Research Brief

Osteoporosis Knowledge and Health Beliefs Among Men in Midlife Years

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ABSTRACT

Objective: To examine the role of socioeconomic variables on middle-aged adult men's knowledge and health beliefs about osteoporosis.

Methods: An anonymous survey used validated scales to assess osteoporosis knowledge and health beliefs in a sample of 262 men aged 36–55 years. Descriptive and group-differences statistics (MANOVA and ANOVA) were used.

Results: Total osteoporosis knowledge was low (mean, 11.1 of 22) and mean scores on perceived susceptibility and seriousness health belief domains were also low: 13.2 and 17.2, respectively out of 30. Multivariate ANOVA revealed that perceived seriousness, barriers to calcium intake, and health motivation varied significantly with level of formal education attained ($P < .05$). There was no significant difference with income.

Conclusions and Implications: Results of this convenience sample of predominantly white men found that level of osteoporosis knowledge and perceived susceptibility were low. Given the increased prevalence of osteoporosis-related fracture in men, methods to increase knowledge and awareness are needed.

Key Words: osteoporosis, Health Belief Model, men, middle-aged, calcium, exercise (*J Nutr Educ Behav*. 2017; ■:1-5.)

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INTRODUCTION

Approximately 54 million Americans have bone-related deficiencies[1-4] such as osteopenia or osteoporosis. Although osteoporosis-related bone fractures are more prevalent among women than men, about 39% of such fractures, as well as up to 25% of osteoporosis-related hip fractures, occur in men aged 50–64 years.[1-4] Moreover, men's risk of mortality 1 year after hip fracture is nearly twice that of women for reasons that are not well understood.[2,3] Men are more likely to sustain a fracture before age 50 than are women; however, many of these fractures could be related to high-energy trauma, such as from physical labor or sports.[4]

Research tends to focus on osteoporosis in women,[5-7] with few studies in older men.[8,9] Consequently, relatively little is known about men's osteoporosis knowledge, beliefs, or health-related behavior, particularly those in the midlife,[10,11] and hence little is known about potential osteoporosis-related, health promotion, and prevention strategies that might be tailored for men.

The purpose of this study was to examine osteoporosis knowledge, beliefs, and associated behaviors among middle-aged men as a preliminary basis for developing tailored interventions. This study assessed the degree to which socioeconomic factors, namely level of education attained and income, were associated with osteoporosis-related knowledge and health beliefs.

METHODS

Study Design, Recruitment, and Participants

This study assessed osteoporosis knowledge and health beliefs using a battery of validated questionnaires administered via Qualtrics (Qualtrics, Provo, UT), an online survey program, during the spring, 2014. Students from 2 introductory undergraduate classes that were purposefully selected were requested to invite and pass along the anonymous online survey link to a male within the desired age range for the study (aged 36–55 years); this age range matched that of prior studies.[12-16] These students, who were representative of the student body, were given a month to recruit and engage participants. E-mail reminders were sent twice to participants at 2-week intervals. The non-incentivized participants consisted of

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262 adult men aged 36–55 years (mean, 47.2; SD, 5.28 years); the sample size was comparable to previous studies examining osteoporosis knowledge and beliefs.[12-15] The study was approved by the East Carolina University's institutional review board; participants completed the informed consent online immediately before starting the survey.

Data Collection

The online survey consisted of demographic questions, a modified version of the original Osteoporosis Knowledge Test (OKT),[15] and the Osteoporosis Health Belief Scale (OHBS),[16] and was administered in this recommended[15] order to ensure responses on the OKT were not influenced by responses on the OHBS.

The original OKT developed by Kim et al[15] is a validated 24-item instrument that assesses participants' knowledge of osteoporosis risk factors and knowledge of preventive behaviors (calcium intake and exercise). This study used a modified 22-item tool (which excluded 2 female-specific items) with a total score ranging from 0 to 22. In addition to a total score, the OKT can be divided into 2 knowledge subscales based on the 22-item test: an exercise subscale with a total of 14 questions (items 1–14) and a possible total score of 0–14, and a calcium intake subscale with a total of 15 questions (items 1–7 and 15–22) and a possible total score of 0–15. Thus, the OKT developers[15] determined that each subscale domain needed to use items 1–7, which tested knowledge of risk factors. The remaining questions used multiple choice options and assessed individuals' knowledge of exercise and knowledge of calcium food sources and recommendations. Scoring of the OKT used scoring sheets developed by the original authors; each item had 1 best correct answer choice. Dummy codes consisted of a score of 1 for each correct answer and 0 for an incorrect or omitted question.[15] According to Kim and colleagues,[15] reliability coefficients were 0.72 and 0.69 for calcium intake and exercise subscales, respectively. The psychometric analysis for the current study indicated a reliability coefficients (Cronbach α) of .70 for the total modified knowledge scale, with .71 and .64 for the exercise and calcium intake subscales, respectively. The reliability coefficient for the calcium intake subscale in this study, although low, was comparable to the statistics from the original authors.[15]

The OHBS, a validated tool,[16] consisted of 42 items that assessed an individual's perception in 7 domain areas, with 6 questions in each domain: (1) osteoporosis susceptibility and (2) seriousness, (3) benefits of exercise and (4) calcium intake, (5) barriers to exercise and 6) calcium intake, and (7) health motivation. The domains related to the constructs of the Health Belief Model[17] and assessed participants' perceived health beliefs related to osteoporosis. Response categories for all items used 5-point Likert-type scales ranging from strongly disagree (1) to strongly agree (5) such that total scores for each domain could range from 6 to 30, per author-provided scoring sheet.[15] Higher scores in a domain indicated how strongly participants agreed or disagreed on that domain. According to Kim and colleagues,[16] reliability coefficients for the OHBS domains ranged from .61 to .80. In the current study, Cronbach α for the domains ranged from .77 to .93.

Data collected included age, ethnicity, marital status, highest level of formal education attained, and annual income earned.

Data Analytic Strategy

The researchers conducted data analysis using Statistical Package for Social Sciences software (version 22.0, SPSS, Inc, IBM Corp, Armonk, NY, 2013). Descriptive statistics, group-differences statistics (MANOVA and ANOVA), and *post hoc* Tukey's Honestly Significant Difference (HSD) comparison tests were computed with $P \leq .05$. Per SPSS, the HSD reduces the risk of type 1 error in the group-differences calculations. Data distribution was evaluated using parametric tests. Statistical significance was set at $\alpha < .05$.

RESULTS

The majority (75%) of participants were white (similar to the university demographics) with either some college or a college degree (65%), and were married (79%) and earned ≥$50,000 annually (71%). Table 1 displays participants' characteristics.

Participants' mean score on the OKT total subscale was 11.1 (SD, 3.49) of 22; a similar trend was observed with the subscales (Table 2). The mean score on the knowledge of risk factors for developing osteoporosis (OKT risk) subscale was 3.5 (SD, 1.67) out of 7. On the OHBS, perceived susceptibility and seriousness of developing osteoporosis had mean scores of 13.2 (SD, 4.59) and 17.2 (SD, 4.26) out of 30, respectively. Table 2 presents reported perceived benefits of and barriers to engaging in osteoporosis-preventive behaviors, exercise, and calcium intake. The data were normally distributed; skewness and ketosis were between –1 and +1. The normal Q-Q plot showed straight lines for the total and subscales.

Education and income differences on the OKT and OHBS were assessed using MANOVA. A MANOVA for the OKT revealed no significant differences by education (Hotelling's $T = 0.51$; $F = 1.371$; $P = .20$), income (Hotelling's $T = 0.07$; $F = 0.177$; $P = .99$), or their interaction (Hotelling's $T = 0.103$; $F = 0.911$; $P = .60$). The MANOVA for the OHBS revealed significant differences by education (Hotelling's $T = 0.188$; $F = 2.117$; $P = .003$) but not by income (Hotelling's $T = 0.116$; $F = 1.230$; $P = .11$) or by the interaction of education and income (Hotelling's $T = 0.328$; $F = 0.911$; $P = .60$). Follow-up ANOVAs and Tukey's HSD comparison tests at .05 on the OHBS by education are shown in Table 3. As shown, the educational groups differed on 3 OHBS domains: perceived seriousness, barriers to calcium intake, and health motivation. Participants with the highest educational level (ie, more than a college graduate) scored significantly lower than the other 3 groups on most of these OHBS domains; although these groups did not differ significantly from each other ($4 = 3 = 2$), all differed significantly ($P \leq .05$, Tukey HSB: $4 = 3 = 2 > 1$) from the group with the lowest education (high school or less) for these OHBS domains. When grouped by education level, participants' mean scores on perceived susceptibility to developing osteoporosis domain of the OHBS ranged from 12.4 to 13.8, out of a total of 30 (Table 3).