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Measuring health-related quality of life (HRQOL) in osteoporotic males using the Male OPAQ

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Abstract

Summary—The Male Osteoporosis Assessment Questionnaire (OPAQ™) is a health-related quality of life (HRQOL) instrument that can differentiate between men with and without fracture. The Male OPAQ™ is a reliable and validated instrument that may be utilized in clinical trials seeking to include male populations.

Introduction—Men with osteoporosis (OP) experience poorer clinical outcomes than do women with the disorder, but little is known about the impact of OP on men's HRQOL. This study aimed to test the validity, reliability, and ability to differentiate between men with and without fracture of an HRQOL for men with osteoporosis, the Male OPAQ™.

Methods—The OPAQ and OPAQ-SV were tested for face validity in interviews with male OP patients, and a revised, male-specific instrument was developed. Thirty-seven men ages 50+

completed the Male OPAQ™ and SF-12 at baseline and a two-week retest of the Male OPAQ™. To analyze both the domain and dimension scores, a normalization procedure was performed on the data to determine health status scores from 0 to 100. Descriptive statistics were calculated for each item and site. Reliability and validity of the Male OPAQ™ were assessed using Pearson's *r*.

Results—The Male OPAQ™ can discriminate between men with and without fracture, and men who have more fractures have poorer scores. Instrument domains correspond to those of the SF-12.

Conclusions—The Male OPAQ™ is a brief and sensitive tool for measuring HRQOL in men with OP. Further testing in a more diverse and large sample is warranted.

Keywords

Fracture; Men; OPAQ; Osteoporosis; Quality of life; Quality of life measurement

Introduction

In 2004, the Surgeon General of the USA issued the report “Bone Health and Osteoporosis” [1]. This comprehensive effort represents a milestone in shaping the trajectory and aims of osteoporosis (OP) research and treatment in the USA. The report chronicles the far-reaching economic, social, and physiologic impact of OP and notes the insufficiency of data on OP in male populations. Two of the key questions posed in this report, “What are the prevalence and burden of osteoporosis and the incidence and burden of fractures in men and racial and ethnic minorities, including Blacks, Asian, and Hispanics?” and “What is the impact on quality of life of asymptomatic spine fractures?” [1] have emerged as the major lines of research in OP-related epidemiology and health-related quality of life (HRQOL) studies. A HRQOL measure for OP in men should be evaluated in order to better understand the sex disparities in OP outcomes and so that we may design interventions which are more responsive to men's experience.

The risk factors for osteoporotic fracture in men such as low bone mineral density (BMD) [2], history of prior fracture [2], family history of OP or fracture, prolonged glucocorticoid use, increased age [3], or sedentism and low exercise engagement [4] are similar to the ones for older women but less well recognized in men by providers and patients alike [Solimeo, unpublished manuscript; 5, 6]. Caucasian men have a higher likelihood of developing OP than do African American men [2]. Men have lower prevalence of OP and lower lifetime risk of fracture than do women [7], but men have poorer fracture-related outcomes [8]. Some of this sex difference may derive from men's underdiagnosis and under-treatment [9, 10]. Men report less susceptibility to OP than do women [11, 12], and healthcare providers may not be familiar with prevention guidelines. For example, in a study of glucocorticoid-induced OP, many providers were not familiar with the need for BMD monitoring or recommendations for calcium or bisphosphonate use [13].

OP has an impact on morbidity to a larger degree than mortality [14], and the documented sex disparity in outcomes between men and women with OP underscores the importance of elucidating the impact of OP on men's HRQOL [6]. Interventions to improve QOL naturally derive from a deeper understanding of measurable components of HRQOL [15]. OP-targeted interventions must meaningfully address the sociocultural embodied experience of quality in quality of life [15]. Studies of HRQOL in female OP patients have documented their suffering from increased anxiety, depression, loss of self-esteem and self-efficacy, social isolation, and the loss of traditional feminine roles [1, 16, 17]. A number of measures have established the relationship between incident fracture, increasing disease severity, and decreasing HRQOL in female OP patients [14]. In particular, the Osteoporosis Assessment

Questionnaire (OPAQ™) has been shown to differentiate between women with and without fractures and is sensitive to severity, with women suffering more vertebral fractures having poorer OPAQ™ scores [18]. However, to date, we are unaware of any OP specific measure of HRQOL that has been validated for use in male populations.

This study was conducted to determine whether OPAQ, a quality of life instrument validated for use with women with OP, could also discriminate between men with and without prevalent fracture. The original Osteoporosis Assessment Questionnaire-Short Version (OPAQ-SV™) was selected because of the author's prior experience with this measure, the OPAQ's established reliability and validity, its ease of use, and its disease-specific scope, which may place fewer burdens on respondents and be of more utility in clinical trials focusing on this disorder. The OPAQ-SV™ was reviewed, and the items which addressed feminine gender roles were identified and modified to fit male respondents. The resultant instrument was then tested for reliability and validity in order to develop the Male OPAQ as a HRQOL for OP.

Methods

Development and scoring of the male Osteoporosis Assessment Questionnaire

The Osteoporosis Assessment Questionnaire (OPAQ™) has been found to be responsive to fracture and discriminates quality of life between post-menopausal women with fractures as well as post-menopausal women without fracture [19]. The original OPAQ™ and a shortened version (OPAQ-SV™) contained gender-specific questions which were validated for women, but not considered socially relevant for male patients. Thirty men ages 60 and older with prevalent clinical osteoporotic fracture were interviewed using OPAQ-SV™ to develop a sex-specific questionnaire. The interviews were conducted by one of the authors (Silverman) at the Osteoporosis Medical Center (OMC) site over the course of 1 month. During these interviews, the OPAQ-SV™ questions were reviewed for face validity in males. Based on their responses, the OPAQ-SV™ was modified to develop the Male OPAQ™. For example, the question "Do you have difficulty combing your hair?" was reworded to be more responsive to men's experience. In OPAQ-SV™, the mood domain was removed from the OPAQ due to redundancy; while in the Male OPAQ™, it was included. Further, because interviewees stressed the importance of usual work, this domain, along with both dressing and reaching domains, was added. The differences between the OPAQ-SV™ and Male OPAQ™ are described in Table 1.

The resultant instrument comprises 39 questions [Appendix]. Similar to the OPAQ-SV™, the Male OPAQ™ assesses three major health dimensions with corresponding health domains: physical function (walking/bending, dressing/reaching, household/self-care, transfer, usual work), emotional status (fear of falls, mood, body image, independence), and symptoms (back pain). In the Male OPAQ™, high values indicate a better health status. If values within a domain were missing or not applicable, the average of the values that were answered by respondents was used only if one half of the answers within the same domain were present. To create a domain score, scores from each question within a domain were summed and a normalization procedure was performed. Resulting scores ranged from 0 to 10, with 0 indicating the worst possible health status and 10 representing the best possible health status. Dimension scores were calculated by adding domain scores within a dimension, and a normalization procedure was performed resulting in dimension scores ranging from 0 to 100. For dimension scores, 0 represents the worst possible health status and 100 represents the best possible health status.

Subject recruitment and consent

This study was conducted at two clinical sites: Duke University Medical Center (DU) and the OMC. Participants were recruited by telephone or in person. Inclusion criteria included male sex, age 50 years or older, a history of osteoporotic fracture or a T-score of ≤ -2.5 SD in the spine or hip, and ability to read and speak English. Potential subjects at DU were identified and referred to the study by a board-certified endocrinologist. Subjects at the OMC were identified from the OMC clinical database, and they were recruited by telephone or in person at the clinic. A signed informed consent protocol was used at both sites, and all respondents were offered an honorarium. The protocol was reviewed and approved by the Duke University Medical Center Institutional Review Board (DU) and the Essex Institutional Review Board (OMC), and work at both sites was conducted in accordance with the guidelines provided by the 1964 Declaration of Helsinki.

Study design and data analysis

Patients completed the Male OPAQ™ and the Short Form 36 (SF-36) of the Medical Outcomes Study [20] by mail at baseline. At 2-week retest, the subjects were mailed the Male OPAQ™ with return postage. A one-page subject information form requesting demographic data, fracture incidence, and OP medication use was administered at baseline.

The 2-week test–retest of the Male OPAQ™ was measured to assess reliability. Scores were compared in each of the three dimensions using Pearson's *r*. Discriminant validity was determined by comparing mean Male OPAQ™ dimensions in 19 men with history of clinical fracture to the 18 men without clinical fracture using a Student's *t* test. To determine the construct validity of the Male OPAQ™, domains considered similar in the SF-36 were mapped together and compared by assessing correlation using Pearson's *r*.

Descriptive characteristics were derived from the demographics portion of the questionnaire. Demographics included age, primary and secondary osteoporosis treatments, working status and income, marital status, and fracture incidence. Age was reported as the mean from both sites combined and also separately for each site for each group of men (with fracture and without fracture). For all other demographic items, percentages for each item were calculated by taking the sum of each item in a given section and dividing that sum by the total number for each group (18 for men with a fracture and 19 for men without a fracture). Descriptive characteristics were compared between men with a fracture and men without a fracture as well as between both sites.

Results

Demographics

Study population characteristics are described in Table 2. The OPAQ™ was shown to be reliable and sensitive in testing with a modest sample size of 32 women [21]; accordingly, the validation of the MALE OPAQ employed a similarly efficient sampling strategy. Mean age and standard deviation are reported (in parenthesis). All other data report the number of men and percent. The total number of respondents includes 37 men, 14 respondents were recruited from the OMC site, while the remaining 23 were recruited from DU site. At the OMC site, all respondents who were enrolled completed the study; while at the DU site, 24 respondents were enrolled and one withdrew. Of the participants, 94.59% were Caucasian and 18 of whom reported fracture. The youngest respondent between both sites was 53, while the eldest respondent was 86. At both sites the average ages were within one standard deviation of each other. The average age of men with a fracture was 69.39; while for men without a fracture, the average age was 71.67. Men with a fracture were more likely to be retired or disabled.

Of the total number of respondents, 89.19% were receiving treatments for osteoporosis or secondary osteoporosis. For men with a fracture, 94.42% were receiving osteoporosis treatments; while for men without a fracture, 89.48% were receiving osteoporosis treatments. Of those receiving treatment, Risedronate and Alendronate were the most commonly reported drugs used for men with a fracture (27.77% and 22.22%, respectively). In men without a fracture, Risedronate, oral Ibandronate, and Alendronate were treatments most frequently reported.

Reliability

In the 2-week test/retest of the Male OPAQ across the three dimensions, a Pearson's correlation test was performed to determine reliability. At baseline, the mean score of participants for physical function, emotional status, and symptoms were 66.54, 74.02, and 68.38, respectively. After the second week, scores for physical function, emotional status, and symptoms were 67.58, 74.98, and 66.62, respectively. Pearson's correlation coefficients were calculated for physical function, emotional status, and symptoms. They were .795, .894, and .818, respectively. This denotes that after a 2-week retest of the same subjects, their answers show a correlation to their original answers from baseline, confirming the Male OPAQ's reliability across the three dimensions.

Discriminant validity

The three dimensions described by Male OPAQ across men with and without fractures are compared in Table 3. For males with fractures, the mean health status reported for physical function, emotional status, and symptoms were 62.50 (9.49), 66.77 (16.00), and 56.94 (19.86), respectively. Males without fracture indicated a higher mean health status across dimensions: 70.01 (9.19), 79.82 (12.13), and 77.11 (19.46), respectively. These differences were compared using Student's *t* test and were shown to be significant across all domains.

Construct validity

The three domains of the Male OPAQ were compared to four domains of the SF-36. In SF-36, those domains included physical function, role physical, bodily pain, and mental [20, 22]. Corresponding domains in the Male OPAQ and corresponding Pearson's *r* were physical function (.8902), physical (.7621), symptoms (.8627), and emotional status (.7320), respectively. Using the Pearson's correlation coefficient, *r*, to determine construct validity, the data suggests that there is a high correlation of the Male OPAQ to SF-36 across all domains (see Table 4).

Discussion

In this study, we successfully developed and validated an instrument for evaluating HRQOL in men—the Male OPAQ™. To our knowledge, this is one of the first attempts to validate an OP-targeted HRQOL instrument for use with men. This instrument can differentiate between men with and without fracture, and men scoring lower on the instrument are more likely to have a self-reported fracture than those men who reported no or fewer fractures. Two-week retest shows a strong correlation, indicating good reliability. The three domains of the Male OPAQ™ were also correlated to similar domains in a general health status instrument, the SF-12 [23]. Men's scores on the Male OPAQ™ confirm published studies indicating that men with OP suffer from fractures and that a greater number of fractures are associated with poorer HRQOL.

The literature on HRQOL in men is growing at a rapid pace, and the emerging trend shows that men's social roles contribute considerably to men's interpretation of and response to disease states and associated risks. The MALE OPAQ validation study reported here reflects

the rising importance of attending to male patients as *men* and builds upon earlier work that demonstrated a mismatch between male gender and the original OPOAQ by conducting face validity work to target the specific areas in need of revision [21]. Men are less likely to proactively seek medical care or consider health maintenance behaviors a priority, and are more likely to associate risky behavior with desirable social roles [24]. These themes in the gerontological literature on men's health, while general and in need of broader investigation, make the recent report of men's internalization of invulnerability to OP all the more troubling [Solimeo, unpublished manuscript; 6].

This study, while effective in demonstrating instrument validity and reliability, has several limitations. While there was a trend of poorer score with increased time from fracture, there was not a trend between increased age and lower score. Interestingly, age was inversely related to fracture incidence within this sample. Because physical function is inversely associated with age, the MALE OPAQ's discriminatory power likely *underestimates* physical function in younger men, making its demonstrated ability to differentiate among men with and without fracture more important. The relationships between the variables current age, age at fracture, race, or fracture site and Male OPAQ™ score were not able to be calculated due to the modest sample size. While the modest sample size was selected based on known group validation of the OPAQ™, further testing with a larger, more diverse sample is warranted.

Conclusions

Clinical understanding of OP in male populations is expanding at a rapid rate, outpacing our knowledge of the psychosocial factors contributing to men's poorer OP-related outcomes. Improvement in the rate of OP diagnosis in men may be on the horizon [1, 25], but such well-intentioned attention to underdiagnosis should be accompanied by the development of tools to understand the consequences of this epidemiological movement. This modest, self-funded study anticipates the needs of clinicians and researchers alike to improve the knowledge of the range of men's OP-related debility and how OP interacts with or can be predictive of HRQOL, and it does so using a definition of quality derived from men's experiences rather than those linked to pharmaceutical outcomes.

HRQOL instruments provide an efficient, standardized approach to exploring the interaction of disease and activities of daily living. OP specific measures reduce respondent burden and are more relevant to disease-targeted interventions. Male OPAQ™ instrument will have a number of practical applications in both clinical and research settings. It can be used as a correlate to the OPAQ in clinical trials exploring bone health and OP outcomes in both men and women. The OPAQ-SV™ can be either respondent or interview administered, requires a short amount of time to complete, can differentiate between respondents with and without fracture, and has been shown to be reliable and valid in female populations. The Male OPAQ™ builds on these advantages and can be used to assess the impact of interventions on OP-related outcomes. The Male OPAQ™ expands the utility of the original instrument in its ability to target the effects of OP on masculine roles and to differentiate between men with and without fracture. The Male OPAQ™ is a reliable and validated instrument that may be utilized in clinical trials seeking to include male populations.

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Appendix

Male OPAQ™ version 1.1

Please answer the following questions about your health. Most questions ask about your health during the past week. There are no right or wrong answers to the questions. It is very important that you answer every question.

The first two questions relate to your overall health. Please circle the number that best answers the question.

- 1) How satisfied are you with your health?

Ⓐ ————— Ⓓ

- 2) Considering all the ways that your osteoporosis affects you, rate how you are now doing.

Ⓐ ————— Ⓓ

The next 37 questions can be answered with a simple “√” or “×”.

The first 4 questions refer to WALKING AND BENDING.

DURING THE PAST WEEK:

- 3) How often were you able to walk as much as you needed to do?

- 1) All days
- 2) Most days
- 3) Some days
- 4) Few days
- 5) No days

- 4) How often did you have trouble bending, lifting or stooping?

- 1) All days
- 2) Most days
- 3) Some days
- 4) Few days

- 5) No days
- 5) How often did you have trouble either walking one block or going down stairs?
- 1) All days
- 2) Most days
- 3) Some days
- 4) Few days
- 5) No days
- 6) How often did you need use of a cane, crutches, walker, or companion while walking?
- 1) All days
- 2) Most days
- 3) Some days
- 4) Few days
- 5) No days

The next 3 questions refer to DRESSING AND REACHING TASKS.

DURING THE PAST WEEK:

- 7) Could you easily put on or take off a pair of stockings and/or underwear?
- 1) All days
- 2) Most days
- 3) Some days
- 4) Few days
- 5) No days
- 8) Could you easily comb, brush, or wash your scalp and hair?
- 1) All days
- 2) Most days
- 3) Some days
- 4) Few days
- 5) No days
- 9) Could you easily reach shelves that were above your head?
- 1) All days
- 2) Most days
- 3) Some days
- 4) Few days
- 5) No days

The next 4 questions refer to HOUSEHOLD AND SELF-CARE TASKS.

DURING THE PAST WEEK:

- 10) Have you had to change the way you bathe yourself?
- 1) Always
 - 2) Very often
 - 3) Sometimes
 - 4) Almost never
 - 5) Never
- 11) Have you had to change the types of clothes you wear because of difficulty in dressing?
- 1) Always
 - 2) Very often
 - 3) Sometimes
 - 4) Almost never
 - 5) Never
- 12) How often have you had difficulty doing daily errands such as going to the grocery store, drug store, or dry cleaner?
- 1) Always
 - 2) Very often
 - 3) Sometimes
 - 4) Almost never
 - 5) Never
 - 6) I never do any daily errands
- 13) How often were you able to do heavy work around the house such as vacuuming or gardening without help?
- 1) Always
 - 2) Very often
 - 3) Sometimes
 - 4) Almost never
 - 5) Never
 - 6) I do not usually do any heavy work around the house

The next 4 questions refer to TRANSFERS (Getting up and down).

DURING THE PAST WEEK:

- 14) How often did you have trouble getting in or out of bed?
- 1) All days
 - 2) Most days
 - 3) Some days

- 4) Few days
5) No days
- 15) How often did you have trouble getting in or out of a chair?
- 1) All days
2) Most days
3) Some days
4) Few days
5) No days
- 16) How often did you have trouble getting on or off the toilet?
- 1) All days
2) Most days
3) Some days
4) Few days
5) No days
- 17) How often did you have trouble getting in and out of cars or public transportation?
- 1) All days
2) Most days
3) Some days
4) Few days
5) No days

The next 5 questions refer to FALLS.

DURING THE PAST WEEK:

- 18) How often were you afraid that you would fall?
- 1) Always
2) Very often
3) Sometimes
4) Almost never
5) Never
- 19) How often were you afraid that you would accidentally break or fracture a bone?
- 1) Always
2) Very often
3) Sometimes
4) Almost never
5) Never

- 20) How often did you feel that you were losing your balance?
- 1) Always
 - 2) Very often
 - 3) Sometimes
 - 4) Almost never
 - 5) Never
- 21) How often did you use a hand rail or other support when walking up or down stairs?
- 1) Always
 - 2) Very often
 - 3) Sometimes
 - 4) Almost never
 - 5) Never
- 22) How often did your fear of falling keep you from doing what you wanted to do?
- 1) Always
 - 2) Very often
 - 3) Sometimes
 - 4) Almost never
 - 5) Never

The next 4 questions refer to BACK ACHE AND PAIN.

DURING THE PAST WEEK:

- 23) How often did you have any backache or pain?
- 1) All days
 - 2) Most days
 - 3) Some days
 - 4) Few days
 - 5) No days
- 24) How would you describe the backache or pain you usually had?
- 1) Severe
 - 2) Moderate
 - 3) Mild
 - 4) Very mild
 - 5) None, I had no back pain
- 25) How often did you feel that your back tired easily?
- 1) All days

- 2) Most days
- 3) Some days
- 4) Few days
- 5) No days

26) How often did backache or pain keep you from doing what you wanted to do?

- 1) All days
- 2) Most days
- 3) Some days
- 4) Few days
- 5) No days

The next 3 questions refer to your USUAL WORK OR ACTIVITIES.

DURING THE PAST WEEK:

27) How often were you unable to do your usual daily work, either at home, as a volunteer, at school, or at a paid job?

- 1) Always
- 2) Very often
- 3) Sometimes
- 4) Almost never
- 5) Never
- 6) I do not usually do any work

28) How often were you unable to be active in your hobbies?

- 1) Always
- 2) Very often
- 3) Sometimes
- 4) Almost never
- 5) Never
- 6) I do not usually do any hobbies

29) How often were you unable to do games and/or sports that you would like to do?

- 1) All days
- 2) Most days
- 3) Some days
- 4) Few days
- 5) No days
- 6) I do not do any games or sports

30) How often have you had to change the way you do your daily activities or shorten the time you spend doing them?

- 1) All days
- 2) Most days
- 3) Some days
- 4) Few days
- 5) No days

The next 3 questions refer to MOOD.

DURING THE PAST WEEK:

- 31) How often have you felt depressed or been in low or very low spirits?
 - 1) Always
 - 2) Very often
 - 3) Sometimes
 - 4) Almost never
 - 5) Never
- 32) How often did you feel that nothing turned out the way you wanted it to?
 - 1) Always
 - 2) Very often
 - 3) Sometimes
 - 4) Almost never
 - 5) Never
- 33) How often has it been difficult for you to deal with feelings of depression or being blue?
 - 1) Always
 - 2) Very often
 - 3) Sometimes
 - 4) Almost never
 - 5) Never

The next 4 questions refer to BODY IMAGE.

DURING THE PAST WEEK:

- 34) How often were you aware of changes in your body when trying on clothes?
 - 1) Always
 - 2) Very often
 - 3) Sometimes
 - 4) Almost never
 - 5) Never
- 35) How often were you bothered by the way your back looks?

- 1) Always
- 2) Very often
- 3) Sometimes
- 4) Almost never
- 5) Never

36) How often did you feel that you could NOT fulfill your role as a father, husband, grandfather?

- 1) Always
- 2) Very often
- 3) Sometimes
- 4) Almost never
- 5) Never

The next 3 questions refer to INDEPENDENCE.

DURING THE PAST WEEK:

37) How often did you feel confident you could live on your own without assistance?

- 1) Always
- 2) Very often
- 3) Sometimes
- 4) Almost never
- 5) Never

38) How often did you have to rely on others for assistance in daily activities?

- 1) Always
- 2) Very often
- 3) Sometimes
- 4) Almost never
- 5) Never

39) How often were you worried that you might not be able to take care of yourself in the future?

- 1) Always
- 2) Very often
- 3) Sometimes
- 4) Almost never
- 5) Never

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Table 1

Comparison of Male OPAQ™ to OPAQ-SV™ domains

Male OPAQ™		OPAQ-SV™	
Dimension	Domains	Dimension	Domains
Physical Function	1. Walking/Bending	Physical Function	1. Walking/Bending
	2.Dressing/Reaching		2. Transfer
	3. Household/ Self care		3. Daily Activity
	4. Transfer		
	5. Usual work		
Emotional Status	1. Fear of falls	Emotional Health	1. Fear of falls
	2. Mood		2. Body image
	3. Body image		3. Independence
	4. Independence		
Symptoms	1. Back pain	Back pain	1. Back Pain

Table 2

Descriptive characteristics by site and overall, N=37

	Men reporting fracture				Men with no self report of fracture				Total across sites (N=37)	p values
	OMC (N=5)	DU (N=13)	Both (N=18)		OMC (N=9)	DU (N=10)	Both (N=19)			
Age (53–86)	68.00 (±8.631)	69.69 (±9.481)	69.39 (±9.419)		72.67 (±9.421)	70.20 (±9.886)	71.67 (±9.069)		70.32 (±9.202)	NS
Employment status										
Retired	60% (3/5)	84.62% (11/13)	83.33% (15/18)		88.89% (8/9)	50% (5/10)	68.42% (13/19)		27/72.97%	NS
Disabled	0	15.38% (2/13)	11.11% (2/18)		0	0	0		2/5.41%	NS
Working	40% (2/5)	0	5.55% (1/18)		11.11% (1/9)	50% (5/10)	31.58% (6/19)		8/21.62%	NS
Marital status										
Married	60% (3/5)	76.92% (10/13)	77.77% (14/18)		55.56% (5/9)	90% (9/10)	78.95% (15/19)		27/72.97%	NS
Widowed	20% (1/5)	7.69% (1/13)	5.55% (1/18)		11.11% (1/9)	0	5.26% (1/19)		3/8.11%	NS
Separated/Divorced	20% (1/5)	7.69% (1/13)	11.11% (2/18)		22.22% (2/9)	10% (1/10)	10.53% (2/19)		5/13.51%, <i>p</i> =.272	NS
Never Married	0	7.69% (1/13)	5.55% (1/18)		11.11% (1/9)	0	5.26% (1/19)		2/5.41%	NS
Annual household income										
<\$25,000	0	15.38% (2/13)	11.11%		0	0	0%		2/5.41%	NS
\$25,000–\$75,000	80% (4/5)	53.85% (7/13)	72.22%		88.89% (8/9)	40% (4/10)	42.10%		23/62.16%	NS
>\$75,000	20% (1/5)	30.77% (4/13)	16.67%		11.11% (1/9)	60% (6/10)	52.63%		12/32.43%	NS
Race										
Caucasian	80% (4/5)	100% (13/13)	94.44% (17/18)		100% (9/9)	90% (9/10)	94.74% (18/19)		35/94.59%	
African American or Hispanic	0	0	0		0	0	0		0	
Asian	20% (1/5)	0	5.56% (1/18)		0	0	0		1/2.70%	
Other	0	0	0		0	10% (1/10)	5.26% (1/19)		1/2.70%	
Pharmacological treatments										
Risedronate	40% (2/5)	30.77% (4/13)	6/22.77%		0	20% (2/10)	2/15.79%		8/21.62%	NS
Alendronate	40% (2/5)	15.38% (2/13)	4/22.22%		33.33% (3/9)	40% (4/10)	7/31.58%		11/29.73%	NS
Testosterone	0	7.69% (1/13)	1/5.55%		0	20% (2/10)	2/10.53%		3/8.11%, <i>p</i> =.159	NS
Methylprednisolone	0	0	0		0	10% (1/10)	1/5.26%		1/2.70%	NS
Bicalutamide	0	7.69% (1/13)	1/5.55%		0	0	0		1/2.70%	NS
Ibandronate Oral	0	0	0		33.33% (3/9)	0	3/15.79%		3/8.11%	.021
Ibandronate IV	0	15.38% (2/13)	2/11.11%		0	0	0		2/5.41%, <i>p</i> =.257	NS
Teriparatide	20% (1/5)	0	1/6.67%		22.22% (2/9)	0	2/10.53%		3/8.11%	.021

	Men reporting fracture			Men with no self report of fracture			Total across sites (N=37)	p values
	OMC (N=5)	DU (N=13)	Both (N=18)	OMC (N=9)	DU (N=10)	Both (N=19)		
Zoledronic Acid	0	7.69% (1/13)	1/5.55%	0	0	0	1/2.70%	NS

Table 3

Comparison of Male OPAQ dimensions in males with and without fractures, all sites

	Physical Function (0–100)	Emotional Status (0–100)	Symptoms (0–100)
Males with fracture (<i>N</i> =18)	62.50 (±9.49)	66.77 (±16.00)	56.94 (±19.86)
Males without fracture (<i>N</i> =19)	70.01 (±9.19)	79.82 (±12.13)	77.11 (±19.46)
<i>p</i> value	0.020	.009	0.004

0 lowest quality of life, 100 best quality of life

Table 4

Comparison of Male OPAQ to SF-36 domains, all sites

	SF-36 Physical Function vs. Male OPAQ Physical Function	SF-36 Role Physical vs. Male OPAQ Physical	SF-36 Bodily Pain vs. Male OPAQ Symptoms	SF-36 Mental vs. Male OPAQ Emotion
Pearson's <i>r</i>	+0.8902	+0.7621	+0.8627	+0.7320