The Prevalence of Urinary Incontinence Among Community Dwelling Adult Women: Results From the National Health and Nutrition Examination Survey

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Purpose: Population based studies estimate that a large proportion of adult women report urinary incontinence. However, there is a wide range of estimates of the burden posed by UI. To measure the prevalence of incontinence in women in the community we analyzed data from women responding to the National Health and Nutrition Examination Survey.

Materials and Methods: NHANES is a series of health and nutrition surveys performed by the National Center for Health Statistics. From 1999 to 2000 NHANES asked a national sample of community dwelling women, "In the past 12 months, have you had difficulty controlling your bladder, including leaking small amounts of urine when you cough or sneeze (exclusive of pregnancy or recovery from childbirth)?" Questionnaire results were recorded and analyzed with respect to demographic data including age, race and level of education.

Results: The overall prevalence of urinary incontinence in women was 38%. The prevalence of daily incontinence increased with age, ranging from 12.2% in women 60 to 64 years old to 20.9% in women 85 years old or older. Of women reporting any incontinence, 13.7% reported daily incontinence, and an additional 10.3% reported weekly incontinence. Prevalence was higher in non-Hispanic white women (41%) than in non-Hispanic black (20%) or Mexican-American women (36%). Women with less than a high school education were less likely to report incontinence than were those with at least a high school education.

Conclusions: Unlike many other studies the NHANES draws a nationally representative sample of subjects in the community and, thus, provides prevalence data for urinary incontinence for all women in the United States. Prevalence is high, and varies with age, race/ethnicity and socioeconomic variables.

Key Words: age factors, continental population groups, epidemiology, urinary incontinence

Population based studies estimate that a large proportion of adult women report UI. There is a wide range of estimates of the prevalence of UI in the literature, from as low as 2.5% to as high as 60%.[1–4] Reasons for the divergence in estimates include variations in definitions of urinary incontinence, sampling methodologies, response rates and question formats.[1,5,6] Most of the data regarding risk factors for the development of incontinence have been derived from studies of volunteer or clinical subjects. This provides information of limited generalizability and restricts the level of inference regarding causality.[7]

Surveys of nationally representative subjects in the community are a means of collecting accurate prevalence data on urinary incontinence. The NHANES is a continuing series of national sample surveys of households and household members in 50 states that allows collection of data regarding many diseases.[8] Based on its large sample size, NHANES can be used to generate accurate national prevalence data for urological diseases and symptoms during the time period covered in the survey. To assess the prevalence of incontinence in the community, we analyzed NHANES data in women from 1999 to 2000.

METHODS

NHANES has been in existence since the early 1960s[9] and has surveyed more than 130,000 people.[10] NHANES was born out of The National Health Survey Act, 1956. This law authorized a survey to provide current statistical data on the amount, distribution, and effects of illness and disability in the United States. NHANES data have been used to influence policy and improve the health of the United States population in many ways. The information gathered by NHANES provides a snapshot of the health and nutrition of the United States population, and persons in this survey are from a broad range of age groups and racial/ethnic backgrounds. Each participant represents approximately 50,000 other United States residents.[10]

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Participants are selected through a complex, multistage probability cluster design using the most current census information.[11] In simple terms NHANES divides the United States into communities. The communities are divided into neighborhoods and the neighborhoods are selected at random. Selected households are approached by NHANES interviewers who ask residents a few short questions to determine if their household is eligible for the study. The NHANES 1999 to 2000 data collection included a standardized home interview followed by a detailed physical examination in a mobile examination center or the participant's home.[12] The NHANES target population is the civilian, noninstitutionalized United States population. NHANES 1999 to 2000 includes over-sampling of low income persons, adolescents 12 to 19 years old, persons 60 years or older, black people and Mexican-Americans.

Beginning in 1999 NHANES became a continuous, annual survey rather than the periodic survey that it had been previously.[10] For a variety of reasons including confidentiality and reliability, survey data are released on public use data files every 2 years. Two or more years of data are necessary to have adequate sample sizes for subgroup analyses.[11] From 1999 to 2000, 9,965 persons participated in the survey.[10]

During this 2-year period NHANES asked a national sample of community dwelling adults, "In the past 12 months, have you had difficulty controlling your bladder, including leaking small amounts of urine when you cough or sneeze (exclusive of pregnancy or recovery from childbirth)?" Questionnaire results from female respondents were recorded and analyzed with respect to demographic data including age, race, education level and poverty level. Poverty level was analyzed based on the PIR, which is a calculated variable based on family income and family size, using tables published each year by the Bureau of the Census in a series of Current Population Reports on poverty in the United States.[8] This is the best income variable to use when comparing data over time because it is relatively standardized for inflation and other factors. The 2 primary reporting categories are below poverty—0 to 0.999, and at or above poverty—1.000 and above.

RESULTS

NHANES found the overall prevalence of urinary incontinence in women as defined in the question to be 38% (8,929,543 of 23,477,726 as extrapolated from United States population estimates, table 1). Overall prevalence was higher in non-Hispanic white women (41%) than in non-Hispanic black women (20%) or Mexican-American women (36%). Women with less than a high school education had a lower prevalence of incontinence (32%) than did women with a high school education (45%) or women with at least some college (high school or more, 38%). Women below the poverty level (PIR 0 or less than 1) were less likely to report incontinence (prevalence 29% and 35%, respectively) than women above the poverty level. Specifically, prevalence of urinary incontinence among women above the poverty level was 40% for those women with a PIR from 1.0 to 1.84 and 37% with a PIR greater than 1.84, the highest socioeconomic category.[8]

Of women responding yes to having difficulty controlling the bladder, 36% reported daily incontinence (13.7% of all women participating in NHANES) and an additional 27% (10.3% of all women) reported weekly incontinence (table 2). This corresponds to a prevalence rate of at least weekly incontinence of 24% among all women surveyed. An additional 23% of women responding yes to difficulty controlling the bladder had a few incontinent episodes per month and 12% had at least yearly incontinence. Regardless of age, race/ethnicity or education level, the majority of women responding yes to difficulty controlling the bladder had at least weekly incontinence. The exception was the lowest income group (PIR 0), in which 100% of women reported a few leakage episodes per month.

The overall prevalence of urinary incontinence ranged from 33% to 41% among different age groups, and was highest in the 75 to 79-year-old age group (44%, part *A* of figure). The prevalence of daily incontinence increased with age, ranging from 12.2% in women 60 to 64 years old to 20.9% in those 85 years or older (part *B* of figure).

TABLE 1. *Prevalence of difficulty controlling bladder among adult women*

	Overall	No. Difficulty Controlling Bladder (%)
Overall	23,477,726	8,929,543 (38)
Age at screening:		
60–64	5,699,785	2,168,863 (38)
65–69	4,895,878	1,785,380 (36)
70–74	4,505,164	1,683,804 (37)
75–79	3,453,472	1,515,900 (44)
80–84	2,981,558	989,003 (33)
85 or Older	1,941,869	786,593 (41)
Race/ethnicity:		
Non-Hispanic white	18,729,539	7,662,444 (41)
Non-Hispanic black	1,941,269	386,480 (20)
Mexican-American	649,003	230,567 (36)
Other Hispanic	1,576,419	468,823 (30)
Other race	581,496	181,229 (31)
Education:		
Less than high school	8,374,762	2,692,649 (32)
High school	7,692,149	3,484,970 (45)
More than high school	7,212,158	2,725,611 (38)
Refused	103,678	26,313 (25)
Unknown	87,647	0 (0)
Missing	7,332	0 (0)
PIR:		
0	111,440	31,876 (29)
Less than 1	3,145,548	1,118,508 (35)
1.00–1.84	5,520,548	2,193,641 (40)
Greater than 1.84	9,649,331	3,538,606 (37)
Refused	2,090,410	759,112 (36)
Unknown	1,560,474	741,618 (48)
Missing	1,399,975	548,182 (39)

The data in this table are based on question KIQ.040: "In the past 12 months, have you had difficulty controlling your bladder, including leaking small amounts of urine when you cough or sneeze?" (Do not include bladder control difficulties during pregnancy or recovery from childbirth.) Source, National Health and Nutrition Examination Survey, 1999–2000.

DISCUSSION

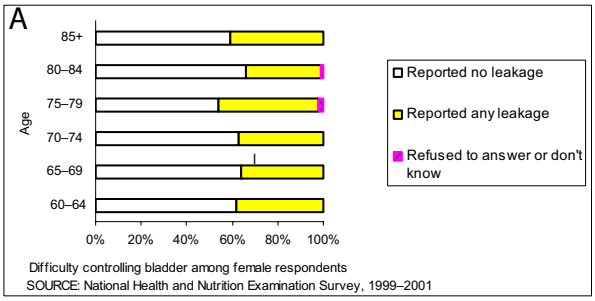
Our analysis of the 1999 to 2000 NHANES data revealed several principal findings. First, we found the overall prevalence of urinary incontinence in women in the United States to be 38% with the frequency of incontinent episodes increasing with age. Similar to the NHANES study results a population based postal survey of 6,000 women in Washington State found the prevalence of urinary incontinence, as defined by any leakage that occurs at least monthly to be 45%.[13] The prevalence of urinary incontinence similarly increased with age, from 28% for respondents 30 to 39 years

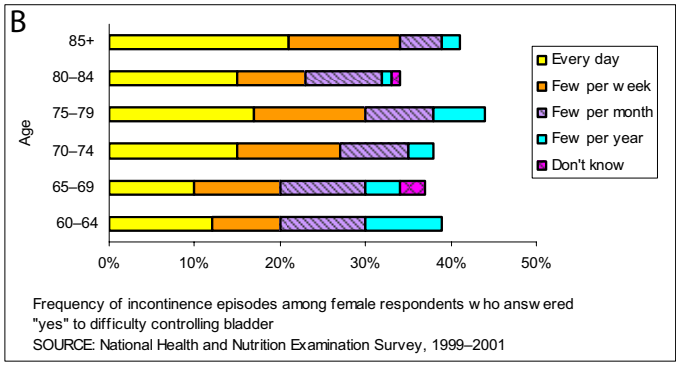
TABLE 2. *Frequency of bladder control problems among those who responded yes to difficulty controlling bladder question*

		Frequency of Bladder Control Problems				
	Overall	No. Every Day (%)	No. Few/Wk (%)	No. Few/Mo (%)	No. Few/Yr (%)	No. Unknown (%)
Overall	8,929,543	3,255,587 (36)	2,408,421 (27)	2,016,715 (23)	1,082,624 (12)	166,196 (2)
Age at screening:						
60–64	2,168,863	686,213 (32)	429,351 (20)	563,017 (26)	490,282 (23)	0 (0)
65–69	1,785,380	475,030 (27)	511,356 (29)	479,229 (27)	172,781 (10)	146,984 (8)
70–79	1,683,804	663,681 (39)	536,511 (32)	338,233 (20)	145,379 (9)	0 (0)
75–79	1,515,900	575,823 (38)	448,955 (30)	286,739 (19)	204,383 (13)	0 (0)
80–84	989,003	456,355 (46)	233,503 (24)	258,379 (26)	21,554 (2)	19,212 (2)
85 or Older	786,593	398,485 (51)	248,745 (32)	91,118 (12)	48,245 (6)	0 (0)
Race/ethnicity:						
Non-Hispanic white	7,662,444	2,759,807 (36)	1,914,582 (25)	1,909,818 (25)	912,041 (12)	166,196 (2)
Non-Hispanic black	386,480	212,544 (55)	74,408 (19)	45,752 (12)	53,776 (14)	0 (0)
Mexican-American	230,567	89,173 (39)	73,734 (32)	26,952 (12)	40,708 (18)	0 (0)
Other Hispanic	468,823	77,927 (17)	315,040 (67)	7,880 (2)	67,976 (14)	0 (0)
Other race	181,229	116,136 (64)	30,657 (17)	26,313 (15)	8,123 (4)	0 (0)
Education:						
Less than high school	2,692,649	1,381,281 (51)	566,047 (21)	463,584 (17)	281,737 (10)	0 (0)
High school	3,484,970	1,104,097 (32)	730,106 (21)	1,040,720 (30)	510,224 (15)	99,823 (3)
More than high school	2,725,611	770,209 (28)	1,112,268 (41)	486,098 (18)	290,663 (11)	66,373 (2)
Refused	26,313	0 (0)	0 (0)	26,313 (100)	0 (0)	0 (0)
PIR:						
0	31,876	0 (0)	0 (0)	31,876 (100)	0 (0)	0 (0)
Less than 1	1,116,508	541,675 (49)	182,029 (16)	241,012 (22)	151,792 (14)	53,823 (2)
1.00–1.84	2,193,641	810,902 (37)	668,567 (30)	394,473 (18)	265,876 (12)	53,823 (2)
Greater than 1.84	3,538,606	988,094 (28)	1,110,863 (31)	952,372 (27)	374,904 (11)	112,373 (3)
Refused	759,112	274,391 (36)	150,098 (20)	143,238 (19)	191,385 (25)	0 (0)
Unknown	741,618	325,985 (44)	140,318 (19)	186,751 (25)	88,564 (12)	0 (0)
Missing	548,182	314,540 (57)	156,546 (29)	66,993 (12)	10,103 (2)	0 (0)

The data in this table are based on question KIQ.060: "How frequently does this (referring to KIQ.040) occur? Would you say this occurs. . .every day, a few times a week, a few times a month, or a few times a year?" Source, National Health and Nutrition Examination Survey, 1999–2000.

old to 55% for those 80 to 90 years old.[13] Although other published prevalence estimates of incontinence show a wide range, the median of those estimates is similar to that of our findings.[6,7] Median level estimates give a picture of increasing prevalence during young adult life (20% to 30%), a broad peak around middle age (30% to 40%) and then a steady increase in the elderly (30% to 50%).





A, difficulty controlling bladder among female respondents. *B*, frequency of incontinence episodes among female respondents who answered yes to difficulty controlling bladder. From National Health and Nutrition Examination Survey, 1999-2001.

Second, we found a higher prevalence in white women compared to those of other racial or ethnic groups. Other large population based studies have also reported higher rates of urinary incontinence among non-Hispanic white people.[14,15] In a large cohort of women enrolled in the Health and Retirement Study, a longitudinal study that surveys more than 22,000 Americans older than age 50 every 2 years, non-Hispanic black women and Hispanic women were 60% less likely to have severe incontinence than were non-Hispanic white women.[1,15]

In a study of patients referred for evaluation of incontinence or prolapse, incontinent white women had a prevalence of pure stress incontinence 2.3 times that of incontinent black women.[7,16] In a comparative urodynamic evaluation of 183 black and 132 white women, white women were found to have lower urethral closure pressures or weaker urethras compared to black women.[17] In contrast, black women with a history of uterine leiomyomata have a 1.8-fold increased risk of urinary incontinence compared to white women with leiomyomata.[14] In addition, statistically controlling for parturition variables has been shown to reduce the effect of race on urinary incontinence.[7,18] These findings demonstrate the need for better understanding of the complex nature of the relationship between urinary incontinence and ethnicity.[14]

Third, women with less than a high school education were less likely to report incontinence than women with at least a high school education. Similarly, women below the poverty level were less likely to report incontinence than those at or above the poverty level. Whether these socioeconomic differences in prevalence are due to underreporting among women of lower socioeconomic status, differences in partu-

rition variables, effects related to racial group differences or other confounding factors is presently unknown.

Although the community based prevalence of incontinence is high, the percentage of women who seek outpatient care for incontinence may be much lower. In fact, data from the Veterans Health Administration revealed that urinary incontinence as a percentage of any diagnosis was present in only 3.8% of all female veterans accessing outpatient health services.[1] Similarly a Dutch national postal questionnaire survey found that only 38% of incontinent women had seen a physician for their incontinence.[19] These proportions are substantially lower than the rates of incontinence reported in population based surveys, suggesting that the majority of women with incontinence do not seek medical care for it.[1] Given the large number of women affected by urinary incontinence, future efforts are needed to encourage earlier treatment.

The data from NHANES are unique in that they allow for nationally representative estimates of the prevalence of certain urological conditions. However, similar to many population based surveys, there are limitations to NHANES. Self-reporting of incontinence episode frequency is subject to recall error. Also, this survey asked about relatively few urological conditions. By simply asking whether subjects had difficulty controlling their bladders, there was no differentiation between stress incontinence and urge incontinence symptoms. Rather the 2 conditions, which are quite different entities, were grouped together. In addition, important etiological factors such as parity, history of vaginal delivery, body mass index and chronic medical illness were not analyzed in our study.

CONCLUSIONS

Unlike many other studies the NHANES draws a nationally representative sample of subjects in the community and, thus, provides prevalence data on urinary incontinence for all women in the United States. Prevalence is high, and varies with age, race/ethnicity and socioeconomic variables.

Abbreviations and Acronyms

NHANES	=	National Health and Nutrition Examination Survey
PIR	=	poverty income ratio
UI	=	urinary incontinence

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