Survey of Osteoporosis Preventive Care in Community Family Medicine Settings

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Objective: *This study's objective was to document and describe osteoporosis preventive care for women age 45 years and older in community family medicine practices.* Methods: *We conducted a cross-sectional mailed survey of 400 women age 45 years and older enrolled in a community-based family medicine research network. Participants responded to 42 items regarding osteoporosis screening and prevention during primary care visits.* Results: *A total of 275 women returned the survey (response rate 71.4%). Of the respondents, 162 (58.9% of the sample) were ages 45 to 64, and 113 (41.1%) were age 65 and older. Rates of counseling on calcium intake, exercise, falls, and bone density testing were similar in the two age groups. Half of women age 65 and older and 43.8% of women under 65 had received bone density testing. Ninety-two percent of the respondents rated a discussion of osteoporosis and fracture prevention with their primary care provider as "very," "moderately," or "somewhat" important, but only 44% actually had such a discussion.* Conclusions: *Most women age 45 and older considered osteoporosis preventive care to be important. However, fewer than half discussed this topic with their primary care provider, and only half of women age 65 and older had undergone bone density screening.*

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Osteoporosis-related fractures are a common source of morbidity and mortality in primary health care. More than 10 million American women and men age 50 years and older currently have osteoporosis, and the number is expected to exceed 14 million by the year 2020.[1,2] Fractures in the United States could cost as much as $20 billion per year, with hip fractures accounting for more than a third of the total cost.[3] Mortality rates may be as high as 25% in women and 35% in men in the first year after hip fracture, and many survivors lose independence and require long-term care.[4]

Despite the magnitude of this preventable health problem, osteoporosis preventive care has not been incorporated into standard primary care practice.[5] For example, a 2002 survey of 1,500 women ages 40–69 in a managed care health plan showed that only 49% had ever discussed osteoporosis with a health care provider, and only 12%–34% of high-risk women had bone density testing.[6] Although evidence-based guidelines support routine osteoporosis screening in women age 65 and older,[7] low levels of risk factor assessment, bone density testing, counseling, and prescription of osteoporosis medications have been documented in primary care practices.[8,9] Most investigations of the reasons for these patterns have concentrated on physicians,[10-17] usually without assessing patient-related factors.

Practice-based research networks (PBRNs) are networks of physicians or practices that conduct practice-relevant research in primary care settings.[18] A PBRN would be an optimal setting to study patient-related factors that could affect osteoporosis prevention strategies. To date, no PBRN surveys have focused on this topic.

We conducted a cross-sectional survey of patients from five community family medicine practices participating in a practice-based research network in North Carolina to accomplish the following goals: first, we wished to document rates of osteoporosis-related preventive care (discussion regarding lifestyle measures and fall prevention, bone density testing, osteoporosis medication

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prescriptions) for women age 45 years and older in community family medicine practices. Second, we wanted to compare the rates of care in women age 65 and older to rates in women ages 45 to 64. Third, we assessed patients' attitudes toward their role and the physician's role in initiating discussions about osteoporosis preventive care.

Our objective was to document and describe osteoporosis preventive care for women age 45 years and older in community family medicine practices and identify aspects of osteoporosis preventive care that occur at low rates. Both patients and physicians could benefit from this study, since the results could suggest ways to improve prevention efforts for this common and important health problem in primary care practice.

Methods

Description of Subjects

Subjects were patients in five family medicine practices participating in the North Carolina Family Medicine Research Network (NC-FM-RN). This practice-based, university-sponsored network is devoted to research on chronic diseases in primary care. Between 2001 and 2004, more than 4,000 patients from 16 practices were enrolled and consented to participate in a research cohort, and the age and racial/ethnic distribution of the cohort is similar to that of the state of North Carolina.[19] In summer 2004, an additional five practices were added, and 1,411 patients from those practices consented to be contacted for all subsequent studies, including the current study.

We surveyed a computer-generated random sample of 400 women age 45 years or older from the NC-FM-RN research cohort because women in this age range may be considered reasonable candidates for osteoporosis preventive counseling or screening. The survey questionnaire was written in English. Because updated contact information for earlier enrolled cohort subjects was incomplete, we only sampled the newest five practices added to the NC-FM-RN in 2004. The research protocol was reviewed and approved by the Institutional Review Board of the University of North Carolina.

Outcomes

Performance of the following osteoporosis preventive care activities was studied: (1) bone density testing, (2) patient-provider discussion regarding calcium intake, lifestyle measures, and falls, (3) prescriptions for osteoporosis medications, including calcium, vitamin D, bisphosphonates, selective estrogen receptor modulating agents, hormone therapy, and calcitonin.

Instruments

The 42-item survey was written by the investigators based on a review of relevant literature and results from the 2004 National Osteoporosis Foundation Health Issues Survey of women age 45 and older.[9,10,16,17,20,21] Questions focused on patient demographics, risk factors for osteoporosis, opinions about the importance of osteoporosis preventive care, and whether the patient had received the outcome activities listed above.

Survey Administration and Data Management

Surveys with stamped return envelopes were mailed to potential respondents using the most recent address in the database. Potential respondents were given a local telephone number to contact study personnel if they had questions regarding the survey or the study. A second copy of the survey was mailed at week 4, followed by a reminder card at week 9 and a third copy of the survey at week 12.

Data were double entered into a Microsoft Access database (Microsoft Corporation, Redmond, Wash) by two research assistants who were blinded to the main objectives of the study. The two data entry tables were compared for accuracy and consistency, and mismatches were corrected in the Access database. Data were recorded as missing if items were unmarked, if multiple responses were marked for a single-answer item, or if written comments did not match any of the response options. The database was converted to a Stata data set for statistical analysis. Unreconciled data entry problems were resolved by the principal investigator in the de-identified Stata data set.

Statistical Analysis

Descriptive statistics were tabulated for all of the patients participating in the study. For the age-stratified analysis, patients were divided into two groups: ages 45 to 64 and age 65 and older. Demographic and anthropomorphic measures and frequency of bone density testing were compared in the two groups (Pearson's chi-square analysis and Fisher's exact tests for categorical variables, two-sample *t* tests for continuous variables).

To account for confounding by homogeneity of physician and patient behaviors within the same practice, we used Mantel-Haenszel tests (estimate of odds ratio, score test, General Association test) to compare survey responses in each age group, controlling for practice site.[22] We also tabulated osteoporosis medication use and respondents' ratings of the importance of screening for osteoporosis and other diseases. A P value of .05 or less was considered significant for all statistical tests. Statistical analyses were performed using the Stata 8.2 software (Stata Statistical Software: Release 8.2. College Station, Tex, Stata Corporation, 2003), except for the Mantel-Haenszel General Association test, which was performed in SAS 9.1 (SAS/STAT 9.1 User's Guide, Cary, NC, SAS Institute, Inc).

Our sample size was selected to allow a total width of 0.10 for a 95% confidence interval for frequency estimates assuming a 60% response rate for the survey and

a 0.25 proportion of women who received osteoporosis preventive care versus those who did not (dichotomous variable).[23] This was a more-conservative estimate of the proportion of women receiving osteoporosis-related care than was reported in the National Osteoporosis Foundation survey.[21]

Results

Of the 400 surveys mailed to participants, 275 were completed and returned, and 15 were returned to the sender due to an expired address (12) or deceased participant (3), resulting in an adjusted response rate of 71.4% (275/385).

The study sample had a mean age of 63.3 years, ranging from 45 to 94 (Table 1). The mean body mass index (BMI) (30.0±7.4) was borderline obese, with significantly higher BMI in women under age 65 (mean BMI=31.2) than in those age 65 and older (mean BMI=28.3, *P*=.002 for difference between age groups). Eleven percent of the women weighed below 127 pounds. Sixty-nine percent of the women were white, and 29% were African American. These demographics were comparable to demographics for the general population of women in North Carolina as reported by the 2004 Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System (BRFSS).[26] That is, in the BRFSS, 30.3% of North Carolina women were reported as overweight (BMI 25.0–29.9), 24.3% obese (BMI≥30.0), 70.9% white and 19.5% African American. Nonrespondents (n=110) were younger on average (mean age 59.1 years, SD=11.0) and more likely to be African American (44.8% African American, 53.8% white) than respondents.

Thirty-six percent of the survey respondents had a history of some type of fracture; fracture prevalence was 41.6% for older women and 32.1% for younger women (*P*=.11). Thirty-nine percent of the women reported a family history of osteoporosis or fracture.

Table 1

Characteristics of Survey Respondents*

Characteristic	*All Women (n=275)*	*Ages 45–64 (n=162)*	*Age ≥ 65 (n=113)*	P *Value*
Mean age, years (SD)	63.3 (12.1)			—
Median age, years (range)	45–94			—
Mean self-reported weight, kg (SD)	79.7 (20.9)	83.7 (21.2)	74.2 (19.2)	<.001**
Mean body mass index (SD)	30.0 (7.4)	31.2 (7.4)	28.3 (7.1)	.002**
Patients with weight < 127 pounds, n (%)	30 (10.9)	9 (5.6)	21 (18.6)	.001†
Race/ethnicity, n (%)				.22†
White	190 (69.3)	107 (66.5)	83 (73.5)	
Nonwhite	84 (30.7)	54 (33.5)	30 (26.6)	
History of fracture, n (%)				
Hip	4 (1.5)	2 (1.2)	2 (1.8)	.71†
Spine	5 (1.8)	2 (1.2)	3 (2.7)	.39†
Wrist	11 (4.0)	5 (3.1)	6 (5.3)	.36†
Rib	6 (2.2)	3 (1.9)	3 (2.7)	.65†
Any	99 (36.0)	52 (32.1)	47 (41.6)	.11†
Family history of osteoporosis or fracture, n (%)				.47†
No or don't know	167 (61.4)	96 (59.6)	71 (64.0)	
Yes	105 (38.6)	65 (40.4)	40 (36.0)	
Have had a bone density test, n (%)				.33‡
No or don't know	148 (53.8)	91 (56.2)	57 (50.4)	
Yes	127 (46.2)	71 (43.8)	56 (49.6)	

Note: the n for each characteristic varied between 271 and 275, depending on the number of missing responses.

SD—standard deviation

* n=275

** *P* value for Student *t* test comparing means in two age groups

† *P* value for Pearson's chi-square test or Fisher's exact test comparing the difference of two proportions, by age

‡ *P* value for Mantel-Haenszel estimate of the odds ratio comparing bone density testing versus not testing for the two age groups, controlling for practice

Overall, 64.7% of the respondents had at least one of the following risk factors for osteoporosis or fracture: weight <127 pounds, personal history of fracture, or family history of osteoporosis or fracture. Nearly half (46.2%) reported having a bone density test in the past.

Calcium, estrogen, and vitamin D were the most common osteoporosis-related medications taken by the patients (Table 2). Few patients were taking bisphosphonates, raloxifene, or calcitonin; those who were taking these medications usually received them from their primary care provider.

Overall, 92% of the women felt that it was important to talk to their primary care providers about osteoporosis and fracture (Table 3); half of the respondents considered this discussion to be "very important," and 41.9% considered it "moderately" or "somewhat" important. Fifty-six percent thought that both the patient and provider should take responsibility for initiating this discussion, and 58.5% considered the annual physical examination to be the best time for the discussion. Forty-four percent of the women had actually discussed osteoporosis or fracture with their primary care provider (Table 4), with no difference between the younger and older women (44.4% versus 44.0%). More women age 65 and older had discussed calcium and dairy intake with their primary care providers compared to the younger women, but this difference was not statistically significant after controlling for practice site (68.7% versus 54.6%, P=.22). About half of the women had discussed exercise and bone density testing with their providers. Only 27.1% had discussed falls with their providers, with a difference in proportion of older women versus younger women that was not statistically significant (31.9% versus 24.0%, P=.07).

Discussion

We surveyed 400 female primary care practice patients age 45 and older to assess rates of osteoporosis preventive care and the patients' attitudes toward this care. Half of the respondents considered a discussion with their primary care provider about osteoporosis or fracture to be "very important," and most thought the best time for this discussion was at the annual physical examination. However, only 44% of women age 65 and older reported having actually talked to their provider about osteoporosis, and only half of the women in that age group reported having had bone density testing.

Although the preventive care rates we found were low overall, they are comparable to rates of preventive care for other diseases. Low rates of clinical preventive services delivery have been documented for other diseases, despite the availability of evidence-based guidelines and standard screening protocols.[25,26] For example, a 2005 cross-sectional analysis of a physician survey linked to Medicare claims data reported the following proportions of Medicare beneficiaries receiving screening services in 2001: 46.7% of women ages 65 to 74 received mammograms, 9.04% of patients ages 65 to 79 received colonoscopy or sigmoidoscopy, 55.9% of diabetic patients age 65 and older received hemoglobin A1C monitoring.[26] Lower preventive care rates might be expected for osteoporosis, since recommendations for routine screening are relatively new and since patients and providers are less familiar with bone health issues. Although the 2002 US Preventive Services Task Force Guidelines recommended routine bone density testing to screen for osteoporosis in women age 65 and older,[7] no standard screening protocol

Table 2

Prescription of Osteoporosis-related Medications*

Medication (ever use)	***Percent of Respondents***				
	Never Prescribed for Patient	*Prescribed by Primary Care Provider*	*Prescribed by Another Provider*	*Prescribed by Both Providers*	*Don't Know*
Calcium	45.6	45.2	6.5	0.4	2.4
Vitamin D	63.3	30.3	3.4	0.4	2.6
Estrogen	56.1	30.0	12.7	0	1.3
Estrogen/progestin	79.7	11.7	5.9	0	2.7
Other hormone	81.2	8.3	5.1	0.5	5.1
Alendronate	89.6	7.4	1.3	0	1.7
Risedronate	90.7	7.2	0.4	0	1.7
Pamidronate	98.2	0	0	0	1.8
Raloxifene	94.7	3.5	0	0	1.8
Calcitonin	92.3	4.7	0	0	3.0

Note: the n for each medication varied between 218 and 248, depending on the number of missing responses.

* n=275

Table 3

Patients' Attitude Toward Physician's Role in Osteoporosis Preventive Care*

Survey Question	***Percent of Respondents***		
	Age 45–64 (n=162)	*Age ≥ 65 (n=113)*	*P Value*
How important is it to talk about osteoporosis and fracture prevention with your primary care provider?			.72**
Not important	6.9	10.0	
Somewhat important	25.6	24.0	
Moderately important	16.9	17.0	
Very important	50.6	49.0	
Who should bring up osteoporosis and fracture prevention in a clinic visit?			.57†
Both patient and primary care provider	56.7	54.2	
Patient	22.9	22.4	
Primary care provider	17.2	16.8	
Neither patient nor provider	3.2	6.5	
When is the best time to talk about osteoporosis and fracture prevention with your primary care provider?			.38†
In a separate clinic visit for that purpose	5.8	2.9	
Annual physical examination	57.7	59.8	
Whenever there is extra time	32.7	26.5	
Only at a visit for a bone problem	2.6	5.9	
Never/not important	1.3	4.9	

Note: the n for each question varied between 258 and 264, depending on the number of missing responses.

* n=275
** *P* value for Mantel-Haenszel score test for trend of odds, controlling for practice.
† *P* value for Mantel-Haenszel General Association test, controlling for practice.

has been accepted for use in primary care practice. Available guidelines offer conflicting recommendations regarding the earliest age to start bone density testing and no recommendations regarding the optimal screening interval or age to stop screening.[7,27,28] Our finding of a similar rate of bone density testing in women ages 45 to 64 compared to women age 65 and older is inconsistent with the emphasis on routine screening in the older age group in the Task Force guidelines.

Some of our results differed from a comprehensive telephone survey on osteoporosis health care conducted by the National Osteoporosis Foundation (NOF) in 2004.[21] More women surveyed by NOF had talked to their doctor about osteoporosis (54% of women ages 45 to 54, 68% of women ages 55 to 64, 63% of women age 65 and older). Likewise, more women in the NOF survey had received bone density tests (49% of women age 45 and older, including 57% of women age 65 and older). These may represent regional differences in practice patterns in the NOF national sample compared to our sample of North Carolina practice patients. Also, factors influencing the patients' and providers' perception of the need for osteoporosis preventive care may have differed between the cohorts. For example, because our cohort had a high mean BMI and a higher proportion of nonwhite participants (30.7% nonwhite in our survey versus 17% in the NOF survey), more of our participants may have been perceived by providers as having low risk for osteoporosis.

Study Limitations and Strengths

We acknowledge several limitations of our study. First, some response items had appreciable rates of missing values, especially questions about medication use (percent missing responses ranged from 9.8% for calcium to 20.7% for "other hormonal agents"). However, the percent missing values for the following essential items were all below 5%: age, weight, race, fracture history, family history of osteoporosis/fracture, past bone density test, and past discussion with doctor about osteoporosis. Second, self-reported weight and height may have been inaccurate, which would affect the BMI calculation. Since the mean calculated BMI in the cohort was borderline obese, we would still estimate most respondents to be at low risk of osteoporosis by weight criteria (ie, not underweight). Third, the fact that fewer respondents reported talking to their primary care provider about a bone density test

than reported having one suggests that recall of counseling may underestimate the frequency at which such events actually take place. Finally, although our results were similar to the NOF survey mentioned above, we cannot generalize them to all adult US women.

The main strength of our study is its focus on primary care patients, who are underrepresented in studies of osteoporosis preventive care. To our knowledge, we conducted the first primary care PBRN survey that focused on this topic.

Conclusions

Our survey adds to the current body of knowledge by documenting rates of osteoporosis preventive care in patients who attend community primary care practices. We found that women age 45 and older in community practices have a high level of interest in osteoporosis and fracture but that fewer than half receive relevant counseling and screening. Future studies should emphasize development of an evidence-based osteoporosis screening protocol and interventions to encourage age-appropriate, cost-effective fracture prevention activities in community primary care practices.

Table 4

Patient-Provider Discussion of Osteoporosis-related Topics (n=275)

	% of Respondents Who Have Talked to Primary Care Provider About This Topic		
Survey Question	*Ages 45–64 (n=162)*	*Age ≥ 65 (n=113)*	P *Value***
Osteoporosis or fracture	44.4	44.0	.64
Intake of calcium or dairy products	54.6	68.7	.22
Exercise to strengthen bones	47.7	53.1	.77
Falls	24.0	31.9	.07
Whether patient might need a bone density test	42.0	47.9	.97

Note: the n for each survey question varied between 244 to 269, depending on the number of missing responses.

* n=275

** *P* value for Mantel-Haenszel estimate of the odds ratio comparing yes versus no counseling for the two age groups, controlling for practice.

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