

Prevalence of Urinary Incontinence in Men: Results From the National Health and Nutrition Examination Survey

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Abbreviations and Acronyms

BACH = Boston Area Community Health

BPH = benign prostatic hyperplasia

ISI = incontinence severity index

LUTS = lower urinary tract symptoms

NHANES = National Health and Nutrition Examination Survey

POR = prevalence odds ratio

UI = urinary incontinence

Submitted for publication February 3, 2010.

Study received National Centers for Health Statistics Ethics Review Board approval.

The Department of Veterans Affairs had no role in the collection, analysis and interpretation of the data or the manuscript preparation, review, or approval.

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† Recipient of a Veterans Health Administration Career Development Award (CDA-2).

‡ Financial interest and/or other relationship with Pfizer.

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Purpose: We estimated the prevalence of urinary incontinence in the United States adult male population and identified associated factors.

Materials and Methods: Data were analyzed for 5,297 men 20 years old or older who participated in the 2005 to 2006 and 2007 to 2008 cycles of the National Health and Nutrition Examination Survey, a cross-sectional, nationally representative survey of the United States noninstitutionalized population. Urinary incontinence (score of 3 or greater on a validated incontinence severity index, indicating moderate to severe leakage) was assessed. Potential associated factors included age, race/ethnicity, education, self-reported health status, prior diagnosis of prostate cancer and/or enlarged prostate (men 40 years old or older), chronic diseases and depression status. Prevalence ORs were estimated from a multivariable logistic regression analysis using appropriate sampling weights.

Results: The prevalence of moderate/severe urinary incontinence was 4.5% (95% CI 3.8, 5.4). Prevalence increased with age from 0.7% (95% CI 0.4, 1.6) in men 20 to 34 years old, to 16.0% (95% CI 13.0, 19.4) in men 75 years old or older ($p < 0.001$). We found no difference in prevalence by racial/ethnic group ($p = 0.38$). Factors significantly associated ($p < 0.05$) with urinary incontinence were age (per 10-year increase, OR 1.8; 95% CI 1.6, 2.0), major depression (OR 2.7; 95% CI 1.6, 4.0) and hypertension (OR 1.3; 95% CI 1.1, 1.5).

Conclusions: Age and race adjusted prevalence estimates for urinary incontinence in men are consistent with other estimates using a similar definition. To our knowledge this is the first study that identifies factors associated with moderate to severe urinary incontinence in men.

Key Words: urinary incontinence, male, prevalence, epidemiology, prostatic diseases

URINARY incontinence is a common condition that negatively affects the general population and impairs quality of life.¹ Although UI is not life threatening, the symptoms often impair the social, physical and psychological well-being of affected individuals. In addition, the costs associated with incontinence are likely to con-

tinue increasing with the aging population.²⁻⁴

There are far more epidemiological studies of UI in women than in men, and few population based prevalence estimates for UI and associated factors in men in the United States.¹ Furthermore, studies that have included both genders demonstrate con-

sistently that prevalence is higher in women than in men by an approximately 2:1 ratio.¹ Recent estimates of UI occurring in the last month in women from NHANES 2005–2006 ranged from 7% in younger women to 32% in women 80 years old or older (16% overall).⁵ For men UI prevalence ranges from 5% to 24%,^{3,6–10} with daily or weekly incontinence ranging from 2% to 11%.^{6,7} Data from NHANES 1999–2000 for men 60 years old or older showed a prevalence of 17% for any UI in the last year.¹¹

Prior studies have consistently reported age as a risk factor for UI in women and men.^{1,6,7} Other associated factors specific to men include LUTS,¹² mobility problems (men 65 years old or older),¹³ comorbid conditions⁷ and prostatectomy.¹⁴ Despite recent advances in surgical techniques for the treatment of prostate cancer, frequent UI (more than 2 times daily) remains a significant negative genitourinary complication in 12% to 16% of men who underwent surgery for prostate cancer even after 5 years.^{14,15} Less is known about UI and associated factors in a nationally representative, population based sample of men of all ages. In our analysis we provide prevalence estimates and identify factors associated with moderate to severe UI in men using data from this 4-year period of the NHANES program.

METHODS

NHANES 2005–2006 and 2007–2008

The NHANES program consists of cross-sectional, national health surveys conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention (<http://www.cdc.gov/nchs/nhanes.htm>). The NHANES provides estimates of the health status of the United States population by selecting a representative sample of the noninstitutionalized population using a complex, stratified, multistage, probability cluster design. The NHANES 2005–2006 oversampled persons 60 years old or older, and black, Mexican American and low income white individuals. The National Centers for Health Statistics Ethics Review Board approved the protocol and all participants provided written informed consent.

Procedures

Participants were interviewed in their homes, and then underwent standardized physical examination including measured height and weight, and further questioning at a mobile examination center. Trained interviewers asked questions about UI of those participants 20 years old or older in a private mobile examination center interview. Men 40 years old or older were also asked questions related to prostate conditions during this private interview.

To define UI we used the validated 2-item ISI, which correlates well with incontinence volume and incontinence frequency.¹⁶ The ISI is based on a question about frequency of episodes (less than once per month, a few times

a month, a few times a week, or every day and/or night) and a question about the amount of leakage (drops, splashes or more). The responses on the 2 questions are multiplied to obtain a severity score ranging from 1 to 12 (score 1 to 2—mild or slight, 3 to 6—moderate, 8 to 9 [not possible]—severe and 10 to 12—very severe).¹⁶

For this analysis the categories of severe and very severe symptoms were combined. This level of severity corresponds to at least weekly leakage or monthly leakage of volumes more than just drops.¹⁶ Stress incontinence was defined based on the question, “During the past 12 months, have you leaked or lost control of even a small amount of urine with activity like coughing, lifting, or exercise?” Urge incontinence was defined based on the question, “During the past 12 months, have you leaked or lost control of even a small amount of urine with an urge or pressure to urinate and you could not get to the toilet fast enough?” Men who responded in the affirmative to both questions were defined as having mixed UI. Men with other UI responded affirmatively to the question, “During the past 12 months, have you leaked or lost control of even a small amount of urine *without* an activity like coughing, lifting, or exercise or an urge to urinate?” For prostate conditions (BPH and prostate cancer) the question, “Have you ever been told by a doctor or health professional that you had an enlarged prostate gland/prostate cancer?” defined BPH and prostate cancer.

Participants self-reported race/ethnicity, which was then categorized as nonHispanic white, nonHispanic black, Hispanic (including Mexican American) and other/mixed race/ethnicity. Age was categorized in 15-year increments from 20 to 34 years old and in 10-year increments over the age of 35 years, with all participants 75 years old or older in the same category. Education was categorized as at least some level of high school education (general equivalency diploma or equivalent) or more than high school. The poverty income ratio (an indicator of socioeconomic status that uses the ratio of income-to-family’s poverty threshold set by the United States Census Bureau) was categorized as less than 1 (below the poverty threshold), 1 to 2 ($1-2 \times$ the poverty threshold) and 2 or more ($2 \times$ the poverty threshold). From body measurements data body mass index was calculated in kg/m^2 , and categorized as less than 25.0 (underweight/normal weight), 25.0 to 29.9 (overweight) and 30.0 or more (obese).

Data on disease status were ascertained through the question, “Has a doctor or other health professional told you that you had [disease]?” In addition to hypertension, 5 disease types also were examined including arthritis, cerebrovascular accident, chronic lower respiratory tract disease (emphysema, chronic bronchitis or asthma), coronary heart disease (heart disease, angina and/or myocardial infarction) and diabetes mellitus (self-report, or taking insulin and/or diabetic pills).¹⁷ The cumulative number of positive responses of the 5 disease types was divided into 3 categories of 0, 1 and 2 or more.

General health status was defined by the question, “Would you say that in general your health is excellent, very good, good, fair, or poor?” Responses were aggregated into 2 categories of excellent, very good or good health vs fair or poor health. Depression was assessed using the validated Patient Health Questionnaire-9, which yields

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