Does Race and Ethnicity Modify the Association of Age with Severe Nocturia and Associated Bother? The Multi-Ethnic Study of Atherosclerosis

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Abstract

Objective: To determine whether race and ethnicity modifies the association of age with severe nocturia defined as urinating ≥ 3 times per night and associated bother.

Methods: This cross-sectional analysis utilized data from the Multi-Ethnic Study of Atherosclerosis (MESA), a cohort of four racial/ethnic groups from six U.S. communities, to collect information on urinary symptoms during the sixth exam using the International Consultation on Incontinence Questionnaire. Sex-specific logistic regression models were used to examine the association of age and race/ethnicity with severe nocturia defined as urinating ≥ 3 times at night while adjusting for demographics, co-morbidities, and medication use. Cross-product terms of age x race/ethnicity were fitted in adjusted sex specific logistic regression models to explore interactions by age and race/ethnicity on prevalence of severe nocturia.

Results: Among 3086 participants, mean age was 73.7 years, 53% were women and race/ethnicity were Non-Hispanic White (NH) in 40.0%, Chinese in 13.3%, NH Black in 25.2%, and Hispanic in 21.5%. Severe nocturia was reported by 22.8% of men and 19.9% of women and adjusted odds of severe nocturia in age group 85+ years was three-fold higher among men (Odds Ratio [OR] 2.98; 95% CI 1.58, 5.61) and two-fold higher among women (OR 2.19; 95% CI 1.22, 3.92) compared to age 55-64 years. Prevalence of severe nocturia ranged from 30.7% to 17.7% among Hispanic and NH White men, respectively, and from 30.5% to 12.6% among Hispanic and NH White women, respectively. After adjustment for covariates, no significant interaction was noted between age, race/ethnicity, and prevalence of severe nocturia (P=0.2 for men and women).

Conclusion: Severe nocturia prevalence increases with age and differs by race/ethnicity but the age-related increase in nocturia does not differ by race/ethnicity.

Keywords: Nocturia; Aging; Bother; Race/ethnicity; sleep disorders.

Introduction

Nocturia is one of the most prevalent and bothersome lower urinary tract symptom [1] and is associated with sleep disturbances, lower sleep quality [2] and increased risk for falls [3] and mortality [4]. Previous studies have reported that while nocturia affects men and women similarly [5] the burden of nocturnal urination increases with advancing age [1,6]. Nocturia prevalence may also differ by race/ethnicity [7,8]. For example, the Boston Area Community Health (BACH) study reported higher

prevalence of nocturia among Black and Hispanic adults compared to White adults and hypothesized that socioeconomic factors accounted for some of these differences [7]. Race/ethnicity may also influence health with aging due to structural racism which can influence access to healthcare, healthy foods, safe places for exercise and health behaviors; [9,10] such life course differences in health factors can influence nocturia prevalence with advancing age [11]. In this study we examined the association of age and race/ethnicity with severe nocturia prevalence and associated bother using data from the Multi-Ethnic Study of Atherosclerosis (MESA), an observational cohort of adults from four different racial/ethnic groups. We specifically examined whether race/ethnicity modifies the association of age with severe nocturia and associated bother. Information on age and racial/ethnic differences of nocturia and associated bother may help elucidate unique factors associated with nocturia that may inform identification and management.

Methods

Study Design and Population

This cross-sectional study focused on men and women who completed the sixth exam of MESA, an observational study which recruited 3213 men and 3601 women, age 45 to 84 years, from six communities in the U.S. (Baltimore, MD; Chicago, IL; Forsyth County, NC; Los Angeles County, CA; Northern Manhattan, NY; and St. Paul, MN) during years 2000-2002 [12]. All participants were free of clinical cardiovascular disease and heart failure at baseline per study design. The Institutional Review Boards at all participating centers approved the study, and all participants gave informed consent. Participants were asked to participate in follow-up exams and questions on urinary symptoms were included in the sixth MESA visit conducted during July 2015 - June 2016. A total of 1749 women and 1536 men returned for the sixth MESA exam and 1635 women (93.5%), and 1451 men (94.5%) completed the questionnaire.

Exposure Assessment

Potential participants self-identified their race/ethnicity using questions based on the U.S. 2000 census questionnaire. Respondents who reported race/ethnicity as White or Caucasian, Black or African American, Chinese, or Spanish/Hispanic/Latino were asked to participate. Race/ ethnicity variables were not mutually exclusive and were categorized as non-Hispanic (NH) White, NH Black, Chinese, and Hispanic.

Outcome Assessment

The primary outcome was the presence of severe nocturia and associated bother. Information on urinary symptoms was collected using the International Consultation on Incontinence Questionnaire (ICIQ),(Abrams, Avery, Gardener, Donovan, & ICIQ Advisory, 2006; Avery et al., 2004) a reliable and validated tool which measures an individual's experience with urinary symptoms over the past four weeks and associated bother.

Prevalence and frequency of nocturia was assessed by the question, "During the night, how many times do you have to get up to urinate, on average?" For this question, respondents were queried on frequency of nocturia episodes as "none", "one", "two", "three", or "four or more". Severe nocturia was defined as getting up at night to urinate 3 or more times because this frequency of nocturnal urination is associated with high levels of associated bother [13]. The question on nocturia was followed by a question querying associated bother and asked, "How much does this bother you?" Participants were prompted to circle a number between 0 (indicating no bother) and 10 (a great deal of bother).

Cohort Description and Covariates

We selected potential covariates based on previous studies which examined factors associated with nocturia and bladder function. Demographic characteristics, medical history, cigarette usage, general health, parity and current medication use at exam 6 along with a fasting blood sample were collected during the standardized interview. The age at the 6th follow-up exam was categorized as 55-64, 65-74, 75-84, and ≥ 85 years. Diabetes status was based on self-reported physician diagnosis of diabetes, use of insulin or oral hypoglycemic agents or a fasting glucose ≥126 mg/dl. Information on physical activity was collected using the MESA Typical Week Physical Activity Survey, which identified the duration and frequency of various physical activities during a typical week and in the past month [14]. MESA participants were contacted every 6 months after baseline visit and queried on changes in health status including new cancer diagnoses and type of cancer including prostate cancer but treatments for prostate cancer were not ascertained. Information on new cardiovascular disease (CVD) events was obtained by trained personnel who contacted the participants or family members approximately every 6 to 9 months. Self-reported diagnoses were then confirmed via review of medical records and adjudication by 2 physician members of the MESA mortality and morbidity review committee. A CVD endpoint included myocardial infarction, angina, stroke, peripheral arterial disease, or heart failure.

Statistical Analysis

Participant characteristics were examined by completion of the ICIQ. Among the MESA participants who completed the ICIQ, characteristics, including medication use, were compared by number of reported nocturia episodes after stratifying by sex. The Chi-Square test was used to compare categorical variables and an unpaired t-test was used to compare continuous variables. To address the non-parametric distribution of reported bother scores ranging from 0 to 10, 1 was added to all scores and then scores were long transformed. Log transformed scores were compared by age and race/ ethnicity in sex stratified analyses using ANOVA. A Bonferroni P-value <.01 was used as the level of statistical significance to account for multiple comparisons (3 racial/ethnic groups compared to whites). Logistic regression

was used to estimate odds ratios (OR) of severe nocturia by race/ethnicity in sex stratified models.

We created a set of sequentially adjusted models to examine association of severe nocturia with race/ethnicity with NH White race as referent group. Model 1 included age, race/ethnicity, and site. Model 2 added BMI, diabetes status, CVD, CKD, smoking status, parity (women), prostate cancer (men), physical activity and education to Model 1. Model 3 added use of diuretics, beta blockers, calcium channel blockers, alpha blockers (men), and oral estrogens (women) to Model 2. Parity was categorized as 0, 1, 2 and 3 live births (women) and education was categorized as less than high school, high school plus some college, and associate degree or higher. Linear trends of severe nocturia prevalence across age groups were examined by testing the linear association of the median values of the age group categories with severe nocturia after adjustment for all covariates in sex stratified models. Cross-product terms of age x race/ethnicity were fitted in fully adjusted sex specific logistic regression models to explore interactions by age and race/ethnicity on prevalence of severe nocturia. Ordinal probit regression with marginal effects was used to calculate the probability of severe nocturia frequency among men and women by race and ethnicity and by age group after adjusting for all covariates. Stata version 14 (College Station, TX) was used to perform the statistical analyses.

Results

Study Population

Differences of the characteristics of MESA participants by completion of ICIQ are shown in supplemental Table 1. Those who did not complete the ICIQ were older (mean age 82.4 [standard deviation [SD] 9.0] vs. 73.7 [SD 8.4] years; P <0.01) and had higher prevalence of diabetes (38.2% vs. 24.1%; P < 0.01) and greater diuretic use (27.0% vs. 18.0%; P < 0.01). Table 1 shows the characteristics of the 1451 men and 1635 women, respectively, who completed the ICIQ by frequency of nocturia episodes. Overall, mean age, BMI and prevalence of obesity, diabetes and CKD were generally higher with more nocturia episodes per night among both genders. Table 2 shows the distribution of medication use by number of nocturia episodes in men and women. Frequency of beta blocker and calcium channel blocker use differed by number of nocturia episodes and was highest in those with ≥ 3 nocturia episodes per night among both men and women. Diuretic use differed significantly by number of nocturia episodes among women only and ranged from 15.1% among women without nocturia to 31.2% among women with ≥ 3 nocturia episodes (see Table 2).

Table 1: Characteristics of MESA Participants by Frequency of Nocturia Episodes

Men	Total	None	One	Two	≥ Three (n=330)	P-value
	(n=1451)	(n=213)	(n=547)	(n=361)		
Age, mean (SD), y	73.7 (8.4)	70.8 (7.9)	72.6 (8.3)	75 (8.6)	75.8 (8.0)	< 0.01
Age Categories, n (%)						< 0.01
55-64 y	223 (15.4)	51 (22.9)	95 (42.6)	49 (22.0)	28 (12.6)	
65-74 y	605 (41.7)	102 (16.9)	254 (42.0)	133 (22.0)	116 (19.2)	
75-84 y	450 (31.0)	46 (10.2)	137 (30.4)	125 (27.8)	142 (31.6)	
≥ 85 y	173 (11.9)	14 (8.1)	61 (35.3)	54 (31.2)	44 (25.4)	
Race/Ethnicity, n (%)						< 0.01
White	589 (40.6)	80 (13.6)	268 (45.5)	137 (23.3)	104 (17.7)	
Chinese	207 (14.3)	34 (16.4)	68 (32.9)	58 (28.0)	47 (22.7)	
Black	333 (22.9)	46 (13.8)	117 (35.1)	90 (27.0)	80 (24.0)	
Hispanic	322 (22.2)	53 (16.5)	94 (29.2)	76 (23.6)	99 (30.8)	
BMI, mean (SD), kg/m^2	28.2 (4.8)	28.5 (4.8)	28.0 (4.4)	28.2 (4.9)	28.5 (5.4)	< 0.01
Obese, n (%)	462 (31.8)	72 (33.8)	162 (29.6)	116 (32.1)	112 (33.9)	0.5
Diabetes, n (%)	377 (26.0)	52 (24.8)	122 (22.7)	100 (28.2)	103 (31.8)	0.07
+Physical Activity (MET/min/week)	3675 [1658, 7395]	3765	4170	3600	2940	0.03

		[1665, 6900]	[1920, 8640]	[1740, 6750]	[1275, 6330]	
High School Education, n (%)	1286 (88.6)	189 (88.7)	513 (93.8)	315 (87.2)	269 (81.6)	< 0.01
Cigarette Smoking, n (%)	88 (6.1)	15 (7.0)	38 (7.0)	25 (6.9)	10 (3.0)	0.06
Prostate Cancer, n (%)	19 (1.3)	3 (1.6)	5 (1.1)	6 (2.0)	5 (1.8)	0.8
Chronic Kidney Disease, n (%)	309 (21.3)	47 (22.4)	106 (19.7)	79 (22.3)	77 (23.3)	0.5
Congestive Heart Failure, n (%)	39 (2.7)	6 (2.8)	11 (2.0)	8 (2.2)	14 (4.2)	0.2
Women	Total	None	One	Two	Three (n=325)	P-value
	(n=1635)	(n=220)	(n=663)	(n=427)		
Age, mean (SD), years	73.7 (8.4)	71.7 (7.9)	72.4 (8.1)	75.1 (8.4)	76 (8.7)	< 0.01
Age Categories, n (%)						< 0.01
55-64 y	250 (15.3)	48 (19.2)	117 (46.8)	53 (21.2)	32 (12.8)	
65-74 y	668 (40.9)	97 (14.5)	302 (45.2)	152 (22.8)	117 (17.5)	
75-84 y	523 (32.0)	60 (11.5)	184 (35.2)	160 (30.6)	119 (22.8)	
≥ 85 y	194 (11.9)	15 (7.7)	60 (30.9)	62 (32.0)	57 (29.4)	
Race/Ethnicity, n (%)						< 0.01
Non-Hispanic White	644 (39.4)	119 (18.5)	297 (46.1)	147 (22.8)	81 (12.6)	
Chinese	204 (12.5)	28 (13.7)	85 (41.7)	65 (31.9)	26 (12.8)	
Non-Hispanic Black	446 (27.3)	38 (8.5)	166 (37.2)	128 (28.7)	114 (25.6)	
Hispanic	341 (20.9)	35 (10.3)	115 (33.7)	87 (25.5)	104 (30.5)	
BMI, mean (SD), kg/m^2	28.7 (6.4)	27.6 (6.4)	28.3 (6.3)	28.9 (6.3)	29.9 (6.4)	< 0.01
Obese, n (%)	582 (35.6)	60 (27.3)	221 (33.3)	165 (38.6)	136 (41.9)	< 0.01
Diabetes, n (%)	347 (21.2)	33 (15.6)	121 (18.8)	105 (25.2)	88 (28.4)	< 0.01
+Physical activity (MET/min/week)	3011 [1140, 5790]	3225 [1091,5100]	3405	3135	2108	0.01
			[1440, 6390]	[1245, 5610]	[578, 4965]	
High School Education, n (%)	1406 (86.0)	205 (93.0)	603 (91.0)	360 (84.3)	238 (73.2)	< 0.01
Cigarette Smoking, n (%)	85 (5.2)	19 (8.6)	38 (5.7)	10 (2.3)	18 (5.5)	0.02
+Parity	2[2,3]	2 [1,3]	2 [2,3]	2 [2,4]	3 [2,4]	0.003
Chronic Kidney Disease, n (%)	337 (20.6)	32 (15.2)	112 (17.4)	99 (23.7)	94 (30.4)	< 0.01
Congestive Heart Failure, n (%)	25 (1.5)	2 (0.9)	8 (1.2)	5 (1.2)	10 (3.1)	0.09

Data shown as % or mean (standard deviation) and total number of participants (percentage); + Data shown as median (interquartile range).

Table 2: Distribution of medication use by number of nocturia episodes by sex.

Men	Total (n=1451)	Zero (n=213)	One (n=547)	Two (n=361)	≥ Three (n=330)	P value
Diuretics	244 (16.8)	31 (14.6)	94 (17.2)	63 (17.5)	56 (17.0)	0.8
Alpha Blockers	59 (4.1)	2 (0.9)	18 (3.3)	15 (4.2)	24 (7.3)	0.002
Beta blockers	329 22.7)	42 (19.7)	107 (19.6)	92 (25.5)	88 (26.7)	0.03
CCB	315 21.7)	26 (12.2)	107 (19.6)	81 (22.4)	101 (30.6)	<0.001
Women	Total (n=1635)	Zero (n=220)	One (n=663)	Two (n=427)	≥ Three (n=325)	
Diuretics	308 (21.2)	32 (14.5)	118 (17.9)	77 (18.0)	81 (24.9)	0.01
Oral Estrogen	66 (4.0)	11 (5.0)	28 (4.2)	11 (2.6)	5 (1.5)	0.06
Beta blockers	365 (22.3)	33 (15.0)	130 (19.7)	101 (23.7)	101 (31.1)	<0.001
CCB	363 (22.2)	34 (15.5)	118 (17.9)	100 (23.4)	111 (34.2)	<0.001

Data shown as total number participants (%) within a column.

Supplemental Table 1: Characteristics of MESA Participants by Completion of the International Consultation on Incontinence Questionnaire (ICIQ) (n=3285)

|	Completed ICIQ	Not Completed ICIQ	P-value
	(n=3,086)	(n=199)	
Sex			0.2
Men, N (%)	1,451 (47.0)	85 (42.7)	
Women, N (%)	1,635 (53.0)	114 (52.8)	
Age, mean (SD), y	73.7 (8.4)	82.4 (9.0)	<0.001
Age Categories, %			<0.001
55-64 y	15.3	4	
65-74 y	41.3	16.6	
75-84 y	31.5	37.2	
≥ 85 y	11.9	42.2	
Race/Ethnicity, %			0.003
White	40	41.2	
Chinese	13.3	4.5	
Black	25.2	30.7	
Hispanic	21.5	23.6	
BMI, mean (SD), kg/m^2	28.5 (5.7)	28.4 (6.9)	0.9
Obese, %	133.8	35.7	0.6
Diabetes and 2003 ADA Fasting Criteria, %			0 .001
Impaired Fasting	23.7	13.7	
Untreated Diabetes	3.8	6.9	
Treated Diabetes	20.3	31.3	
Any Diuretic Use, %	18	27	0.002
Chronic Kidney Disease, %	21.5	45	<0.001
Current Cigarette Use, %	5.6	3.2	0.02

Severe nocturia was common among men and women and 22.8% of men and 19.9% of women reported ≥ 3 nocturia episodes per night. Figure 1 depicts the bivariable analysis of severe nocturia by sex and by age group. In men, the prevalence of severe nocturia was highest among in men ≥85 years old (29.4%) and lowest among men 55-64 years old (12.6%). Severe nocturia in women was highest in the age 75-84 years (31.6%) group and lowest in the 55-64 years age group (12.6%). A significant linear trend in frequency of severe nocturia was noted across age groups for men (P < 0.001) and for women (P =0.03). In multivariable analyses with adjustment for age, co-morbidities, parity, smoking status, and physical activity, adjusted odds of severe nocturia was three-fold higher among men (OR 2.98; 95% CI 1.58, 5.61) and two-fold higher among women (OR 2.19; 95% CI 1.22, 3.92) in the age 85+ year group compared to age 55-64 ≥ years.

Race/ethnicity was also associated with severe nocturia in men and women. In bivariable analyses, severe nocturia ranged from as high as 30.7% among Hispanics to 17.7% among NH Whites among men. Among women, severe nocturia prevalence ranged from 30.5% among Hispanics to 12.6% among NH Whites. Table 3 shows the multivariable adjusted odds of severe nocturia by race/ethnicity. In both men and women, odds of severe nocturia were higher among Black and Hispanic adults compared to Whites after adjustment for age and site (Model 1). Further adjustment for demographics and co-morbidities attenuated these associations of race and ethnicity with severe nocturia (Model 2). After adjustment for all covariates including age, co-morbidities, and physical activity, only Hispanic women showed significantly higher odds of severe nocturia compared to White women while race/ ethnicity was not significantly associated with severe nocturia in men. No significant interaction was noted between age and race/ ethnicity and prevalence of severe nocturia for both men (P = 0.2) and women (P=0.2) after adjustment for all covariates. Figure 2 shows the multivariable adjusted probability of severe nocturia by age group and by race and ethnicity for both men (top panel) and women (bottom panel). Across all racial and ethnic groups, adjusted probability of severe nocturia increased with advancing age.
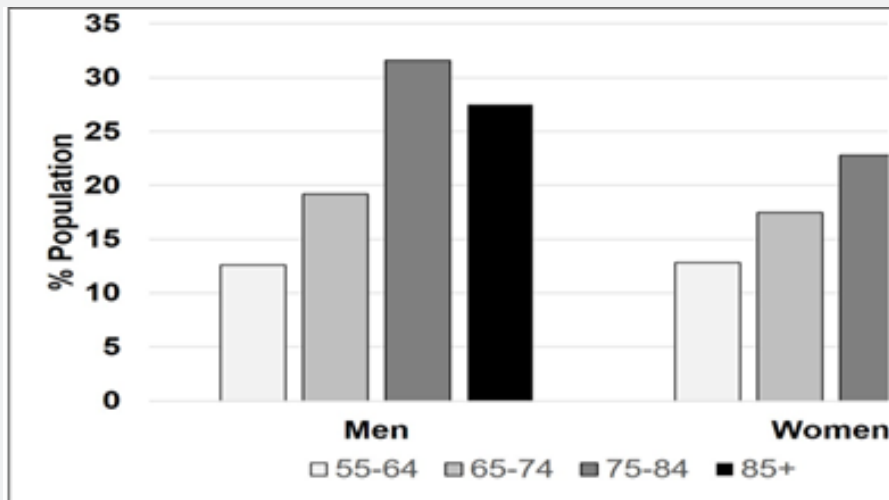
Figure 1: Prevalence of severe nocturia episodes by age group and by sex.
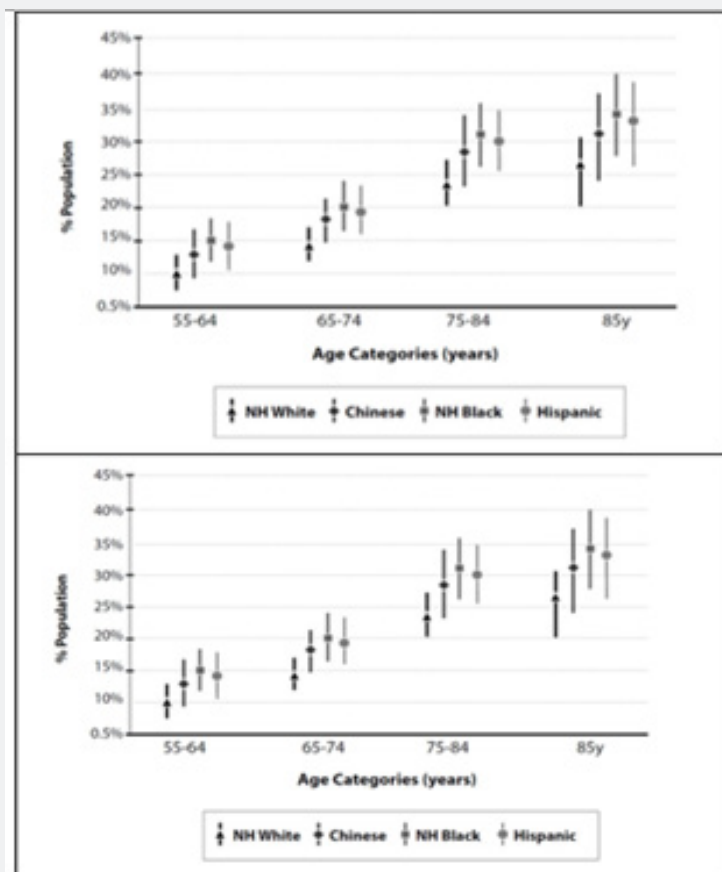
Figure 2: Adjusted probability of severe nocturia by age group and by race/ethnicity among men and women. Probability of severe nocturia is adjusted for site, body mass index, diabetes status, presence of clinical cardiovascular disease and chronic kidney disease, smoking status, physical activity, parity (women), prostate cancer (men), education, use of diuretics, beta blockers, alpha blockers (men), oral estrogen use (women) and calcium channel blockers. Severe nocturia is defined as getting up at least 3 times per night to urinate.

Table 3: Adjusted odds ratios (OR) of severe nocturia (≥ 3 episodes) by race/ethnicity

Race/Ethnicity	Total n /severe nocturia n	Model 1	Model 2	Model 3
		OR (95% CI)	OR (95% CI)	OR (95% CI)
Men				
Non-Hispanic White	589/104	Reference	Reference	Reference
Chinese	207/47	1.37 (0.87 to 2.16)	1.43 (0.86 to 2.37)	1.36 (0.81 to 2.27)
Non-Hispanic Black	333/80	1.47 (1.04 to 2.09)	1.41 (0.94 to 2.13)	1.39 (0.92 to 2.11)
Hispanic	322/99	1.64 (1.14 to 2.36)	1.54 (1.00 to 2.39)	1.53 (0.98 to 2.38)
Women				
Non-Hispanic White	644/81	Reference	Reference	Reference
Chinese	204/26	1.17 (0.69 to 1.98)	0.89 (0.44 to 1.80)	0.95 (0.46 to 1.95)
Non-Hispanic White	446/11	2.26 (1.61 to 3.16)	1.46 (0.93 to 2.29)	1.32 (0.83 to 2.09)
Hispanic	341/104	2.96 (2.03 to 4.31)	1.67 (0.99 to 2.81)	1.70 (1.00 to 2.90)

Model 1 adjusts for age and site; Model 2 adds body mass index, diabetes, clinical cardiovascular disease, chronic kidney disease, smoking status, physical activity, parity (women), prostate cancer (men) and education to Model 1; Model 3 adds use of diuretics, beta blockers, alpha blockers (men), oral estrogen use (women) and calcium channel blockers.T3

The distribution of self-reported bother scores with at least one nocturia episode is shown in Figure 3 for men (top panel) and women (bottom panel). Bother scores increased with increasing number of nocturia episodes among men and women and log-transformed bother scores differed significantly by number of nocturia episodes among men and women ($P < 0.001$). Bother scores among men and women with severe nocturia did not differ by race/ethnicity (ANOVA F test = 0.2 for both men and women) or by age group (F test = 0.08 for men and 0.4 for women). No significant interaction was noted between age and race/ ethnicity and log transformed bother scores for both men ($P = 0.5$) and women ($P=0.2$) with severe nocturia after adjustment for all covariates.
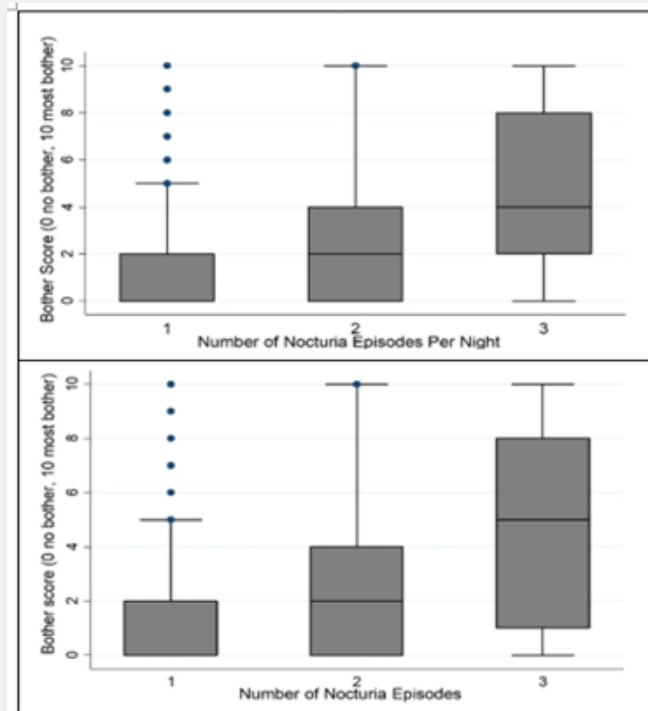
Figure 3: Boxplot of bother scores by number of nocturia episodes among men (Top) and women (Bottom).

Discussion

In this cross-sectional analysis of older adults recruited from six communities across the U.S., prevalence of severe nocturia defined as >3 nocturia episodes per night increased with older age in both men and women. Our findings of greater prevalence of severe nocturia with increasing age are consistent with a large cross-sectional population-representative survey of nocturia among men and women from the US, United Kingdom, and Sweden [15]. A review of 43 studies reporting nocturia prevalence in community-based populations also reported that at least 60% of older people void >2 times nightly [16]. Nocturia, as a symptom, can be broadly classified based on etiology including increased fluid intake and urine production (overall or just at night), reduced bladder capacity or secondary to sleep disorders [1]. Among older adults, nocturia is often a function of increased urine production and thus intervening solely with medications for bladder dysfunction may not benefit this population with nocturia [17]. Initial interventions for nocturia in older adults should focus on lifestyle and behavior approaches [18] and lack of strong sex differences in nocturia prevalence suggest that sex-specific factors (e.g. prostate disease or parity) are not singular causes.

Our analyses also showed marked differences in severe nocturia prevalence by race/ethnicity, especially among women. Odds of severe nocturia were over two-fold higher among those Hispanic or NH Black vs. NH White women and adjustment for demographics and co-morbidities substantially attenuated the associations. Our findings further support the presence of racial/ethnic disparities in severe nocturia among older adults, which may in part be mediated by a higher burden of metabolic related co-morbidities in some racial/ethnic groups. However, other factors that occur across the lifecourse such as occupation and behaviors may also influence the racial/ethnic disparities in severe nocturia [19,20]. Our findings of racial/ethnic disparities in severe nocturia are supported by the Boston Area Community Health Study, a survey of 5,506 adults aged 30-79(7) which reported a higher prevalence of ≥ 1 nocturia episode in Black (38.6%) and Hispanic (30.7%) vs. NH White adults (23.3%). A study of 1000 community-dwelling adults age 65 to 106 years recruited from Medicare beneficiary lists found nocturia was more common among Black than White adults [21]. Regardless of prevalence differences, the evaluation and treatment of nocturia should not differ by race/ethnicity. A retrospective study that analyzed 24-hour frequency-volume charts completed by men seeking treatment for lower urinary tract symptoms found no difference in etiology of nocturia between White and Black men for those with ≥ 1 nocturnal voids, and thus suggested that race/ethnicity should not play a role in the evaluation of patients seeking treatment for nocturia (8) More studies are needed to discern reasons for racial/ethnic differences in nocturia because such could better identify interventions for nocturia prevention.

Our study also found that bother scores for nocturia did not differ significantly by race/ethnicity or by age group among men or women. Bother scores were higher with greater number of nocturia episodes per night, and both men and women reported very low bother scores with only one nocturia episode per night. Our findings are supported by a study performed by Tikkenen and colleagues who reported that the degree of bother and health-related quality of life correlates with the number of voids [13].

Strengths and Weaknesses

The strengths of this study include the use of a study population recruited from six U.S communities across four different racial/ethnic groups encompassing men and women. Moreover, our MESA study included Chinese participants who have been underrepresented in previous studies on racial/ethnic differences in nocturia. Urinary symptoms were ascertained using the ICIQ which has been previously validated and asks persons to recall urinary symptoms over the past four weeks and queries associated bother with urinary symptoms. This study also collected information on medication use and presence of co-morbidities including CVD. While the response rate for the ICIQ in MESA exceeded 90%, the non-response could have led to an underestimation of nocturia prevalence because the participants who did not complete the ICIQ were older with more co-morbidities compared to those who completed the ICIQ. Another limitation of this study is lack of direct measures of nocturia such as timed urine collections and the question on nocturia in the ICIQ does not specifically ask about sleep interruption.

Overall, this study shows that severe nocturia is common in both men and women and increases with advancing age regardless of race/ethnicity. Due to the high frequency of severe nocturia and the potential negative impact of severe nocturia on health outcomes, clinicians should consider screening for nocturia in older adults in all racial/ethnic groups to discuss implementation of safety measures to prevent falls and treatment.

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