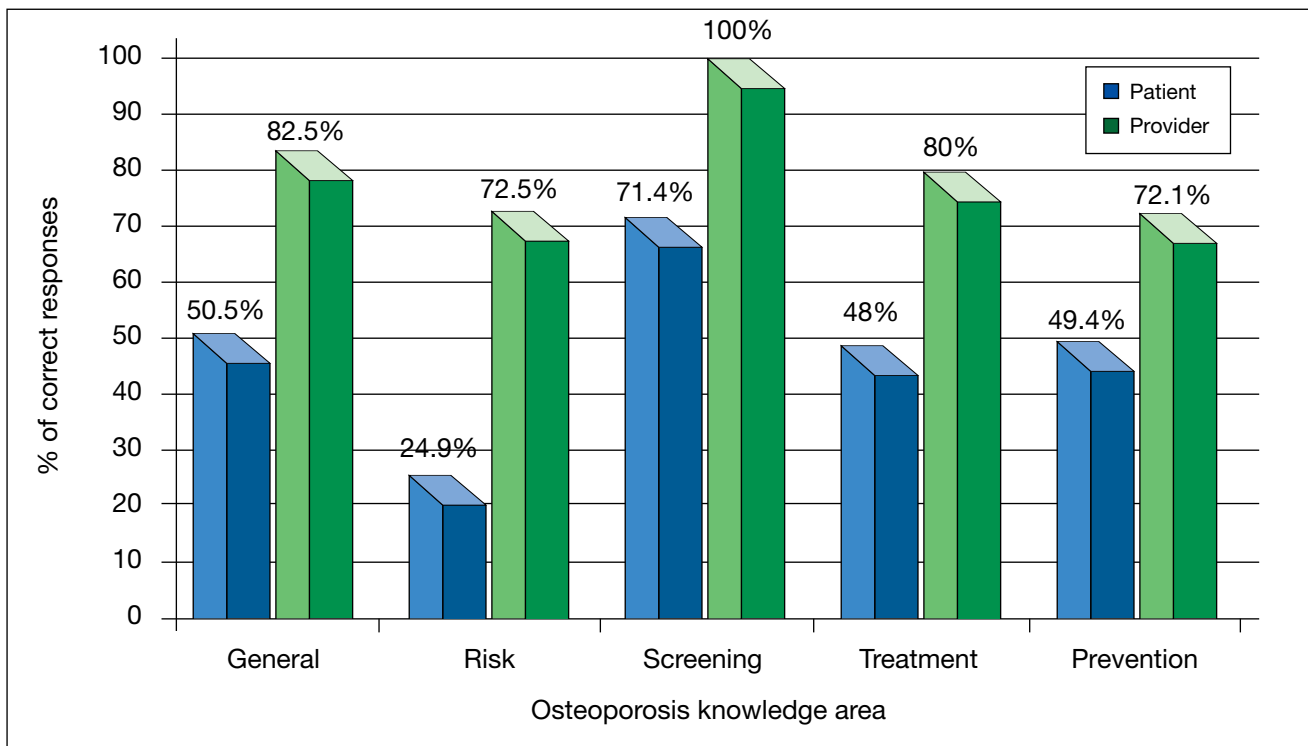


Figure 2. Comparison of osteoporosis knowledge between patients and providers.

available at their institution. Patients and providers also were asked to indicate their age range on the surveys.

Descriptive analysis was used to determine frequency of correct responses to the osteoporosis questions.

RESULTS

A total of 197 patient surveys and 20 provider surveys were completed. As we did not tabulate the number of surveys distributed to patients, the patient response rate is unknown; however, the provider response rate was 100%. Of the patient surveys, about 89% were obtained from patients visiting primary care clinics and about 11% were obtained from patients visiting the rheumatology clinic. Similarly, about 85% of provider surveys were obtained from primary care providers, and about 15% of these surveys were obtained from providers in the rheumatology clinic.

Provider osteoporosis knowledge

The participating providers ranged in age from younger than 30 years to up to 70 years. Of the providers, 95% were aware that osteoporosis and osteoarthritis are different conditions and that a man with osteoporosis should be taking calcium supplements. All of the providers were aware that osteoporosis is a disease that affects both men and women, that there are means for preventing osteoporosis, that therapies are available for men with osteoporosis, and that both men and women with osteoporosis are at increased risk for fracture.

Providers gave correct answers to about 80% or more of the questions regarding osteoporosis general knowledge, screening, and treatment (Figure 2). They were the least knowledgeable about osteoporosis risk factors and prevention, answering only about 72% of the questions in these areas

correctly. There was a wide range of knowledge regarding the risk of osteoporosis from medications; providers gave correct answers to 85% of questions about corticosteroid risks, 65% of questions about testosterone risks, 60% of questions about GnRH agonist risks, and 45% of questions about antiseizure medication risks. About 50% of providers were aware that rheumatoid arthritis is a risk factor for osteoporosis, and 45% of providers knew that ankylosing spondylitis is a risk factor. There were no significant differences between the responses from the primary care providers and the rheumatology clinic providers with respect to any of the question categories.

Patient osteoporosis knowledge

The male outpatients who completed the questionnaire ranged in age from younger than 30 years to 71 years

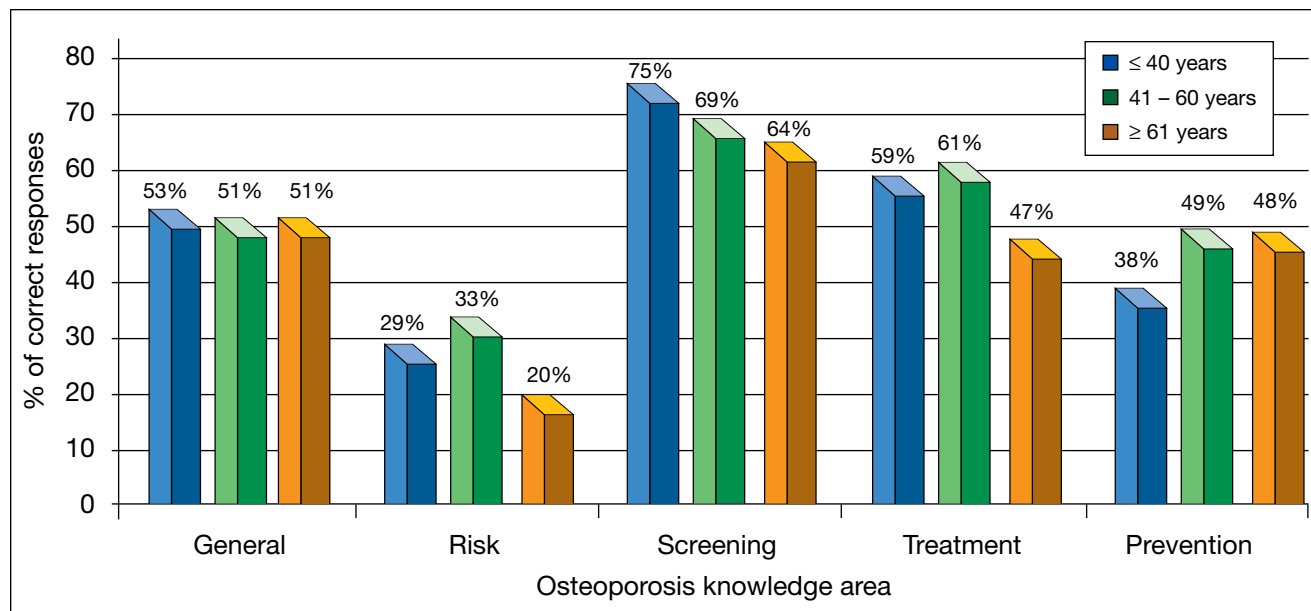


Figure 3. Patient knowledge of osteoporosis by age group.

and older. Patients of all ages were most knowledgeable about strategies to screen for osteoporosis (Figure 3). After screening, osteoporosis treatment was the second strongest area of osteoporosis knowledge for patients aged 60 years and younger.

Overall, 51% to 89% of patients knew that osteoporosis affects both men and women, that both men and women with osteoporosis are at risk for fracture, that osteoporosis screening is available for both men and women, that men with osteoporosis should take calcium supplements, that exercise and calcium/vitamin D supplements are preventive, and that a family history of osteoporosis is a risk factor for the disease. Only 20% to 50% of patients knew that osteoporosis and osteoarthritis are different conditions, that therapy is available for men with osteoporosis, that excessive alcohol intake and smoking are risk factors for osteoporosis, and that reducing alcohol intake and smoking can help prevent the disease. Only 5% of the patients

were aware that the mortality associated with male hip fracture is greater than the mortality associated with female hip fracture.

Patients gave correct answers to approximately 25% of all questions related to risk factors. Specifically, 58% of patients were aware that a family history of osteoporosis is a risk factor for the disease, while 36% were aware that rheumatoid arthritis is a risk factor. Only 9% of patients were aware that osteoarthritis is not a risk factor for osteoporosis, while 13% were aware that low testosterone is a risk factor and 11% were aware that thyroid disorder is a risk factor. Approximately 32% of patients were aware that smoking is a risk factor, and 31% were aware that excessive alcohol intake is a risk factor. Thirty seven percent of patients were aware that a personal history of nontraumatic fracture is a risk factor.

The patients achieved an average score of 71% on questions related to osteoporosis screening. Specifically, about 65% of patients were aware of

the availability of osteoporosis screening for men, whereas 73% were aware of the availability of osteoporosis screening tests for women.

Patients achieved an average score of 48% on questions related to osteoporosis treatment. Specifically, 47% of the patients were aware of the availability of osteoporosis therapy for men, while 75% were aware that a man with osteoporosis should be taking calcium supplements. Only 21% of the patients were aware that bisphosphonate therapy does not replace the need to have daily calcium supplementation for patients with osteoporosis.

The study patients achieved, on average, a score of 49% on all questions related to prevention. Specifically, 61% of patients were aware that preventive strategies exist for male osteoporosis. About 63% were aware that calcium/vitamin D supplementation helps to prevent the disease, and 59% were aware that exercise is preventive. About 45% of patients knew that smoking cessation helps to pre-

vent osteoporosis, while 47% were aware that decreasing or stopping excessive alcohol intake is preventive. Only 21% of patients were aware that such bisphosphonates as alendronate (Fosamax, Merck, Whitehouse Station, NY) and risidronate (Actonel, Proctor and Gamble Pharmaceuticals, Inc., Cincinnati, OH) are used to prevent osteoporosis.

DISCUSSION

Gaps in provider knowledge

Overall, the providers who participated in our survey had good knowledge about osteoporosis screening and treatment, but they were not aware of the risks of osteoporosis associated with inflammatory arthritis, such as ankylosing spondylitis and rheumatoid arthritis.

We found that only 45% of physicians were aware that ankylosing spondylitis is a risk factor for osteoporosis. In fact, the reported incidence of osteoporosis in patients with ankylosing spondylitis varies from 18.7% to 62%,^{11,12} which likely indicates that osteoporosis plays a major contributing role in the increased frequency of vertebral fractures among this patient population. Awareness of this fact was lacking among physicians in other studies as well. According to a survey of British clinical rheumatologists, patients with ankylosing spondylitis are not routinely screened for osteoporosis.¹²

Only half of the physicians in our study were aware that rheumatoid arthritis is a risk factor for osteoporosis, although rheumatoid arthritis is promoted by the American Medical Association as a medium osteoporosis risk factor in men.¹³ Most cross-sectional studies have reported that bone mineral density is lower in patients with rheumatoid arthritis than in healthy controls.¹⁴

Another knowledge gap that we identified in providers concerned medications that increase the risk of osteoporosis. Most (85%) of the providers were aware that corticosteroid use is a risk factor for osteoporosis, but they were not as familiar with the risk of osteoporosis associated with GnRH agonists, such as leuprolide (60%), and antiepileptic medications (45%).

Efforts to close the gap in physician knowledge about the diseases and medications that increase the risk of male osteoporosis will likely require the dissemination of information in medical schools, residency programs, and practice settings. Increasing provider knowledge about osteoporosis, however, does not always lead to changes in practice. Hansen and colleagues showed that, although physician knowledge of osteoporosis increased following an internet-based lecture, the physicians did not change their behavior and there was no increased screening of patients at risk for osteoporosis.¹⁵

Multifaceted approaches that target both physicians and patients may be more successful in closing the knowledge gap and changing behavior. A study by Majumdar and colleagues took such an approach to encouraging osteoporosis testing and treatment in patients treated in the emergency department for wrist fracture. The patients were handed information about osteoporosis, and their providers were faxed osteoporosis treatment guidelines that were endorsed by local opinion leaders and patient education. These interventions resulted in a threefold increase in osteoporosis testing and treatment.¹⁶

The recently developed Fracture Risk Assessment Tool may offer another means of closing providers' knowledge gaps. This tool, developed by the World Health Organization, estimates the 10-year probability of os-

teoporotic fractures for an untreated patient aged between 40 and 90 years using bone mineral density data and clinical risk factors for fracture.¹⁷ Educating providers about incorporating the tool into daily practice may improve their knowledge of male osteoporosis risk factors and optimize their management of the disease.

Gaps in patient knowledge

We found that the study patients had a relatively poor understanding of the basics of osteoporosis. In fact, less than half were aware that there is a difference between osteoporosis and osteoarthritis. According to a study by Satterfield and colleagues, at least one third of older women also confuse these two conditions.⁹ After osteoporosis was defined for the patients in our survey as "low bone mass" or "thin bones," patients still demonstrated little understanding of the condition's risk factors and treatment. Although they demonstrated a little more knowledge about preventing osteoporosis, they were the most knowledgeable about screening. Still, with an average of 71% of the questions regarding screening answered correctly, their screening knowledge can only be rated as fair.

According to the medical literature, both male and female patients have a poor understanding of the risk factors for osteoporosis and measures to prevent it. For instance, Cindaş and Savaş conducted an osteoporosis survey of male patients in Turkey and found that: only 62% of at-risk patients were aware that osteoporosis affects men, only 58% knew that exercise helps to prevent osteoporosis, and only 64% knew that calcium supplements help to prevent the disease.¹⁰ We found a similar level of awareness among our population of male U.S. veterans. In another study of 1,649 patients performed in Eng-

land, only 29% of women were aware that lack of exercise is a risk factor for osteoporosis.¹⁸ Sedlak and colleagues showed that men did not perceive themselves to be at risk for osteoporosis and participated in few osteoporosis preventive behaviors.¹⁹ Male patients in our study demonstrated disappointing awareness of osteoporosis risk factors, including such lifestyle factors as smoking and alcohol intake. This knowledge gap may be due, in part, to providers who were unable to educate their patients because they were not familiar with the risk factors for male osteoporosis.

Given the significant knowledge deficits we found among male veterans regarding risk factors for osteoporosis, educating such patients about these risk factors and how they may be modified may be one strategy for preventing osteoporosis. For example, an osteoporosis quiz could be administered to patients while they are waiting to be seen by a provider. Answers would be available to the patients, either immediately or in the form of a mailing, after they complete the quiz. If patients have questions after completing the quiz or reviewing the answers, these questions could be brought to the attention of the patient's provider.

Finding an instrument that is short, reliable, and valid would be ideal for promoting this patient-physician dyad. Two surveys—the 25-item Facts on Osteoporosis Quiz (FOPQ)²⁰ and the 20-item Osteoporosis Questionnaire (OPQ)²¹—have been developed to improve patient knowledge about osteoporosis. Using a brief survey such as the FOPQ or the OPQ in the setting of a routine checkup at a primary care provider's office could help to improve male patients' awareness of osteoporosis significantly. Neither of these instruments, however, were developed specifically for men.

Another strategy is to focus education around lifestyle factors, such as smoking and excessive alcohol intake. This type of education not only would promote osteoporosis prevention but also is consistent with the paramount goals of healthy cardiac living.

Study limitations

Our study has several limitations. As it used a convenience sample of male veterans living in an urban setting, its results may not be generalizable to other male populations. We did not obtain information on the sociodemographic characteristics of the patients surveyed, nor did we determine whether they had been screened for osteoporosis in the past or were being treated for the disease. Although we simplified the grade readability level of our questions to grade 8.1, we did not assess the patients' health literacy levels, so we do not know whether some patients had difficulty understanding the questions. We also did not explore the reliability and internal consistency of the instruments. Finally, as we did not select the surveyed physicians randomly, the extent of bias is not known.

IN CONCLUSION

Osteoporosis is a debilitating disease that poses a significant public health problem as the population ages. In the present study, most physicians who completed the questionnaire had a good to excellent degree of knowledge about screening and treatment of male osteoporosis, but only fair knowledge about risk factors and preventive treatment for the disease. By contrast, while male veteran outpatients had fair to good awareness of osteoporosis prevention and screening, they had poor understanding of osteoporosis risk factors and treatment. There is a need for health care providers to im-

prove their knowledge of risk factors and preventive therapies for male osteoporosis so that they can appropriately counsel patients about lifestyle factors, medications, and diseases associated with the condition. We have identified gaps in knowledge about male osteoporosis among health care providers and male patients at one VA institution, which can help guide future educational interventions to optimize bone health and prevent osteoporosis and the development of fragility fractures. ●

Acknowledgements

The authors would like to thank Rachel McNamara for her assistance with the article's figures.

Author disclosures

The authors report no actual or potential conflicts of interest with regard to this article.

Disclaimer

The opinions expressed herein are those of the authors and do not necessarily reflect those of Federal Practitioner, Quadrant HealthCom Inc., the U.S. government, or any of its agencies. This article may discuss unlabeled or investigational use of certain drugs. Please review complete prescribing information for specific drugs or drug combinations—including indications, contraindications, warnings, and adverse effects—before administering pharmacologic therapy to patients.

REFERENCES

1. Lane NE. Epidemiology, etiology, and diagnosis of osteoporosis. *Am J Obstet Gynecol.* 2006;194(suppl 2):S3–S11.
2. Kamel HK. Male osteoporosis: New trends in diagnosis and therapy. *Drugs Aging.* 2005;22(9):741–748.
3. Jones G, Nguyen T, Sambrook PN, Kelly PJ, Gilbert C, Eisman JA. Symptomatic fracture incidence in elderly men and women: The Dubbo Osteoporosis Epidemiology Study (DOES). *Osteoporos Int.* 1994;4(5):277–282.
4. National Committee for Quality Assurance. *The State of Health Care Quality: 2003.* Washington,

MALE OSTEOPOROSIS

Continued from page 33

- DC: National Committee for Quality Assurance; 2003. http://www.ncqa.org/Portals/0/Publications/Resource%20Library/SOHC/SOHC_2003.pdf. Accessed August 17, 2009.
- Chevalley T, Hoffmeyer P, Bonjour JP, Rizzoli R. An osteoporosis clinical pathway for the medical management of patients with low-trauma fracture. *Osteoporos Int*. 2002;13(6):450-455.
 - Kaufman J, Johnell O, Aadie E, et al. Background for studies on the treatment of male osteoporosis: State of the art. *Ann Rheum Dis*. 2000;59(10):765-772.
 - Jacobsen SJ, Goldberg J, Miles TP, Brody JA, Stiers W, Rimm AA. Race and sex differences in mortality following fracture of the hip. *Am J Public Health*. 1992;82(8):1147-1150.
 - Torgerson DJ, Thomas RE, Campbell MK, Reid DM. Randomized trial of osteoporosis screening. Use of hormone replacement therapy and quality-of-life results. *Arch Intern Med*. 1997;157(18):2121-2125.
 - Satterfield T, Johnson SM, Slovic P, Neil N, Schein JR. Perceived risks and reported behaviors associated with osteoporosis and its treatment. *Women Health*. 2000;31(4):21-40.
 - Cindas A, Savas S. What do men who are at risk of osteoporosis know about osteoporosis in developing countries? A pilot study in Isparta, Turkey. *Scand J Caring Sci*. 2004;18(2):188-192.
 - El Maghraoui A, Borderie D, Cherruau B, Edouard R, Dougados M, Roux C. Osteoporosis, body composition, and bone turnover in ankylosing spondylitis. *J Rheumatol*. 1999;26(10):2205-2209.
 - Geusens P, Vosse D, van der Linden S. Osteoporosis and vertebral fractures in ankylosing spondylitis. *Curr Opin Rheumatol*. 2007;19(4):335-339.
 - Campion JM, Maricic MJ. Osteoporosis in men. *Am Fam Physician*. 2003;67(7):1521-1526.
 - Phillips K, Aliprantis A, Coblyn J. Strategies for the prevention and treatment of osteoporosis in patients with rheumatoid arthritis. *Drugs Aging*. 2006;23(10):773-779.
 - Hansen KE, Rosenblatt ER, Gjerde CL, Crowe ME. Can an online osteoporosis lecture increase physician knowledge and improve patient care? *J Clin Densitom*. 2007;10(1):10-20.
 - Majumdar SR, Rowe BH, Folk D, et al. A controlled trial to increase detection and treatment of osteoporosis in older patients with a wrist fracture. *Ann Intern Med*. 2004;141(5):366-373.
 - Kanis JA, Johnell O, Oden A, Johansson H, McCloskey E. FRAX and the assessment of fracture probability in men and women from the UK. *Osteoporos Int*. 2008;19(4):385-397.
 - Griffiths F. Women's health concerns. Is the promotion of hormone replacement therapy for prevention important to women? *Fam Pract*. 1995;12(1):54-59.
 - Sedlak CA, Doheny MO, Estok PJ. Osteoporosis in older men: Knowledge and health beliefs. *Orthop Nurs*. 2000;19(3):38-42, 44-46.
 - Ailinger RL, Harper DC, Lasus HA. Bone up on osteoporosis. Development of the Facts on Osteoporosis Quiz. *Orthop Nurs*. 1998;17(5):66-73.
 - Pande KC, de Takats D, Kanis JA, Edwards V, Slade P, McCloskey EV. Development of a questionnaire (OPQ) to assess patient's knowledge about osteoporosis. *Manturitas*. 2000;37(2):75-81.